The prehistoric inhabitants of the Wadi Howar

An anthropological study of human skeletal remains from the Sudanese part of the Eastern Sahara

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Volume I

Abstract

The prehistoric inhabitants of the Wadi Howar - An anthropological[1] study of human skeletal remains from the Sudanese[2] part of the Eastern Sahara

All currently available human skeletal remains from the Wadi Howar (Eastern Sahara, Sudan) were employed in an anthropological study. The study's first aim was to describe this unique 5th to 2nd millennium BCE material, which comprised representatives of all three prehistoric occupation phases of the region. Detecting diachronic differences in robusticity, occupational stress levels and health within the spatially, temporally and culturally heterogeneous sample was its second objective. The study's third goal was to reveal metric and non-metric affinities between the different parts of the series and between the Wadi Howar material and other relevant prehistoric as well as modern African populations. The research strategy adopted to achieve these three aims and to surmount the limitations imposed by the small size of the sample and the material's extraordinarily poor state of preservation was to apply simple, well-established methods to as broad a range of pertinent metric and non-metric traits as possible.

The reconstruction and comprehensive osteological analysis of 23 as yet unpublished individuals, the bulk of the Wadi Howar series, constituted the first stage of the study. The analyses focused on each individual's in situ *position, state of preservation, sex, age at death, living height, living weight, physique, biological ancestry, epigenetic traits, robusticity, occupational stress markers, health and metric as well as morphological characteristics. Building on the results of these efforts and the re-examination of the rest of the material, the Wadi Howar series as a whole, altogether 32 individuals, could be described. All gathered data were summed up and remarkable observations were highlighted. The occurrence of unusual* in situ *positions and post-depositional movements, the widespread and severe* post mortem *damage, a number of pseudopathologies, the leptosome physique, the tropically adapted body proportions, the long and high* Crania[3]*, the biologically sub-Saharan nasal morphology, the marked alveolar prognathism, the strikingly high mandibular symphyses (*Symphyses mandibularum*), the extremely large teeth, an Inca bone (*Os incae*), a large parastyle (*Tuberculum paramolare*), a peg-shaped upper third molar (*Dens molaris superior III*), paranasal as well as intertrochlear foramina (*Foramina paranasalia et intertrochlearia*), the antebrachial and femoral shaft bowing, the interosseous border (*Margo interosseus*) and pilaster sizes, the cranial and cervical occupational stress markers, the advanced, anterior, labial, notched, angled and cupped dental wear, the occupational stress markers of the bones of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*), the physiological medullary stenosis of a number of long bones, the advanced thinning of a frontal bone (*Os frontale*), patches of small lesions on*

[1] The term anthropology was employed to refer to the comparative biological science usually called biological or physical anthropology in English-speaking countries (e.g. Grupe *et al*. 2005; Hoßfeld 2005: 15-50; Knußmann 1988(a), 1996: 1-6; Schwidetzky 1988; Susanne 1987).

[2] This thesis was written prior to the independence of the Republic of South Sudan. The terms Sudanese and Sudan, by themselves or in combination with geographic adjectives such as Northern, Southern, Central, etc., were used accordingly.

[3] Both anglicised and internationally accepted original *Nomina anatomica* terms were provided throughout this thesis. Whenever names coincided only *Nomina anatomica* terms were given (Federative Committee on Anatomical Terminology 1998; Feneis 1993; Feneis/Dauber 2000).

*the outer surface (*Tabula externa*) of a parietal bone (*Os parietale*), an ossified structure on the inner surface (*Tabula interna*) of a parietal bone (*Os parietale*), a parietal bone (*Os parietale*) with depressions, the artificial removal of incisors (*Dentes incisivi*), the common and often pronounced enamel hypoplasia, a cervical vertebra (*Vertebra cervicalis*) with osteolytic lesions and the cases of tooth crowding and crown compression were given special attention in this context.*

The attempts to determine the amount of intra-observer error showed that a few differences between original and control data were significantly different from zero. However, the absolute maximum and mean differences between the data in question were either negligible or caused by the discrepancies between laboratory estimates and in situ *measurements of long bone lengths. Furthermore, no original and control data differed significantly or in tendency from each other.*

*A wide variety of robusticity, occupational stress and health variables was evaluated. The pre-Leiterband (hunter-gatherer-fisher/hunter-gatherer-fisher-herder) and the Leiterband (herder-gatherer) data of over a third of these variables differed statistically significantly or in tendency from each other. The most pronounced diachronic differences were discovered when cranial thickness measurements, robusticity and stress traits of the occipital region (*Regio occipitalis*) and the mandible (*Mandibula*), combined musculoskeletal stress markers, overall and anterior dental abrasion scores, enamel hypoplasia data, cortical thickness measurements, shaft bowing and interosseous border (*Margo interosseus*) size scores of the bones of the upper free extremities (*Partes liberae membrorum superiorum*) and the mean adult ages at death were compared. The Leiterband sub-sample was characterised by higher enamel hypoplasia frequencies, lower mean ages at death and less pronounced expressions of occupational stress traits. This pattern was interpreted as evidence that the adoption and intensification of animal husbandry did probably not constitute reactions to worsening conditions. Apart from that, the relevant observations, noteworthy tendencies and significant differences were explained as results of a broader spectrum of pre-Leiterband subsistence activities and the negative side effects of the increasingly specialised herder-gatherer economy of the Leiterband phase.*

Using only the data which could actually be collected from it, multiple, separate, individualised discriminant function analyses were carried out for each Wadi Howar skeleton to determine which prehistoric and which modern comparative sample it was most similar to. The results of all individual analyses were then summarised and examined as a whole. The classification patterns which became apparent during this process could subsequently be interpreted. Thus it became possible to draw conclusions about the affinities the Wadi Howar material shared with prehistoric as well as modern populations and to answer questions concerning the diachronic links between the Wadi Howar's prehistoric populations. When the Wadi Howar remains were positioned in the context of the selected prehistoric (Jebel Sahaba/Tushka, A-Group, Malian Sahara) and modern comparative samples (Southern Sudan, Chad, Mandinka, Somalis, Haya) in this fashion three main findings emerged. Firstly, the series as a whole displayed very strong affinities with the prehistoric sample from the Malian Sahara (Hassi el Abiod, Kobadi, Erg Ine Sakane, etc.) and the modern material from Southern Sudan and, to a lesser extent, Chad. Secondly, the pre-Leiterband and the Leiterband sub-sample were closer to the prehistoric Malian as well as the modern Southern Sudanese material than they were to each other. Thirdly, the group of pre-Leiterband individuals approached the Late Pleistocene sample from Jebel Sahaba/Tushka under certain circumstances. A theory offering explanations for these findings was developed. According to this theory, the entire prehistoric population of the Wadi Howar belonged to a Saharo-Nilotic population complex. The Jebel Sahaba/Tushka population constituted an old Nilotic and the early population of the Malian Sahara a younger Saharan part of this complex. The A-Group, on the other hand, was not a Saharo-Nilotic population. The pre-Leiterband groups probably colonised the Wadi Howar from the east, either during or soon after the original Saharo-Nilotic expansion.

Consequently, they retained stronger affinities with the Late Pleistocene Jebel Sahaba/Tushka population from the eastern Saharo-Nilotic periphery. Unlike the pre-Leiterband groups, the Leiterband people originated somewhere west of the Wadi Howar. They entered the region in the context of a later, secondary Saharo-Nilotic expansion. In the process, the incoming Leiterband groups absorbed many members of the Wadi Howar's older pre-Leiterband population. The increasing aridification of the Wadi Howar region ultimately forced its prehistoric inhabitants to abandon the wadi. Most of them migrated south and west. They, or groups closely related to them, were the ancestors of the majority of the Nilo-Saharan-speaking pastoralists of modern-day Southern Sudan and Eastern Chad.

Finally, a detailed and contextualised report of the undertaken research and its results was produced. The first part of this report was used to provide an outline of the study and an overview of the relevant anthropological, archaeological, historical and ethnographic context. The material which formed the basis of the study and the methods which were employed to analyse it were introduced in the second part. In the third part, the results of the analyses were summarised. After offering interpretations of the results, the material, the methods, the results and their interpretations were discussed in the fourth and final part of the report.

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I. Introduction

Chapter synopsis

A short general introduction was provided (see I.A.). The aims of the study and the research strategy were outlined (see I.B.). Describing the Wadi Howar material osteologically and extracting as much relevant biological information from each individual as possible was the first major objective of the study. Detecting diachronic differences in robusticity, occupational stress levels and health between the different parts of the sample constituted the second main goal. Exposing the biological connections between different parts of the series and the affinities between the Wadi Howar material and other relevant prehistoric as well as modern African populations was the study's third and final principal aim. The discussion and contextualisation of the material, methods, results and interpretations were considered a separate, additional goal in its own right. The research strategy was clearly defined. Consequently, only those methods which were deemed to be best suited to achieving the research objectives were selected. Moreover, the methods had to meet three additional requirements. Firstly, they had to be valid, objective, reliable and well-established. Secondly, they had to be able to surmount the material's limitations. Thirdly, they had to be as time- and cost-efficient as possible.

The main features of the geography and climate of the Wadi Howar region were summarised (see I.C.1.). The wadi lies in the southern part of the Sudanese Sahara. It stretches from the border between Chad and Sudan to the Nile Valley. Its course can be divided into the Upper, the Middle and the Lower Wadi Howar. Today, the Wadi Howar region can be described as a desert. However, the area was much more humid in the past. The wadi and its surroundings were characterised by fairly wet conditions during the Early and Middle Holocene. After this period, the area became increasingly arid.

A brief sketch of the history of the research focusing on the Wadi Howar region was given (see I.C.2.). The remote region received almost no attention until the 1980s. From then on, until 2006, successive archaeological and geographical DFG *projects intensively studied the wadi and its prehistory.*

An overview of the most important aspects of the archaeological context was presented (see I.C.3.). The Wadi Howar witnessed three main occupation phases. Hunter-gatherer-fishers who used pottery and grinding stones inhabited the area during the Wavy Line/Laqiya phase (ca. 5000-4000 calBCE). The Leiterband/Herringbone phase (ca. 4000-2200 calBCE) was the period of the cattle herder-gatherers. The people of the Handessi phase (ca. 2200-1100 calBCE) were primarily keepers of small livestock who also hunted and gathered. The occupation phases were not only associated with different subsistence strategies but also with different climatic conditions, settlement patterns, artefacts and contact networks. The sites where the Wadi Howar material was excavated were introduced (see I.C.3.b.). Abu Tabari 02/1 (ca. 3870-3665 calBCE), a site most likely used by pastoralists for whom fishing, hunting and gathering were still of vital importance, and Abu Tabari 02/28 (ca. 3000 calBCE), a site most likely used by highly specialised cattle herders, are the most important ones of these sites.

The results of the previous anthropological research on human remains from the Wadi Howar were summed up (see I.C.4.). Henke et al. *(2002) drew attention to a dichotomy between the older, more robust, and the younger, more gracile, skeletal material which was available in 2002. They also highlighted evidence suggestive of affinities with Late Pleistocene series from Nubia and modern, biologically sub-Saharan groups. The author (2005, in press) updated the preliminary description of the,* *by 2007 considerably larger, sample and put two interconnected hypothesis forward. The first hypothesis stated that the prehistoric inhabitants of the Wadi Howar were part of a biologically sub-Saharan population complex which was ancestral to the majority of the contemporary Southern Sudanese Nilo-Saharan speakers. Furthermore, the first hypothesis assumed that this population complex also included Late Pleistocene Nubians and certain "Meso-" and Neolithic groups of the Sudanese Nile Valley. The second hypothesis stated that the morphological differences between the members of this continuous population complex were primarily the result of a diachronic decrease in overall robusticity. Isotope analyses carried out by Schmitz (2008) revealed that, unlike the younger parts, the older parts of the Wadi Howar sample had fairly heterogeneous* $\delta^{13}C$ *values and that several specimens, primarily pre-Leiterband individuals, had* $^{87}Sr/^{86}Sr$ *values which were classified as probably or definitely "non-local". Inspections of the remains by Prof. Dr. J. Burger confirmed that any attempts to extract DNA from them would be futile.*

The remaining part of the introduction chapter was dedicated to establishing the broader anthropological, linguistic, historical and ethnographic context (see I.D.). The anthropological contextualisation was achieved by outlining the results of the osteological, isotope and genetic studies pertinent to questions concerning the biological characteristics of the prehistoric populations of the Sahara and the Sudanese Nile Valley (see I.D.1.). An overview of the relevant skeletal series and the research on their robusticity, stress markers, health and biological affinities was complied (see I.D.1.a.). The numerous studies which have exposed diachronic robusticity, stress and health changes in the Nile Valley formed one main focus. The models which have been proposed to explain the population history of the Nubian Nile Valley and the Sahara formed the other main focus. Especially Chamla's (1968) classification of the early Saharan material, the so-called Saharan "Mechtoids" and the competing theories suggesting either in situ *evolution or combinations of migration, gene flow and continuity as the main mechanisms of change in the Nubian Nile Valley were given attention. Various publications on isotope analyses which have uncovered evidence of the changing dietary importance of* C_4 *plants and migration as well as residence patterns were reviewed (see I.D.1.b.). As far as DNA analyses were concerned, five points were particularly emphasised (see I.D.1.c.). Firstly, the reliability of aDNA analyses of material from the Sahara or the Nile Valley is highly questionable. Secondly, analyses of modern DNA are unable to make meaningful contributions to the positioning of prehistoric populations without known descendants. Thirdly, the few studies on modern groups from the Eastern and Central Sahara suggest fairly close connections between these groups and various East African populations. Fourthly, the genetic landscape of the Nile Valley is characterised by clines which connect the populations of the delta to those from Central Sudan. Fifthly, the modern Southern Sudanese groups form a distinct, separate cluster.*

Linguistic publications attempting to reconstruct the past of the Sahara and the Nile Valley were presented (I.D.2.a.). Examples of languages belonging to the Nilo-Saharan and the Afro-Asiatic phylum were given and the current geographic distributions of the phyla outlined. The likely homelands and expansion histories of the groups speaking Nilo-Saharan and the Afro-Asiatic proto-languages were reported. Moreover, the information value of lexical roots relating to subsistence and other everyday activities associated with specific proto-languages was highlighted. Most importantly, the linguistic models in which the Wadi Howar plays a central role were touched upon. Dimmendaal's (2007(a)) "Wadi Howar Diaspora" model assumes that a considerable number of Eastern Sudanic-speaking groups left the Wadi Howar in response to the aridification of this refugial area. Rilly (2004) suggested a similar scenario and cited the ancestors of the speakers of Meroïtic as one of the groups originating in the Wadi Howar. Blench's (1999) "Inter-Saharan Hypothesis" proposes that the ancestors of the speakers of proto-Chadic migrated from the Nile Valley through the Wadi Howar to the Chad Basin.

The unique insights analyses of Saharan rock art offer were explored (see I.D.2.b.). After introducing the commonly employed classificatory frameworks, examples of petroglyphs and pictographs illustrating prehistoric activity patterns and the population history of the Sahara were compiled. Special emphasis was placed on the fact that the pictured groups could often be unambiguously classified as biologically North African, sub-Saharan or "mixed". Finally, the engravings which have been discovered in the Wadi Howar region, i.e. in the vicinity of the Gala Abu Ahmed and at Zolat el Hammad, were mentioned.

An evaluation of studies of Ancient Egyptian, classical and more recent historical sources containing information pertaining to the activities, appearance, origin and fate of the peoples of the Sahara and the Sudanese Nile Valley was attempted (see I.D.2.c.). It was deemed to be most noteworthy that Ancient Egyptian and classical texts and artistic representations suggest that the Nubians were not a homogeneous group, that the populations living south and west of Nubia were fully biologically sub-Saharan and that countless groups from the desert either tried to or actually did enter the Nile Valley.

Eastern and Southern African foragers were considered appropriate models for the Wavy Line/Laqiya phase hunter-gatherer-fishers, Southern Sudanese mixed economy pastoralists for the Leiterband phase herder-gatherers and Eastern Saharan, Eastern Sahelian and East African pastoralists for the Handessi phase small livestock keepers (see I.D.2.d.). Accounts containing facts about the everyday activities, nutrition, health, group interactions, history, cultural practices and funerary customs of the selected groups were systematically summed up. The picture which emerged in the course of this process was striking. The actual composition of diets, the dissimilar workloads, the different mobility levels, the social importance of livestock, the irrational attitudes towards other groups and their lifestyles, the omnipresence of inter-tribal violence, the mechanisms facilitating the integration of members of other groups and the countless cultural practices which appear to have persisted for millennia were regarded as particularly enlightening.

I.A. General introduction

Even though the Neolithic transition has formed an important focus of anthropological as well as archaeological research for decades, many aspects of this complex and regionally highly variable process remain controversial (e.g. Blench/MacDonald 2000; Cohen/Armelagos 1984; Diamond/Bellwood 2003; Gallagher *et al*. 2009; Larsen 1995; Pinhasi/Cramon-Taubadel 2009; Rowley-Conwy 2009; Wood *et al*. 1992). Two central questions, which need to be answered for any geographic region under study, focus on the continuity of local populations and the biological impact the shift from an extracting to a producing subsistence economy had on the people involved. Did migrating populations associated with the new technology partly or wholly replace autochthonous foragers or did local groups merely adopt a new subsistence system? Did the new economy improve the quality of life or did it increase workloads, heighten overall stress levels and make populations more susceptible to disease? Because different types of finds allow us to reconstruct different parts of the past, these questions cannot be answered by studying what archaeological studies focus on: traces of human activities. Artefacts offer opportunities to draw conclusions about past cultures. The inferences concerning the bearers of these cultures, one can make on this basis, are, however, rather limited. It is only by analysing human skeletal remains that we can gather reliable information about the people themselves and attempt to determine if local pre- and post-Neolithic transition populations were linked by biological continuity and if the economic shift improved or worsened their lives.

Given that it constituted an, at times, refugial corridor connecting the Nile Valley to the Chad Basin, it is hardly surprising that the Wadi Howar is considered a likely key crossroads region of Early and Middle Holocene Africa. Bearing this, the complex and still extremely poorly understood population history of the Sahara as well as the often far-reaching consequences Saharan developments had for Nubia and Egypt in mind, it is difficult to overestimate the value of any anthropological material from this area (e.g. Bechhaus-Gerst 2000; Becker 2008, in press; Blench 2006: 159-162; Caneva 1996; Chamla 1968, 1986; Dimmendaal 2007(a); Dutour *et al*. 1994; Friedman 2002; Hassan 1988; Irish/Turner 1990: 50; Jesse 2003(b), 2006(b); Keding 1997(a), 2009: 290-447; Keita/Boyce 2005; Kröpelin 2007(c); Kuper 1988; Kuper/Kröpelin 2006; Lange 2005: 18; MacDonald 1998: 41; Pachur/Altmann 2006: 238-244; Pachur/Kröpelin 1987; Petit-Maire/Dutour 1987; Rilly 2004, 2010; Seidlmayer 2002). Yet, although some preliminary results of the examination of a part of the sample had already been published and the material was to be subjected to systematic isotope analyses at a later point in time, no comprehensive osteological investigation of the human remains recovered in the Wadi Howar had been conducted when the current study was embarked upon (Henke *et al*. 2002; Schmitz 2008). Describing this exceptional material, uncovering in which respects the adoption of new subsistence strategies in an increasingly arid environment affected this specific sample and positioning it biologically in the context of other prehistoric and contemporary African groups could thus be regarded as a scientifically in every respect worthwhile undertaking. It was clear that such a project would not only advance the study of the anthropological aspects of the Neolithic transition in a critical part of Africa but also make a potentially invaluable contribution to the reconstruction of the population history of the Sahara and Northeast Africa.

I.B. Outline

I.B.1. Research objectives

Reconstructing the skeletal remains of 23 as yet unpublished individuals, subjecting them to a comprehensive osteological analysis and providing an anthropological description of the entire Wadi Howar sample were the initial objectives of the project. The results of these initial analyses and data collected from various comparative samples were intended to be used in subsequent attempts to identify diachronic differences within the Wadi Howar sample and to test a number of hypotheses concerning the biological connections between different parts of the series and between the Wadi Howar material and other relevant prehistoric as well as modern African populations. The final aim was to critically discuss the material, the methods, the results and the interpretations against the background of the pertinent literature.

I.B.1.a. Individual analyses

Cleaning the main part of the series and reconstructing the preserved parts of the bones and teeth of the 23 individuals it comprised were the prerequisites for all later analyses. Accomplishing this task therefore constituted a key objective of this part of the study. Subsequently, each reconstructed skeleton was to be individually analysed. The aim was to describe each skeleton's *in situ* position and state of preservation, to estimate its sex, age at death, height, weight, physique and biological ancestry, to evaluate its occupational stress markers, to make palaeopathological diagnoses and to document its metric as well as non-metric characteristics. The approach, which was considered to be most likely to make it possible to extract as much relevant biological information from each individual as possible throughout this process, was to use as wide a range of normal and modified standardised morphological and metric techniques as necessary to overcome the limitations imposed by the material's extremely poor state of preservation (e.g. Aufderheide/Rodríguez-Martín 1998; Bass 1987; Bräuer 1988; Brothwell 1981; Buikstra/Ubelaker 1994; Ferembach *et al*. 1979; Gill/Rhine 1990; Hauser/De Stefano 1989; Hawkey/Merbs 1995; Hemmer 2007; Herrmann *et al*. 1990; İşcan *et al*. 2000; Kunter 1988; Lahr 1996; Martin 1928; Ortner/Putschar 1981; Rösing 1988; Rösing *et al*. 2007; Sjøvold 1988; Schultz 1988; Szilvássy 1988; Ullrich 1966; White 2000; Wilczak/Kennedy 1998).

I.B.1.b. Group analyses

I.B.1.b.1. Description of the sample

The goal of this stage of the project was to characterise the altogether 32 individuals strong Wadi Howar series as a whole, including the 8 previously published individuals that were recovered from 5th to 2nd millennium BCE sites between 1980 and 1999 (Becker in press; Henke *et al*. 2002). An overview was to be compiled to summarise and statistically describe both the basic anthropological information established in the course of the individual osteological analyses and the metric as well as non-metric data which had been gathered additionally (e.g. Drenhaus 1988; Hoppa/Vaupel 2002; Knußmann 1988(d); Madrigal 1998).

I.B.1.b.2. Diachronic differences

The aim of the intra-sample comparisons was to determine if it would be possible to identify diachronic differences in robusticity, occupational stress levels and health. Differences which could have been caused by the growing reliance on animal husbandry and the increasing aridification would be of particular interest. It was concluded that, ideally, as many different types of relevant data as possible, such as robusticity measurements, evaluation scores of cranial as well as postcranial robusticity traits and muscle attachment sites, age at death, height and weight estimates and dental abrasion and enamel hypoplasia scores, should form the basis of these analyses (e.g. Bräuer 1988; Ferembach *et al*. 1979; Hawkey/Merbs 1995; Hemmer 2007; Lahr 1996; Martin 1928; Rösing 1988; Ruff *et al*. 1984; Schultz 1988; Smith 1984; Szilvássy 1988). Statistically, the comparison of the pre-Leiterband (hunter-gatherer-fisher/hunter-gatherer-fisher-herder) and the Leiterband (herder-gatherer) sub-sample was to be accomplished variable by variable, employing Mann-Whitney U and χ^2 tests (e.g. Mann/Whitney 1947; Pearson 1900; Yates 1934).

I.B.1.b.3. Metric and non-metric affinities

The two questions the inter-sample comparisons were designed to answer were: "Which relevant prehistoric and modern African groups did the ancient inhabitants of the Wadi Howar share the greatest metric and non-metric affinities with?" and "Was the Wadi Howar sample drawn from a continuous population, a succession of different populations associated with the documented archaeological changes or a number of "mixed" populations?"

Methodologically, the comparisons were envisaged as a two-stage process. Firstly, using only the data actually collected from an individual in question, each Wadi Howar skeleton would be considered most similar to that comparative sample into which it was most frequently placed when entered into separate, individualised discriminant function analyses as an ungrouped case (e.g. Barnard 1935; Fisher 1936; Mahalanobis 1936). Secondly, the overall pattern in which the separate Wadi Howar individuals were going to be classified would be interpreted. The classification frequencies were also to be examined with χ^2 tests to detect significant differences between the sub-samples (e.g. Pearson 1900; Yates 1934). It was clear that a large body of cranial as well as dental metric and non-metric comparative data, consisting of variables shown to be reliable predictors of biological ancestry, would be required in this context (e.g. Gill 1998; Gill/Rhine 1990; Hanihara/Ishida 2005; Irish 1997; İşcan *et al*. 2000; Ousley *et al*. 2009; Turner *et al*. 1991; Weinberg *et al*. 2005). The necessary data would have to be collected from material representing both prehistoric groups encountered at Saharan and Nile Valley sites, such as Hassi el Abiod, Kobadi, Jebel Sahaba and the A-Group Site 277, and relevant modern populations, such as the Southern Sudanese Fur and Masalit, Chadian Tubu and Kanembu, West African Mandinka, East African Haya and Northeast African Somalis.

I.B.1.c. Discussion

Presenting a summary of the relevant anthropological, archaeological, ethnographic, historical as well as linguistic context and discussing the results of the study, the manner in which they were achieved and their interpretations critically against the background of the pertinent literature were seen as important objectives. It would have clearly been a serious flaw not to draw attention to possible sources of error, identified shortcomings, encountered problems and the difficult decisions which shaped the project. There could be no doubt that the most parsimonious interpretations, suggested by the results alone, had to be put forward first. Nevertheless, not evaluating their credibility in the light of all available information or failing to, if necessary, offer alternative explanations would have rightfully been perceived as another inexcusable deficit. Not least because of the importance attached to this part of the thesis, it was decided to strictly limit all contextualised evaluations to the appropriate sections of the discussion chapter.

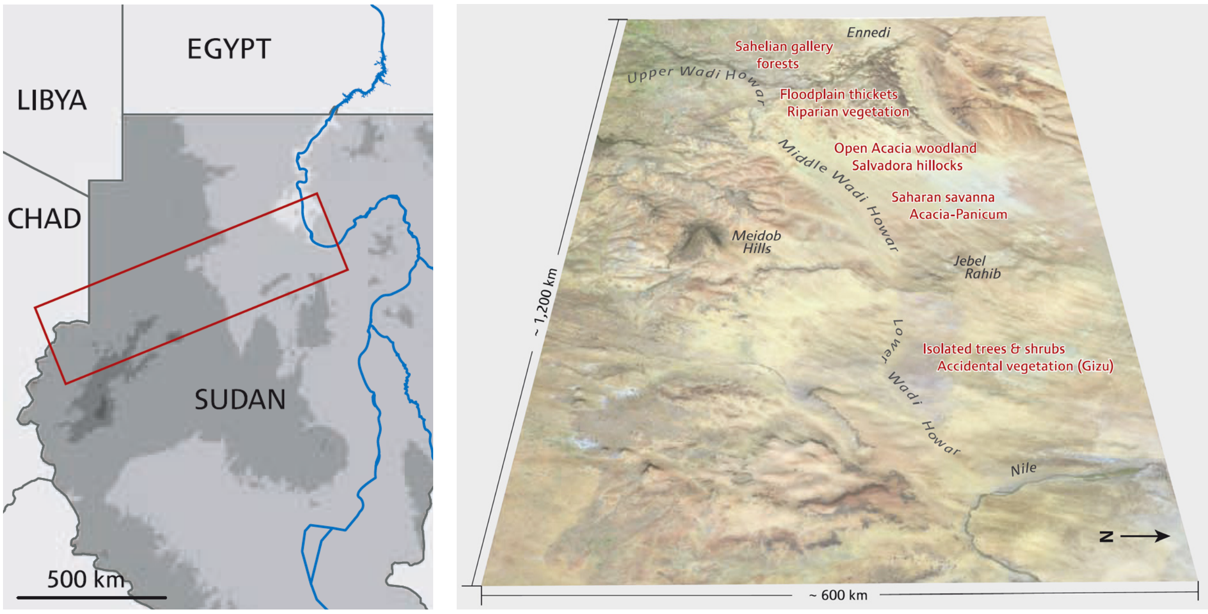
I.B.2. Research strategy

In view of the nature of the material, it was apparent from the outset that technology-laden methods, like aDNA and isotope analysis or geometric morphometrics and cross-sectional morphology analysis, would be inapplicable, unable to answer the questions posed by the study or outcompeted by equally reliable but simpler observational and metric techniques (e.g. Grupe *et al*. 2005; Pääbo *et al*. 2004; Stock/Shaw 2007; Weber/Bookstein 2007). These traditional methods would not only be much faster and cheaper to use but also able to produce much more relevant information. Only by collecting a wide variety of macroscopically collectable data and by employing a large number of different osteological methods would it be possible to extract a maximum of information from this small and badly preserved sample. Building on this initial decision in favour of methodological simplicity, a step which was in full accordance with the principles of scientific investigation, it was attempted to keep the overall design of the study as simple as possible (e.g. Gauch 2003; Godfrey-Smith 2003; Lienert/Raatz 1998; Losee 2001; Popper 1935; Quine/Ullian 1970). The analyses' transparency and parsimony were to be enhanced by, whenever different approaches would have delivered more or less identical results, deliberately giving preference to well-established, simple and economical methods which generate readily understandable and easily reproducible data. In sum, the overall approach was intended to be time- and cost-efficient, custom-designed to surmount the material's limitations and oriented solely towards answering the research questions.

I.C. The Wadi Howar

I.C.1. The region

I.C.1.a. Geography



(a) (b)

Figure 1: The location of the Wadi Howar (a) and its course (b), with main vegetation types and exaggerated elevations (Nussbaum *et al*. 2007: 40; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The Wadi Howar, sometimes also referred to as the "Yellow Nile", is an almost 1100-km-long dry river system in the Sudanese part of the Eastern Sahara. It lies on the southern fringes of what is traditionally known as the "Libyan Desert". During the Early and Middle Holocene it was the major Saharan tributary to the Nile and served as a corridor connecting the Chad Basin to the Nile Valley. The sources of the ancient river were located in the area between the Jebel Marra in Sudan and the

Ennedi Plateau in Chad. Today's wadi begins its course close to Lake Undur, an episodically flooded area, on the border between Sudan and Chadian (e.g. Kröpelin 1999: 446, 2007(a), 2007(c): 18; Kuper/Kröpelin 2006; Neumann 1989(b): 135; Pachur/Altmann 2006: 238-244; Pachur/Kröpelin 1987: 298). Using hydrological, geomorphologic and geological criteria, the wadi can be divided into the Upper, Middle and Lower Wadi Howar. The Upper Wadi Howar is about 250 km long and runs through the Chadian-Sudanese border region. Its first part, the stretch from Lake Undur to Bahai, is called Wadi Tina. Before it eventually disappears into the desert, the Upper Wadi Howar manifests itself in the shape of deeply incised and, later, shallow plaited channels (e.g. Gabriel *et al*. 1985: 105; Kröpelin 1993: 20, 2007(a), 2007(c): 18-19; Nussbaum *et al*. 2007: 40).

Figure 2: A channel of the Lower Wadi Howar approximately 110 km west of the Nile Valley (A. Gundelwein).

Continuing the course, the ca. 390-km-long Middle Wadi Howar forms a shallow 4 to 10 km wide valley which divides the dune fields of the Erg Ennedi in the north and the Jebel Tageru in the south. It ends where the southern foothills of the Jebel Rahib meet the northern foothills of the Jebel Tageru and the wadi, which is only about 2 km wide at this point, is sealed off by a dune barrier. The subsequent Lower Wadi Howar, which stretches over 400 km from the Jebel Rahib to a point in the Nile Valley slightly north of Debba between the Third and the Fourth Cataract, is a mostly featureless valley lacking easily recognisable banks or channels (e.g. Kröpelin 1993; Meissner/Schmitz 1983; Neumann 1989(b): 34-35; Pachur/Kröpelin 1987: 298).

I.C.1.b. Climate

Presently, average annual rainfall ranges from 300 to 400 mm in the Upper to 20 to 40 mm in the Lower Wadi Howar. The region's flora and fauna vary accordingly. Precipitation in the Lower Wadi Howar, where the vast majority of the human skeletal remains were excavated, is quite irregular and years without rain are not uncommon. This final stretch of the wadi is largely devoid of vegetation but tundub bushes (*Capparis decidua*) and acacia trees (*Acacia tortilis*) are occasionally encountered (e.g. Kröpelin 1999: 450-451; Nussbaum *et al.* 2007; Leroux 1983).

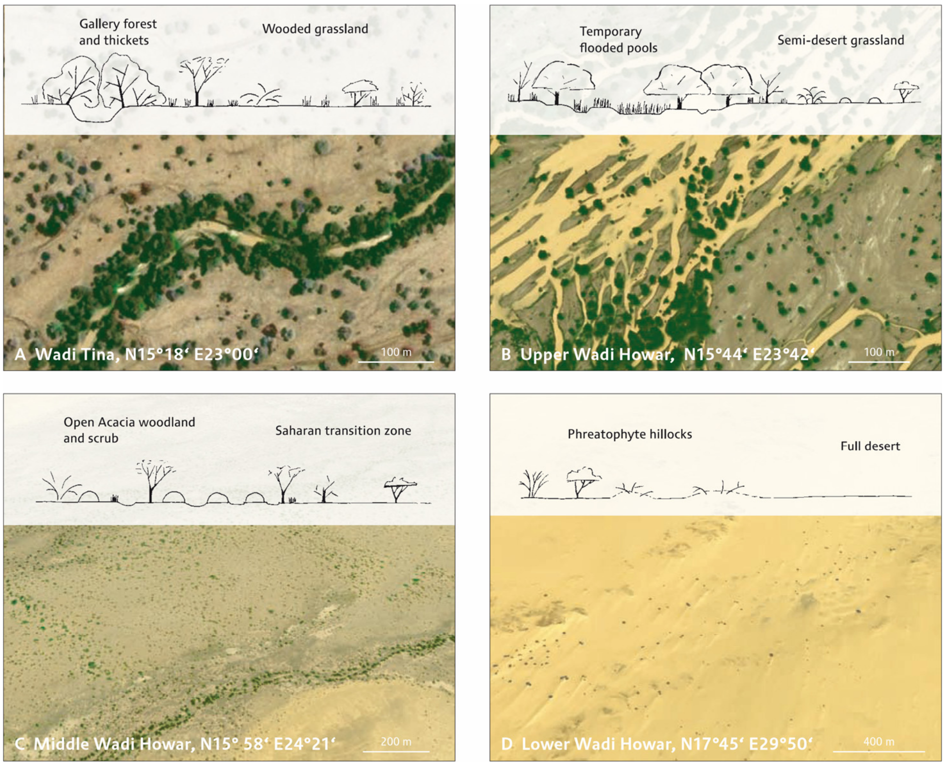


Figure 3: Representative vegetation profiles and satellite views of the different parts of the Wadi Howar (Nussbaum *et al*. 2007: 41; University of Cologne, SFB 389 - ACACIA, *Forschungsstelle Afrika*).

Although certain fluctuations need to be taken into account, climatic conditions in the Wadi Howar were much more favourable during the Early and Middle Holocene. Around 9300 BP the Eastern Sahara witnessed the onset of pluvial conditions when the tropical rainfall belt rapidly expanded as much as 800 km northwards. Due to the shift of vegetation zones, which accompanied this northward expansion of the tropical summer rains, the Wadi Howar was then embedded in a landscape dominated by savannah vegetation of the Southern Sahelian or Sudanese type with broad-leafed trees like *Celtis integrifolia*, *Crateva adansonii* and *Terminalia macroptera*. From this time until around 4000 BP, the wadi itself was most likely a chain of permanent lakes and temporary pools that was only exposed to partial fluvial action after substantial local rainfall. After a number of drier intervals, probably around 8300 BP, 7000 BP and 6000 BP, and another humid phase around 5700 BP, the climate started to get increasingly drier after 5300 BP. During this period the wadi was surrounded by thorn savannah, dominated by *Acacia nilotca*, *Ziziphus sp*. and *Grewia tenax*. Even though around 200 mm of rainfall per year can still be assumed form 4000 to 3000 BP and another brief wet phase can be detected in the Lower Wadi Howar region around 2000 BP, the area slowly turned into a semi-desert and, finally, a desert from 3300 BP onwards (e.g. Besler 2002; Jahns 1995; Kröpelin 1993: 215-216, 234-235, 244-245, 1999: 484, 487, 490; Kröpelin *et al*. 2008; Kuper/Kröpelin 2006; Neumann 1989(a), 1989(b): 140-143; Pachur/Kröpelin 1987: 300).

I.C.1.c. Logistical implications

As a remote, hyper-arid area in the Sudanese Sahara, today, the Lower Wadi Howar is completely uninhabited and only infrequently crossed or visited by humans. Carrying out any type of research in this area constitutes a considerable logistical effort. The University of Cologne's permanent facilities in

Khartoum, their special field equipment and three custom-built cars, fitted with extra diesel and water tanks, solar panels and so forth, were an absolute necessity. All supplies, i.e. the water, food and diesel eight people require during 28 days in the desert, had to be taken along. Consequently, they were restricted to the bare essentials. Reaching the isolated Abu Tabari sites from the Nile Valley took at least two days by car. Additionally, the inconveniences in the field were plentiful. The daily activities, which crossing and working in a most demanding desert environment entailed, could be strenuous. Sandstorms as well as temperatures as high as 45°C during the day and as low as 4°C during the night were encountered. The practically daily occurrence of fierce winds, which often reburied or displaced already exposed bones and at times rendered excavations altogether impossible, were only one noteworthy additional difficulty.

(a)

(b)

(c)

(d)

Figure 4: Photographs taken during the 2006 field season. Setting up a temporary camp (a), extricating a car from soft sand (b), Abu Tabari 02/28-22 reburied by blown-in sand (c) and a sandstorm approximately 150 to 200 km north of the Lower Wadi Howar in the Qa'ab Depression area (d) (a, c, d: A. Gundelwein; b: C. Mischka).

I.C.2. Research history

The Darb el Arba'in lead from Asyut (Middle Egypt) to El Fasher (Darfur, Sudan) and crossed the Middle Wadi Howar west of the Jebel Rahib. Following this caravan route in 1793, W. G. Browne was most likely the first European traveller to set foot in this remote part of the Eastern Sahara. Only considerably later was the area revisited by Europeans when Percival, Whittingham and Coningham crossed the Wadi Howar further east between the Jebel Rahib and Abu Tabari on reconnaissance missions in 1906, 1907 and 1907/1908 respectively. The first western description of the wadi which used its present name was made slightly later by W. J. H. King in 1913: "*The Howar wadi is a long valley, said by the Arabs to be an old watercourse, that runs into the Nile slightly north of Dongola. It is a clay valley with much water in winter, but dry in summer; in places it is as deep and wide as the Nile valley. It is the boundary between the Zaghawa and the Bedayat*" (King 1913: 278). Expeditions in the 1920s and 1930s lead by Maydon, Newbold, Bagnold, Frobenius/Rhotert and Shaw passed through the Middle and, in Shaw's case, also the Lower Wadi Howar. They reported the first archaeological finds, collected information about the wadi's flora, fauna and climate and made further efforts to map the area. After Wakefield had collected some archaeological material in 1941, no further research was carried out in this part of the Sudanese Sahara until the University of Khartoum conducted an archaeological survey in the Middle and Upper Wadi Howar in 1975/1976 (e.g. Bagnold 1931, 1933; Bagnold *et al*. 1933; Browne 1799: 180-215; Frobenius/Rhotert 1934; Hinkel 1979; King 1913; Maydon 1923; Mohammed-Ali 1981, 1982; Newbold 1924; Newbold/Shaw 1928; Shaw 1929: 71; Shaw *et al*. 1936).

The field work the University of Cologne's research project *B.O.S.* ("*Besiedlungsgeschichte der Ostsahara*") undertook in the Wadi Howar between 1980 and 1984 marked the beginning of a period of more intensive and systematic archaeological research. Studies carried out under the umbrella of the Technical University of Berlin's research programme *SFB* 69 (Research in Egypt and Sudan. Special Research Project Arid Areas) in the 1980s also investigated the geomorphology of the Wadi Howar, particularly the Lower Wadi Howar. Archaeological research was further intensified after the A2 project (Wadi Howar. Settlement Area and Thoroughfare at the Southern Margin of the Libyan Desert), part of the more inclusive interdisciplinary research centre "ACACIA - Arid Climate Adaptation and Cultural Innovation in Africa (*SFB* 389)" of the University of Cologne, began its work in 1995. Until 2006, repeated archaeological field work focused on all regions of the Wadi Howar and some neighbouring areas, for example the Jebel Tageru, the Erg Ennedi and the Wadi Hariq. At present, only one *DFG*-funded archaeological project is working in the region: "At the borders of power. The fortress Gala Abu Ahmed in the Lower Wadi Howar, Sudan. A base of Kushite domination". Led by Dr. F. Jesse, the project began its work in 2008, shortly after the ACACIA programme had run out in 2007 (e.g. Hoelzmann *et al*. 2001; Jesse 2003(a), 2006(a); Jesse *et al*. 2004; Jesse/Keding 2007; Jesse/Kuper 2006; Keding 1997(b), 1998, 2000, 2002; Kröpelin 1993; Kuper 1981, 1988, 1995; Lange 2005; Pachur/Altmann 2006: 238-244).

I.C.3. Archaeological context

The over 2400 archaeological sites, which have been recorded in the Wadi Howar to this day, bear witness to a range of human activities in this area throughout the Holocene. Their archaeological activities along the wadi enabled the research programmes *B.O.S*. and ACACIA to document the continuous use of the region from ca. 5000 to at least 1100 calBCE, to establish an archaeological sequence for this period, to analyse the Neolithic transition in the Wadi Howar and to point out various connections with cultures of the Nile Valley and other parts of the Sahara (e.g. Haberlah 2004; Jesse 2003(b), 2006(b); Jesse/Keding 2002, 2007; Keding 1997(a), 1998, 2009: 290-447; Kuper 1988; Lange 2005).

I.C.3.a. Occupation phases

Based on the analysis of the dune habitat Conical Hill 84/24 in the Lower Wadi Howar, a basic pottery sequence could be reconstructed which, using results from Conical Hill 95/4, Dreizack 95/2 and Abu Tabari 97/1, was later completed and found to be valid for the entire Wadi Howar (e.g. Gabriel *et al.* 1985; Jesse 2003(b): 173-174; Jesse/Keding 2007; Keding 1997(a), 2000; Richter 1989).

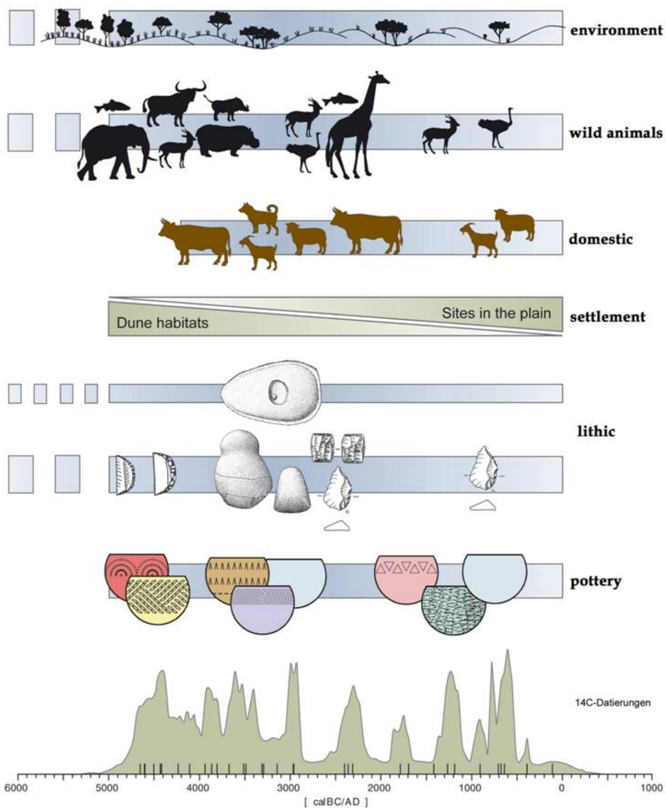


Figure 5: Overview of the cultural and ecological changes in the Lower Wadi Howar (Jesse 2006(a): 45; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The earliest human occupation phase is characterised by Wavy Line and Laqiya pottery (ca. 5000-4000 calBCE). The following Leiterband horizon (ca. 4000-2200 calBCE) is dominated by Leiterband and Halbmond-Leiterband pottery, both of which are often associated with ceramics decorated with Herringbone patterns in the Lower or simple zigzag patterns in the entire Wadi Howar. The last occupation phase corresponds to the Handessi horizon (ca. 2200-1100 calBCE), formerly referred to as the Geometric Pottery horizon, for which pottery with geometric patterns or mat impressions is typical (e.g. Gabriel *et al.* 1985: 108-110; Jesse 2004(b); Jesse/Keding 2002: 280, 2007; Keding 2000, 2009: 290-447; Keding/Vogelsang 2001; Richter 1989: 434-437).

I.C.3.a.1. Wavy Line/Laqiya phase - Hunter-gatherer-fishers

The sites of the Wavy Line/Laqiya phase (ca. 5000-4000 calBCE) are associated with a subsistence based on hunting, fishing and gathering. These sites are predominantly located close to bodies of water. The area's savannah environment during this humid phase with permanent lakes and plentiful local precipitation obviously offered ideal foraging conditions. Dune habitats, also known as "artefact stabilised dunes", were the preferred settlement sites in the Lower Wadi Howar and wadi terraces were often used in the, then swampy, Middle Wadi Howar (e.g. Besler 2002; Gabriel *et al.* 1985; Jesse 2006(a); Keding 2000, 2002: 91; Lange 2005: 17).

(a)

(b)

(c)

(d)

Figure 6: Typical Wavy Line/Laqiya phase artefacts. Pottery fragment with Dotted Wavy Line decoration at the bottom (a), pottery fragment with Dotted Wavy Line decorations at the top and Laqiya decorations at the bottom (b), segments from Erg Ennedi 98/20 (c) and bone harpoons from Jebel Tageru 84/34 (d) (Keding 2009: 295).

The oldest Wavy Line pottery has been recovered from 9th millennium BCE sites in the Central Sahara and the Central Sudanese Nile Valley. Whereas the initially held view that Wavy Line pottery was spread by expanding groups exploiting aquatic resources has been strongly criticised by many authors over the years, it remains a fact that different variants of this trans-Saharan tradition eventually appeared in an area from the Red Sea to the Atlantic and from Northern Kenya to Morocco (e.g. Arkell 1962; Camps 1974; Clark 1980; Edwards 2004: 26, 33; Haaland 1992; Hays 1974; Jesse 2003(b): 283-290, 2004(a); MacDonald 1998: 33-34, 42-43; McIntosh 1993; Mohammed-Ali/Khabir 2003; Sutton 1974).

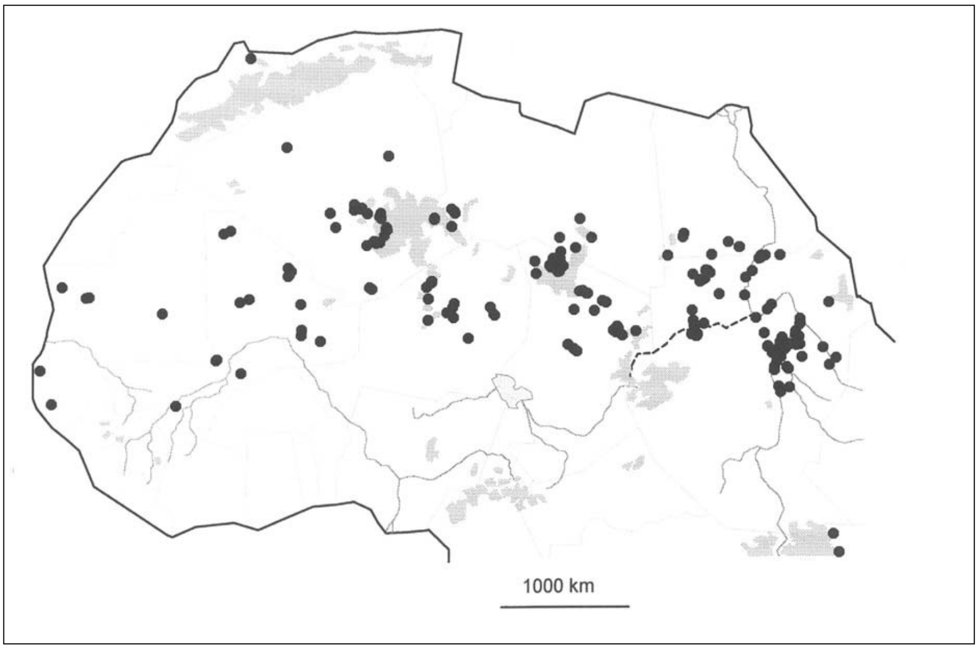
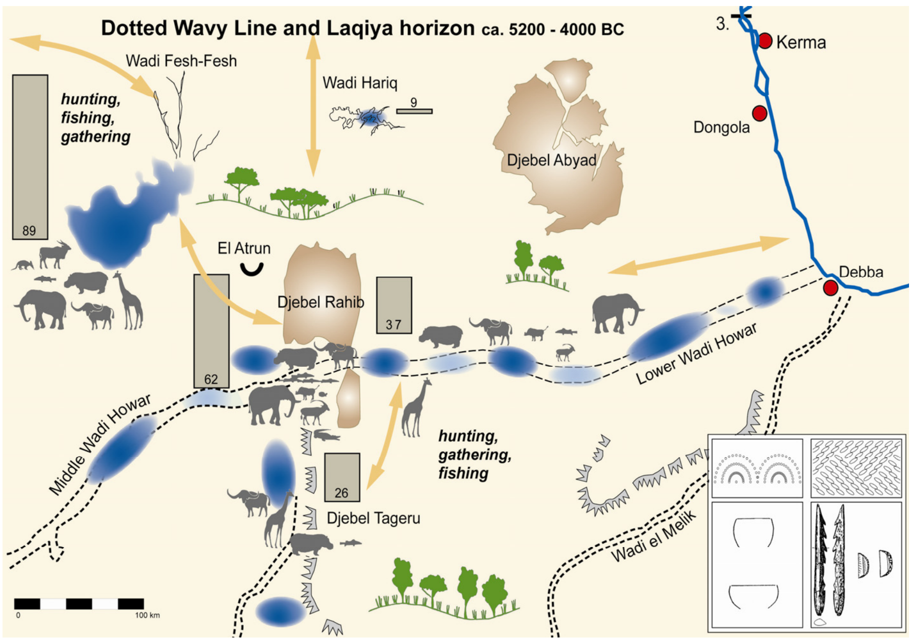
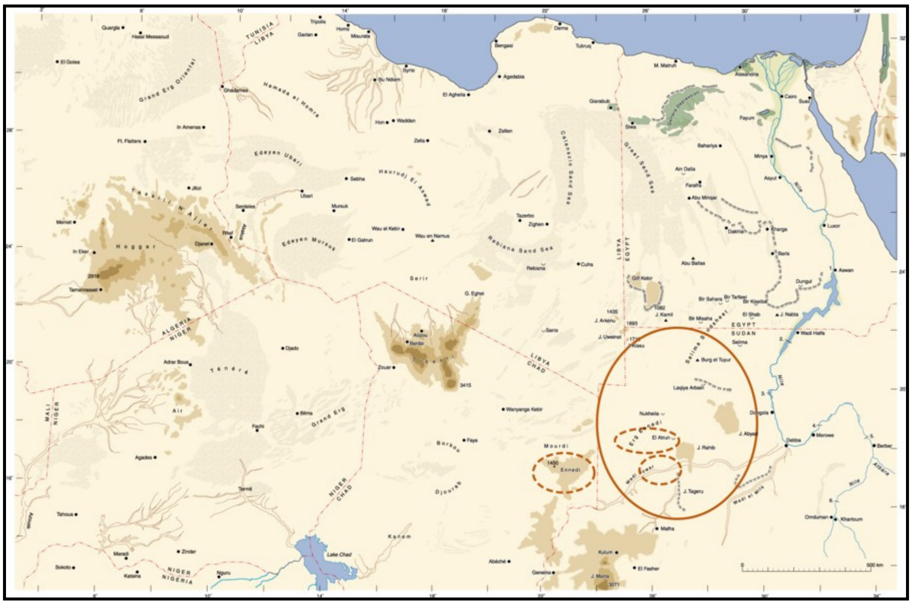


Figure 7: Distribution of Wavy Line pottery sites (Jesse 2004(a): 299).

The 6th and 5th millennium BCE Wavy Line sites, which represent the Wadi Howar's oldest Holocene human occupation, seem to belong to an eastern sub-tradition occupying an area between Northern Chad and the Nile Valley. The slightly younger Laqiya pottery, which is attested from around 5000 BCE onwards and exclusively distributed between the Selima Sandsheet in the north, the Jebel Tageru in the south, the Erg Ennedi in the west and the Lower Wadi Howar in the east, is interpreted as a result of an intensified regionalisation, linking groups which were moving through the region west of the Sudanese Nile Valley (e.g. Jesse 2003(b); Jesse *et al.* 2004: 152-153; Keding 1998; Lange 2006; Schuck 1989).



(a)



(b)

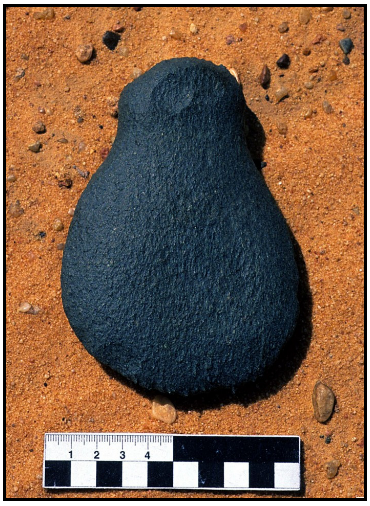
Figure 8: Environment and subsistence activities in the Wadi Howar region during the Way Line/Laqiya phase (a). Arrows symbolise possible mobility patterns, depicted animals are documented at the sites in the particular areas and the numbers in the columns indicate the numbers of sites. Reconstructed Wavy Line/Laqiya phase networks (b) (a: University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*: 2007; b: Keding 2009: 368; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

I.C.3.a.2. Leiterband/Herringbone phase - Cattle herder-gatherers

The Leiterband horizon (ca. 4000-2200 calBCE) is linked to a cattle herding and gathering economy in a wadi embedded in a thorn savannah and a partial shift of settlement activities from elevated sites to the plains. The still relatively wet Middle Wadi Howar became a preferred settlement area, even though the drier Lower Wadi Howar was still intensively used. The emergence of this distinct cultural complex is probably best understood as the result of independent regional developments within the larger Saharan and Central Sudanese context. The transition from the Wavy Line/Laqiya to the Leiterband/Herringbone phase does not seem to have involved discontinuities. Moreover, it is believed that animal husbandry was most likely adopted due to impulses resulting from contacts with pastoralists from the Nile Valley or the Central Sahara (e.g. Edwards 2004: 66, 75; Haberlah 2004; Jesse 2004(b), 2006(a): 48, 2006(c), 2008(a); Jesse *et al*. 2004: 154-156; Jesse *et al*. 2007; Jesse/Keding 2002; Keding 1997(a): 144-195, 1998: 9-10, 2002: 96, 2009: 291-447, 784-788; Lange 2005; Pöllath 2009: written communication). The fairly homogeneous Leiterband horizon unites a large area which includes the Wadi Howar, the Jebel Tageru and the Erg Ennedi in Sudan as well as the Borkou Plateau and the Ennedi Mountains in Chad. Although Leiterband pottery is unknown in the Nile Valley and the northern parts of the Sudanese Sahara, such as the Laqiya Arbain and Wadi Hariq region, ceramics similar to Leiterband ware are known from sites as far west as the Taoudenni Basin in Mali. Darfur axes, often found at Leiterband sites, have an even wider southerly pan- and circum-Saharan distribution (e.g. Bailloud 1969; Commelin 1983, 1984; Courtin 1969; Gaussen/Gaussen 1988; Godhoff 2005; Jesse *et al*. 2004: 152-153; Jesse *et al*. 2007; Keding 1997(a): 144-195, 1998, 2009: 291-447, 784-788; Mohammed-Ali 1981, 1982).

(a)

(b)

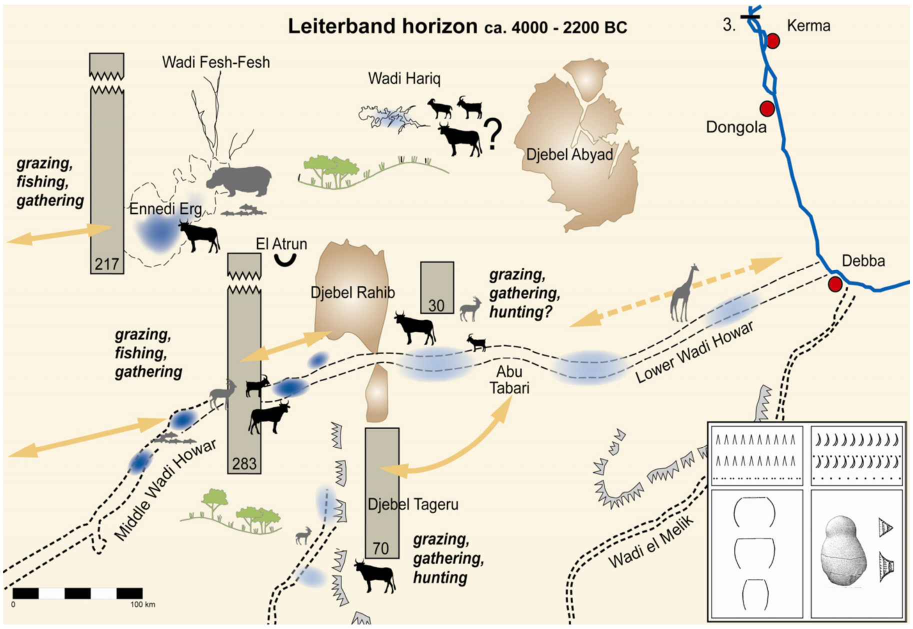


(c)

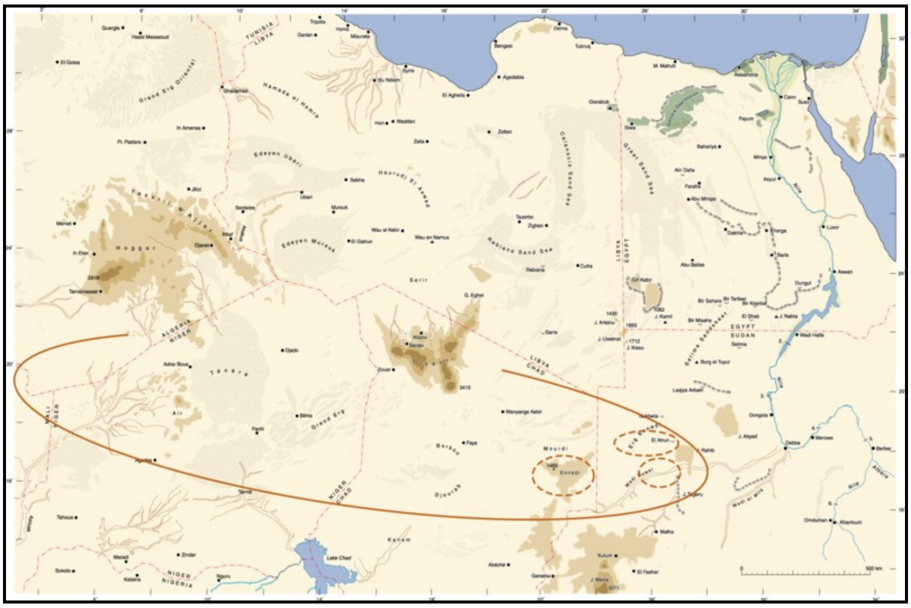
(d)

Figure 9: Typical Leiterband/Herringbone phase artefacts. Leiterband vessels (a), pottery fragment (SNM 3986) with Leiterband decoration at the top and Herringbone decoration at the bottom (b), a Darfur axe (c) and microliths, including transverse arrowheads (d) (a, c, d: Keding 2009: 297; b: Jesse 2008(a): Fig. 11.6).

Incised Herringbone patterns, which are often found on ceramics associated with Leiterband pottery at sites in the Lower Wadi Howar, can also be identified in largely contemporaneous Nubian A-Group and pre-Kerma pottery assemblages. However, very similar decorations are present at the "*Nécropole de la Frontière*" in Northern Mali as well. The connection with the Nile Valley is particularly interesting because A-Group pottery has been found in the Laqiya region. The presence of caliciform beakers in the Lower Wadi Howar is considered further evidence of links with the Nile Valley, this time to specific Neolithic sites like El Kadada and Kadero (e.g. Bianchi 2004: 38-39, 45; Edwards 2004: 66-70; Gaussen/Gaussen 1988; Godhoff 2005; Honegger 2004(b): 62-63; Jesse 2003(a), 2004(b), 2008(a); Jesse/Keding 2002; Keding 2000; Krzyżaniak 1991, 2004; Lange 2006; Kuper 2007; Nordström 1972; Reinold 2002).



(a)

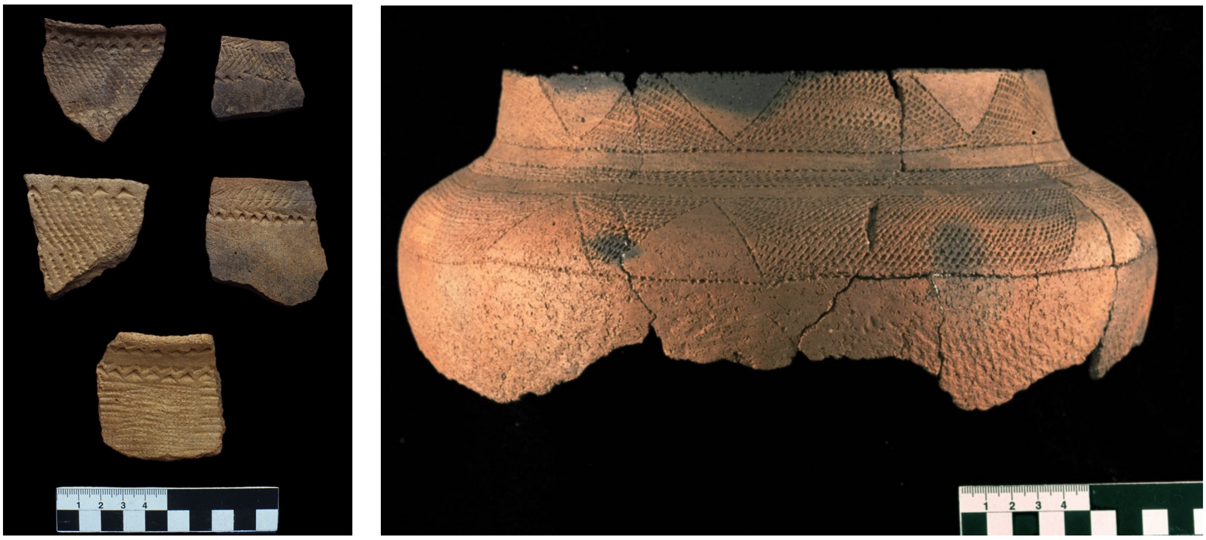


(b)

Figure 10: Environment and subsistence activities in the Wadi Howar region during the Leiterband/Herringbone phase (a). Arrows symbolise possible mobility patterns, depicted animals are documented at the sites in the particular areas and the numbers in the columns indicate the numbers of sites. Reconstructed Leiterband/Herringbone phase networks (b) (a: University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*: 2007; b: Keding 2009: 368; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

I.C.3.a.3. Handessi phase - Small livestock herders

The producers of Handessi pottery (ca. 2200-1100 calBCE) gathered and raised sheep, goats and cattle. Undoubtedly due to the worsening climate in the region, Handessi sites, which are normally located on the wadi floor, are comparatively rare in the Lower Wadi Howar and seem to be the remnants of rather infrequent visits. Although hunting played a more prominent role again, gathering and raising sheep and goats, animals able to cope with the pronounced aridity of the Sahel-like environment of this period, appear to have formed the primary subsistence basis (e.g. Jesse 2006(b); Jesse *et al*. 2004; Jesse/Keding 2002: 281, 2007; Keding/Vogelsang 2001).



(a) (b)

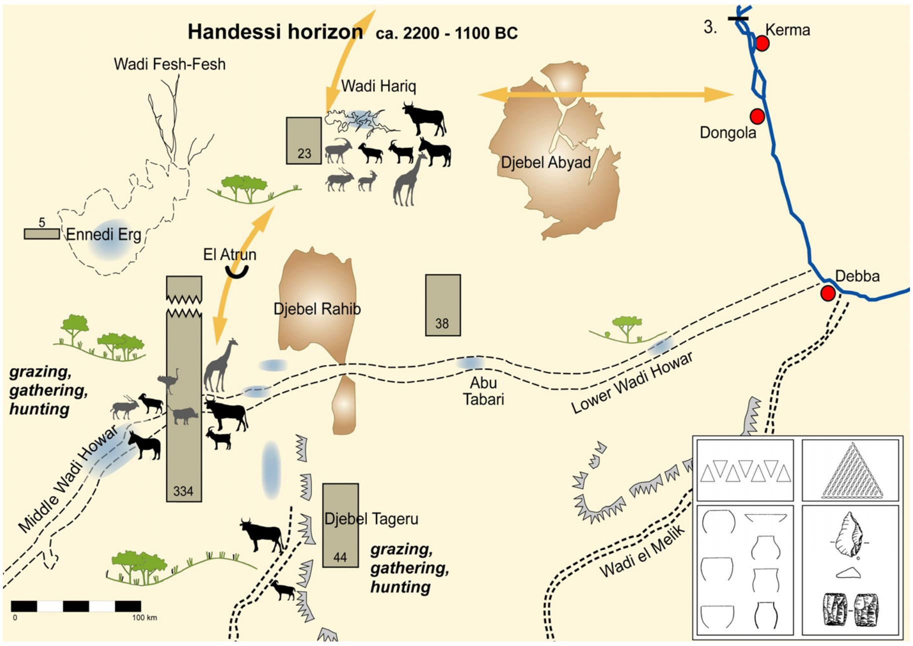
Figure 11: Typical Handessi phase artefacts. Handessi A pottery (a) and a Handessi B vessel (b) (Keding 2009: 300).

Handessi A ceramics and the antecedent Leiterband pottery do not seem to be directly connected. Certain characteristics of Handessi ceramics are reminiscent of particular features of wares associated with contemporaneous cultures of the Nubian Nile Valley and more central parts of the Southern Sahara. Not least the fact that Handessi A only appeared around 2200 BCE in the Wadi Hariq and the Wadi Howar, after it had already been in use in the Laqiya region for ca. 200 years, suggests that it originated in the north of the Sudanese Sahara. The Handessi groups were obviously moving south, gradually abandoning areas that had become too arid. This process is illustrated by the cessation of permanent settlement activities in the Laqiya region and the Wadi Hariq, around 1700 and 1500 BCE respectively. Handessi B assemblages are known from the Wadi Hariq, the Wadi Howar and the Jebel Tageru only, where they are documented from approximately 1800 BCE onwards. Judging by the variability of the encountered ceramics, it seems that, at least, the Middle Wadi Howar was populated by several different groups during the Handessi B period (e.g. Breunig 2009: written communication; Edwards 2004: 109-110; Jesse 2004(c): 105-106, 2006(b); Jesse *et al*. 2004; Keding 2009: 291-447, 784-788; Lange 2005).

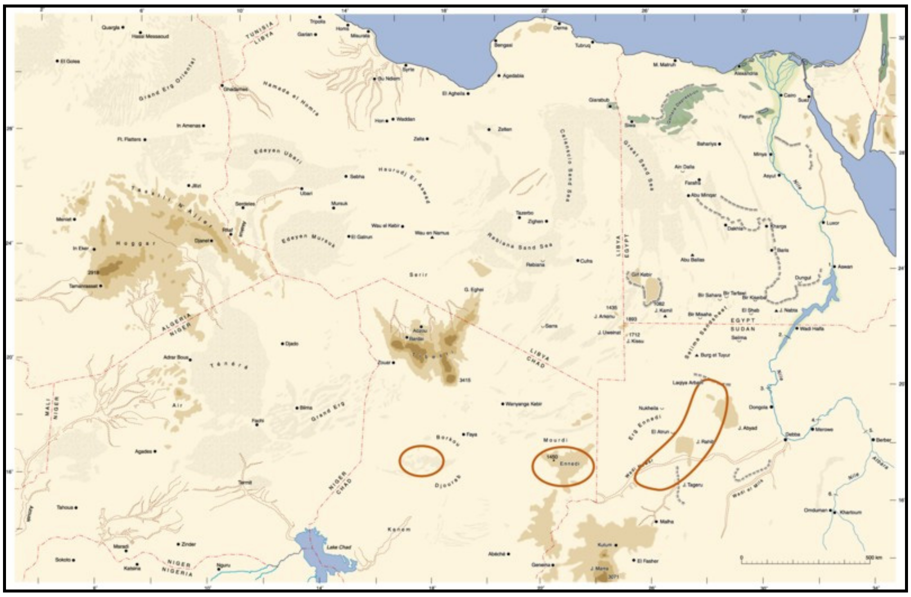
I.C.3.a.4. Transient presence

Although the Handessi people appear to have been the last true Wadi Howar population, at least certain parts of its course continued to be used. The mere presence of a structure like the Kushite fortress Gala Abu Ahmed and the evidence of probably associated settlement activities in its vicinity leave no doubt that the Wadi Howar was still partially inhabited and of strategic importance during the 1st millennium BCE. Zaghawa, Bideyat, Teda, Daza and Midob, as well as Howawir and Kababish Arabs, used to visit the wadi seasonally at various times during later periods and partly still continue to do so. They hunted animals like addax (*Addax nasomaculatus*) or oryx antelopes (*Oryx dammah*), collected plant foods such as "*difra*" (*Echinocloa colona*), grazed camels and other livestock on ephemeral "*gizu*" vegetation or used the recently dried up Abu Tabari wells. Members of the same ethnic groups must have also fairly frequently crossed the Wadi Howar, for example when following the Darb el Arba'in caravan route or on the way to collect salt at El Atrun (e.g. Browne 1799: 180-215;

Eigner/Jesse 2009; Haberlah 2004; Lange 2005; Hassanein Bey 1924; Jesse 2006(a), 2011: personal communication; Jesse/Peters 2009; King 1913: 278; Kröpelin 2007(c): 18, 28-29; Newbold 1928: 277; Shaw *et al*. 1936: 199).



(a)



(b)

Figure 12: Environment and subsistence activities in the Wadi Howar region during the Handessi phase (a). Arrows symbolise possible mobility patterns, depicted animals are documented at the sites in the particular areas and the numbers in the columns indicate the numbers of sites. Reconstructed Handessi phase networks (b) (a: University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*: 2007; b: Keding 2009: 370; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

I.C.3.b. Sites

The eight previously published individuals were excavated at Abu Tabari 95/2, Conical Hill 95/4, Djabarona 96/1, Djabarona 96/4 and Djabarona 96/120. Abu Tabari 95/2, a dune habitat in the Lower Wadi Howar, yielded 95/2-3. This individual was buried with two globular pots decorated with

Herringbone motifs and a number of other grave goods. Two further individuals, one of whom only represented by an as yet undescribed tooth, were discovered at another artefact stabilised dune in the Lower Wadi Howar, Conical Hill 95/4. Using charcoal collected in the vicinity of the disturbed, most likely Wavy Line/Laqiya phase burial from which both Conical Hill 95/4 individuals were retrieved, a date of 4420±50 calBCE could be established. Djabarona 96/1-1, -2 and 96/4 were unearthed on the banks of the eastern part of the Middle Wadi Howar at two Leiterband sites. The graves contained extended bodies and a wealth of personal adornments, like stone and ostrich eggshell beads. The grave goods from Djabarona 96/4 also included two pots and grinding equipment. The individuals 96/120-3, -4 and -5 were recovered from graves at Djabarona 96/120, a Handessi site in the Middle Wadi Howar. All three were found in flexed positions and both 96/120-3 and 96/120-4 were buried with a pot (e.g. Becker in press; Henke *et al*. 2002; Jesse 2007: written communication; Jesse/Keding 2002; Keding 1997(b), 2002).

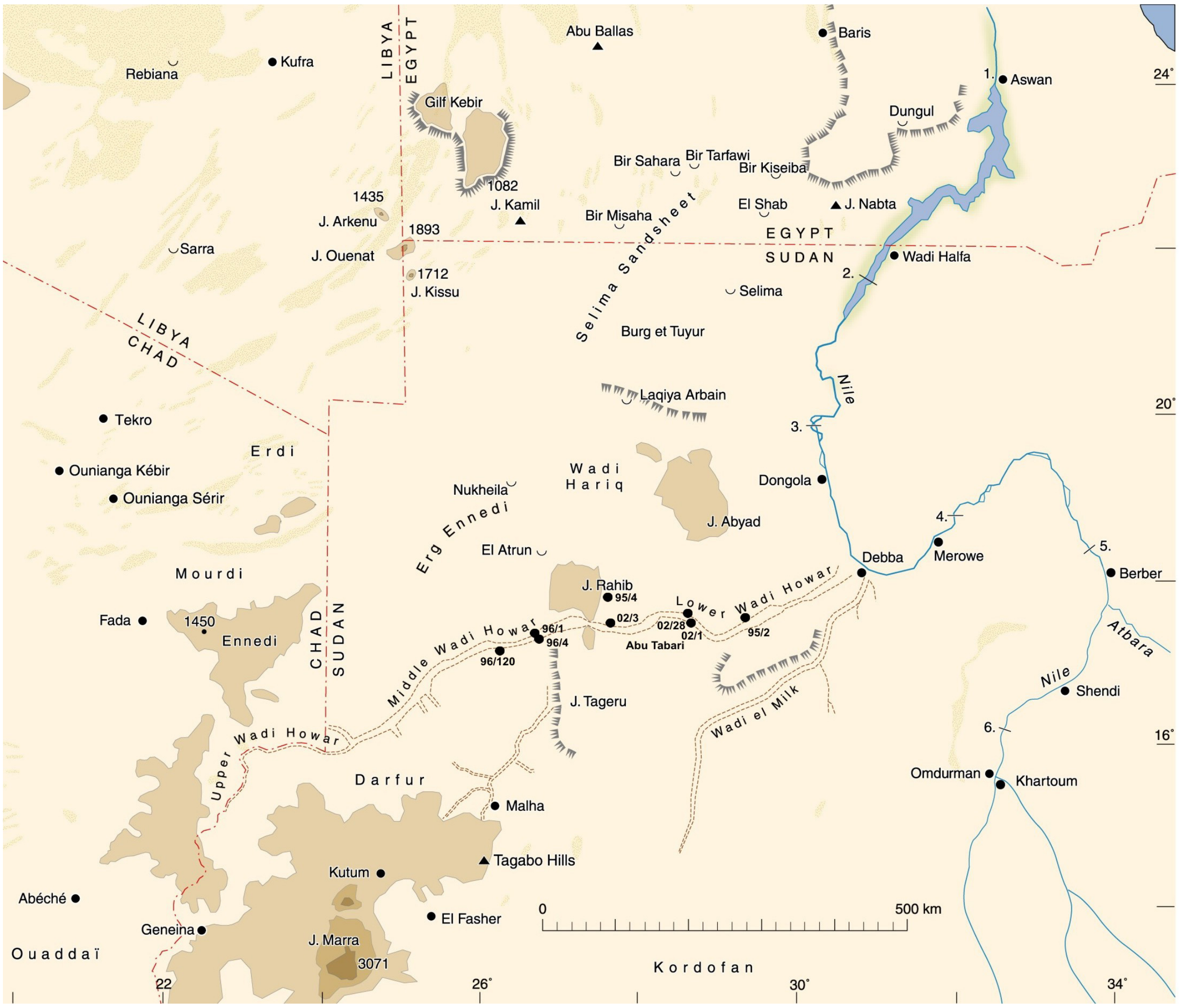


Figure 13: Location of the Wadi Howar sites from which existing human skeletal remains have been recovered (Map template: University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 03/31 and 03/34 yielded two of the 23 as yet unpublished specimens which formed the primary material basis of this study. The fragments of a single human bone were collected as a surface find at Abu Tabari 03/31 in the course of survey activities. Cattle bones and mainly undecorated pottery were also recorded at this Leiterband/Herringbone phase site. There is a single radiocarbon date of ca. 3500 calBCE for Abu Tabari 03/31. It is, however, believed to be unreliable. Unfortunately, Abu Tabari 03/34, from where 03/34-1 was recovered, could only be dated to the Leiterband/Herringbone period thus far. The remaining 21 of the above-mentioned 23 as yet unpublished individuals were excavated at Abu Tabari 02/1, Abu Tabari 02/28 and Conical Hill 02/3 (e.g. Becker in press; Jesse 2003(a), 2007: written communication; Kröpelin/Schuck 2004; Lange 2005).

I.C.3.b.1. Abu Tabari 02/1

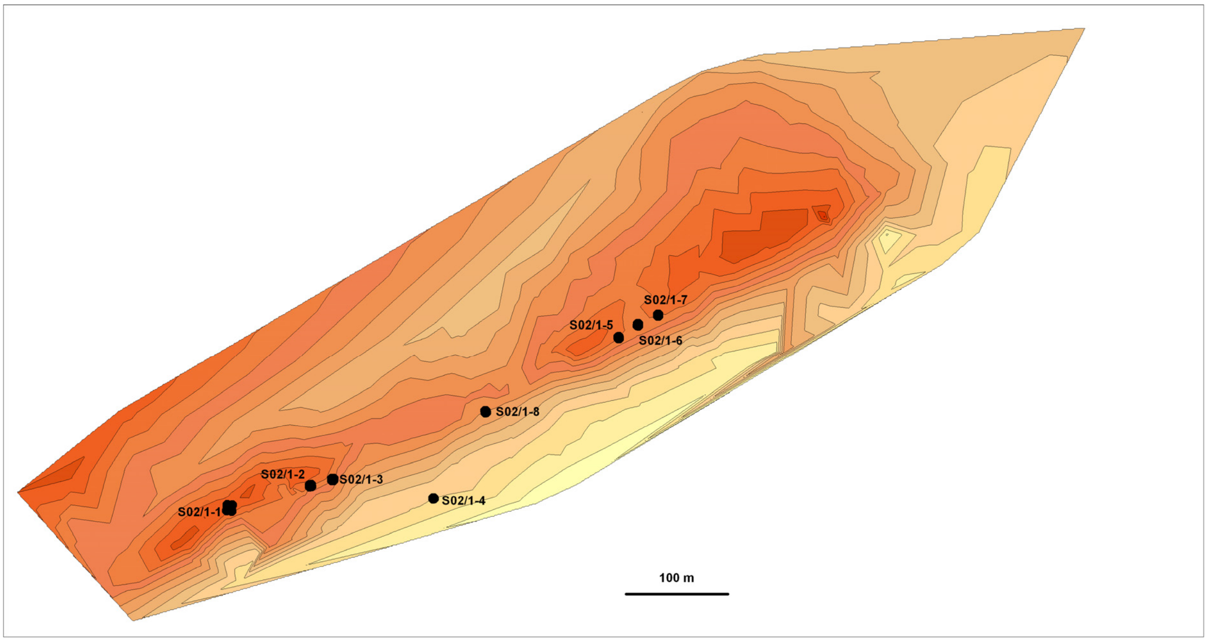


Figure 14: Abu Tabari 02/1 (University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1 is an approximately 800 by 130 m large settlement site on a somewhat elevated sandbank. Three reliable ^{14}C dates (5055±35, 4855±50 and 4880±40 BP) assign an age of approximately 3870±60 to 3670±30 calBCE to this site[4]. The site's high soil phosphate levels are thought to be a result of prolonged human settlement. The composition of the faunal remains implies that the site was either occupied all year round or only abandoned seasonally during this still comparatively wet period. A zooarchaeological analysis revealed that 53% of the identified specimens of the collected animal remains were domestic animals (mainly *Bos taurus*), 32% aquatic species (such as *Hippopotamus amphibius*, *Crocodylus niloticus*, *Varanus niloticus*, mud and softshell turtles as well as fish like *Lates niloticus*, *Polypterus* sp., *Synodontis* sp. and *Clariidae*) and 15% wild mammals (e.g. antelopes, warthogs and elephants). These results suggest that the inhabitants of Abu Tabari 02/1 were cattle herders who engaged in a considerable amount of foraging. The lithic assemblage consisted predominantly of unretouched quartz flakes. However, it also included six axe heads, nearly 100 lower grinding stones and 123 stone balls. The grinding stones were possibly used

[4] Two additional samples from Abu Tabari 02/1 yielded probably reliable ^{14}C dates: 4745±30 BP/3530±80 calBCE and 4195±25 BP/2810±70 calBCE. The latter of these two dates is, however, based on a surface find and does not appear to pertain to the site's main occupation (Jesse 2011: written and personal communication).

to process plants, grind colour pigments or prepare meat and the so-called "bola balls" may have fulfilled certain functions in hunting or herding contexts. The decorative patterns of the remarkable pottery are only known from this site. The seven caliciform beakers found at Abu Tabai 02/1 were the first to be discovered outside the Nile Valley in Sudan. The six graves, which were excavated on the southern edge of Abu Tabari 02/1, yielded flexed bodies lying on their right sides, facing south. One individual, 02/1-2, was found with wing bones of a spur-winged goose (*Plectropterus gambensis*) placed on the pelvis. Otherwise, grave goods were rare and mainly consisted of personal adornments like ostrich eggshell beads (e.g. Gundelwein 2007; Jesse 2003(a), 2006(a), 2007, 2008(a), 2009: written communication; Kröpelin 1993: 88; Kröpelin/Schuck 2004: 62-64, 71-72; Kuper 2007; Lange 2005; Lhote 1952: 4-5; Pluskota 2003: 186-187; Pöllath 2005; Pöllath/Peters 2003, 2007: 65-67; Shahack-Gross *et al*. 2003; Smith 2005: 42).

I.C.3.b.2. Abu Tabari 02/28

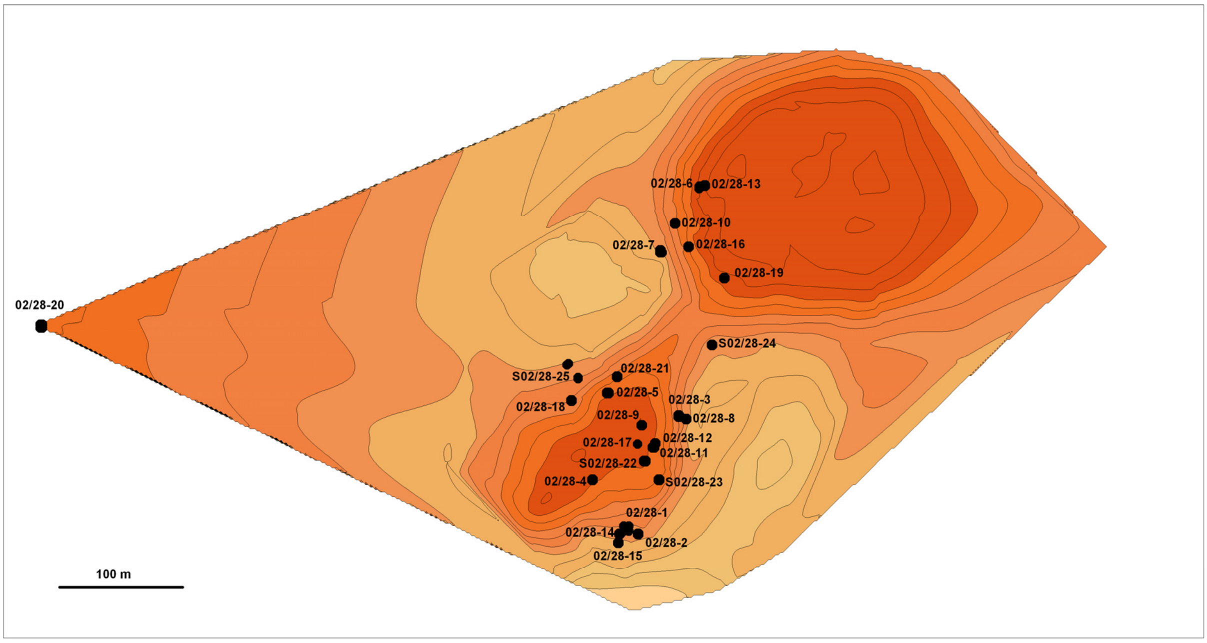


Figure 15: Abu Tabari 02/28 (University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Also located on a slightly raised sandbank, Abu Tabari 02/28 is a roughly 500 by 450 m large scatter of finds which could be dated to the period around 3000 calBCE by one unreliable (4450±180 BP/3140±230 calBCE), two probably reliable (4110±30 BP/2720±100 calBCE, 4060±45 BP/2630±110 calBCE) and two reliable ^{14}C dates (4350±35 BP/2970±50 calBCE, 4345±35 BP/2960±50 calBCE). The environment characterised by diverse habitats and readily available water, which the inhabitants of Abu Tabari 02/1 were used to, had changed by then. The Lower Wadi Howar had become drier and pools only filled up after seasonal rains during this already relatively arid period. While only 2.2% and 0.5% of the identified zooarchaeological specimens at the site comprised wild mammals and aquatic species respectively (for example antelopes, hares, *Tilapiini*, *Clariidae*, *Syndontis* sp. and *Chambardia* clams), 97.3% represented domestic animals (predominantly *Bos taurus*). Cattle were also, most likely, intentionally buried at Abu Tabari 02/28 (for instance 02/28-24) and formed the main component of the contents of numerous, possibly ritual, bone pits (such as 02/28-17 or -20). These observations indicate that the people associated with Abu Tabari 02/28 were specialised cattle herders. Although the recorded pottery assemblage also contained a limited number of pieces decorated with Leiterband patterns, it was rather uniform otherwise. Incised herringbone motifs and impressed horizontal rows of dots or dotted zigzags were the dominant pottery decorations. The stone artefacts recovered from Abu Tabari 02/28 mainly consisted of unretouched quartz flakes, but stone balls, grinding stones and a few axe heads were also encountered. The 13 excavated graves contained north-south orientated bodies in flexed positions, often buried with grave goods like ceramic pots and bowls, ostrich eggshell beads and stone artefacts (e.g. Jesse 2006(a), 2007: written communication, 2008(a): 58, 61-65; Keding 1997(a): 216-240; Kröpelin/Schuck 2004: 69-72; Lange 2005; Pöllath/Peters 2007).

I.C.3.b.3. Conical Hill 02/3

Figure 16: Upper and lower grinding stone at Conical Hill 02/4 (M. Lange; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The approximately 150 by 80 m large Conical Hill 02/3 site is situated on an open plain about 500 m away from another site, Conical Hill 02/4, with which it might have originally formed a larger settlement. Four radiocarbon dates revealed an age of about 2310±80 to 1780±70 calBCE (3460±35 to 3845±35 BP) for Conical Hill 02/3 and 3490±110 to 2370±150 calBCE (4705±100 to 3895±105 BP) for Conical Hill 02/4. These dates and the range of the recovered pottery types suggest that the site was occupied for an extended period. The most intense human activities are, however, likely to have taken place during the Leiterband/Herringbone phase. Even though calcareous sediments on the southern edge of the site and a number of shell fragments are indicative of a small seasonal pool, the climate had clearly become rather unfavourable in the western part of the Lower Wadi Howar by that time. Surprisingly, considering the presence of a seasonal pond, Conical Hill 02/3's zooarchaeological assemblage was devoid of traces of aquatic fauna. With *Clarias* sp. and *Syndontis* sp. each only identified once, the situation at the neighbouring site Conical Hill 02/4 was comparable. The almost complete absence of aquatic fauna, the small number of partial gazelle and giraffe skeletons as well as the abundance of cattle bones, which constituted 90% of the identified animal specimens, imply that the inhabitants of Conical Hill 02/3 were cattle herders who rarely hunted or fished. Leiterband and Incised Herringbone motifs dominated the spectrum of the reported pottery decorations, but Dotted Wavy Lines, zigzag patterns and mat impressions were also identified. Whole and fragmented upper and lower grinding stones were scattered all over the site and segments as well as small blade-shaped points were noted. Nonetheless, just as at many other sites in the Lower Wadi Howar, the lithic assemblage as a whole mostly consisted of unspecific flakes made from quartz and a few other local raw materials. The only excavated grave, Conical Hill 02/3-4, was located on the western edge of the site. The body inside was buried without grave goods, sitting up with arms and legs flexed and adducted (e.g. Becker in press; Godhoff 2005: 13-14, 17-28, 62-67; Jesse 2007: written communication, 2008(a): 58; Jesse *et al*. 2007: 46; Kröpelin/Schuck 2004: 64-66, 72-73; Pöllath 2005).

I.C.4. Previous anthropological work

I.C.4.a. Osteological studies

I.C.4.a.1. Human remains published in 2002

Eight individuals, excavated by teams of the University of Cologne's ACACIA programme (*SFB* 389) at 5th to 2nd millennium BCE sites in the Wadi Howar, were subjected to an osteological analysis by Prof. Dr. Dr. h. c. W. Henke, the author and M. Stang M.A. in 2001 and 2002. The documentation of the remains and the results of their examination were published in 2002 (Henke *et al*. 2002). Extensive *post mortem* damage, Conical Hill 95/4's strikingly angled molar wear and conspicuous robusticity as well as Djabarona 96/1-1's enamel hypoplasia lesions and unusually blunt mandibular angle (79) were found to be the small sample's most salient peculiarities. Furthermore, the material could be divided into two morphologically distinct groups. One group, consisting of the robust Wavy Line/Laqiya and Herringbone individuals Conical Hill 95/4 and Abu Tabari 95/2-3, displayed certain affinities with the Late Pleistocene populations from Jebel Sahaba and Wadi Halfa. The other group, formed by the decidedly more gracile Leiterband and Handessi individuals Djabarona 96/1-1, -2, 96/4, 96/120-3, -4 and -5, exhibited traits normally associated with modern biologically sub-Saharan populations. Nevertheless, due to the small sample size and the material's unsatisfactory state of preservation, no formal attempt to test the hypothesis that the older group was ancestral to the younger was made.

I.C.4.a.2. Human remains recovered since 2002

The author participated in the *SFB* 389's activities in Sudan in 2003 as the A2 excavation team's anthropologist. In spite of the extreme conditions in the Lower Wadi Howar, 18 individuals could be recovered from four Neolithic sites during this field season: four from Abu Tabari 02/1, twelve from Abu Tabari 02/28, one from Abu Tabari 03/31 and one from Abu Tabari 03/34 (see Lange 2005). In 2004 and 2005, the University of Cologne contracted the author to begin the reconstruction and analysis of the 18 individuals excavated in 2003 and a further three individuals unearthed in 2002. In the course of this association with the *SFB* 389, a preliminary osteological examination of the remains of ten individuals was completed. A 46-page report, submitted to the A2 project in 2005, presented and contextualised the results of the analysis of four of these ten individuals, namely Abu Tabari 02/1-2, -3, 02/28-5 and Conical Hill 02/3-4 (Becker 2005). The clear morphological affinities of these individuals with biologically sub-Saharan populations were pointed out and discussed. Two interconnected hypotheses were put forward in this context. Firstly, the Late Pleistocene populations from Jebel Sahaba and Wadi Halfa, the Early Khartoum human remains from Saggai, Shabona and Khartoum Hospital, the “Khartoum Neolithic” skeletal material from Kadero, the Wadi Howar series and certain contemporary Nilo-Saharan-speaking groups from Southern Sudan are all members of the same, continuous, biologically sub-Saharan population complex. Secondly, the morphological differences between the members of this population complex are the result of a diachronic decrease in overall robusticity. The A2 project’s last field team also included the author. The survey and excavations in 2006 led to the excavation of two more individuals at Abu Tabari 02/28 and the discovery of several very promising new sites in the Jebel Abyad and the area between the Jebel Abyad and the Lower Wadi Howar (see Jesse 2008(b)).

Table 1: The human skeletal remains from the Wadi Howar.

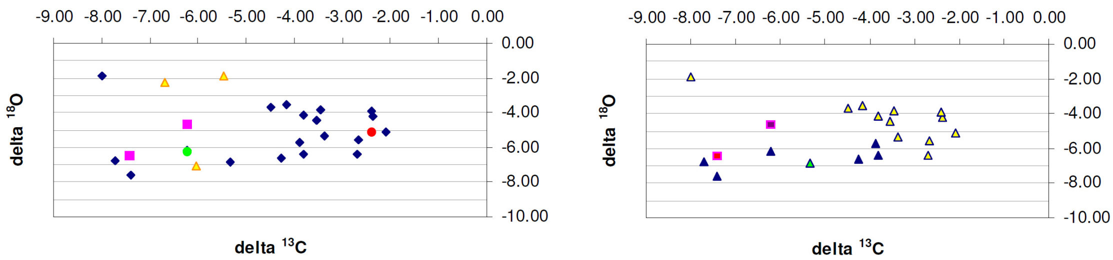
	Number of individuals recovered	**Sex**	**Age**	**Region**	**Age of site**	**Cultural association**
Abu Tabari 95/2	1	1 male	1 adult or older	Central part of the Lower Wadi Howar	~4000-2200 calBCE	Herringbone
Abu Tabari 02/1	6	2 female, 3 male, 1 indeterminate	5 adult or older, 1 sub-adult	Western part of the Lower Wadi Howar	~3900-3600 calBCE	Unique ware/ Caliciform beakers
Abu Tabari 02/28	14	8 female, 5 male, 1 indeterminate	11 adult or older, 3 sub-adult	Western part of the Lower Wadi Howar	~3000 calBCE	Herringbone/ Leiterband
Abu Tabari 03/31	1	1 male	1 adult or older	Western part of the Lower Wadi Howar	~4000-2200 calBCE	Leiterband
Abu Tabari 03/34	1	1 female	1 adult or older	Western part of the Lower Wadi Howar	~4000-2200 calBCE	Leiterband/ Herringbone
Conical Hill 95/4	2	1 female, 1 male	1 adult or older, 1 sub-adult	Western part of the Lower Wadi Howar	~4400 calBCE	Wavy Line/ Laqiya
Conical Hill 02/3	1	1 male	1 adult or older	Western part of the Lower Wadi Howar	~2300-1800 calBCE	Leiterband/ Herringbone
Djabarona 96/1	2	2 female	2 adult or older	Eastern part of the Middle Wadi Howar	~4000-2200 calBCE	Leiterband
Djabarona 96/4	1	1 male	1 adult or older	Eastern part of the Middle Wadi Howar	~4000-2200 calBCE	Leiterband
Djabarona 96/120	3	2 female, 1 male	3 adult or older	Eastern part of the Middle Wadi Howar	~2200-1100 calBCE	Handessi
Total	32	16 female, 14 male, 2 indeterminate	27 adult or older, 5 sub-adult	Central part of the Lower to eastern part of the Middle Wadi Howar	~4400-1100 calBCE	Wavy Line, Laqiya, Leiterband, Herringbone, Handessi

In 2007, the author contributed a 28-page chapter on the human remains to an *Africa Praehistorica* volume which will showcase the wide range of insights into the Wadi Howar’s past ACACIA’s multidisciplinary A2 project managed to gain. Summarising the findings of the 2002 publication, the unpublished 2005 report and the doctoral research undertaken until then, the contribution gave a short overview of the series, highlighted noteworthy observations and formulated various hypotheses. Observations remarked upon included the material’s extraordinarily poor state of preservation, unusual *in situ* positions, rare epigenetic traits and certain occupational stress markers. The hypotheses concerned the impact of the different subsistence strategies, the homogeneity of the Wadi Howar’s prehistoric population and the sample’s likely affinities with other prehistoric as well as modern African populations (Becker in press).

I.C.4.b. Other studies

I.C.4.b.1. Isotope analyses

Using samples taken from six of the individuals published in 2002 and from four further skeletons excavated in 2002 and 2003, Prof. Dr. G. Grupe of the University of Munich performed the first isotope analyses in 2002 and 2004. The results appeared to corroborate the zooarchaeological and archaeological conclusions about the dietary habits of the different groups of the Wadi Howar's prehistoric inhabitants (e.g. Becker in press; Grupe 2002: written communication, 2004: written communication; Jesse *et al.* 2007; Jesse/Keding 2002, 2007; Keding/Eisenhauer 2007; Kröpelin/Schuck 2004; Pöllath/Peters 2007; Schmitz 2008: 51).



(a) (b)

Figure 17: Bivariate plots of $\delta^{13}C$ and $\delta^{18}O$ values, by areas (a) and sites (b). (a): blue diamonds = Abu Tabari 95/2-3, 02/1, 02/28; red circle = Abu Tabari 03/34-1; pink squares = Conical Hill 95/4, 02/3-4; yellow triangles = Djabarona 96/1, 96/4; green circle = Djabarona 96/120-4. (b): green triangle = Abu Tabari 95/2-3; blue triangles = Abu Tabari 02/1; yellow triangles = Abu Tabari 02/28; pink square = Conical Hill 95/4; purple square = Conical Hill 02/3-4 (after Schmitz 2008: 113, 118). Typical consumers of parts of C_3 plants, like fruits or roots, are characterised by $\delta^{13}C$ values between -16 and -10‰, typical consumers of C_4 plants, such as tropical grasses, by values of -2 to +2‰ (e.g. Grupe *et al.* 1997; Grupe 2002: written communication, 2004: written communication; Grupe *et al.* 2005: 124-130; Herrmann *et al.* 1990: 231-247).

Supervised by Prof. Dr. G. Grupe, Dipl.-Biol. B. Schmitz dedicated her 2007/2008 *Diplom* research project to the histological and isotope analysis of bone samples extracted from 28 Wadi Howar individuals (Schmitz 2008).

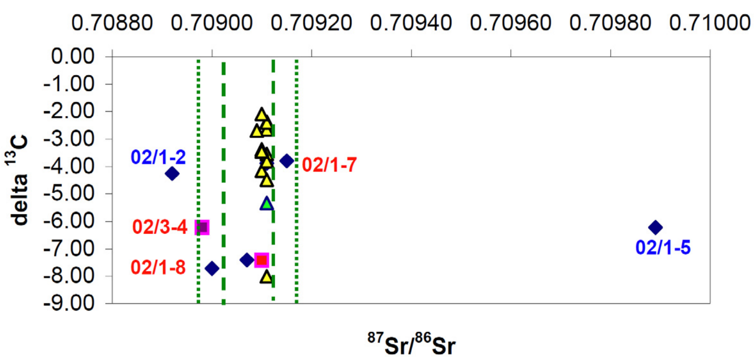


Figure 18: Bivariate plot of $^{87}Sr/^{86}Sr$ and $\delta^{13}C$ values. Green triangle = Abu Tabari 95/2-3; blue diamonds = Abu Tabari 02/1; yellow triangles = Abu Tabari 02/28; pink square = Conical Hill 95/4; purple square = Conical Hill 02/3-4. The dashed line represents the first and the dotted line the second standard deviation from the mean of all soil samples. Red labels indicate "probably" non-local and blue labels "definitely" non-local individuals (after Schmitz 2008: 140).

Despite the fact that the specimens had lost their organic bone matrix constituents almost entirely and extracting intact collagen therefore proved virtually impossible, the samples' inorganic bone components were structurally reasonably well preserved. Their rather homogeneous $\delta^{13}C$ values suggested that C_4 plants, and/or animals feeding on them, must have been of considerable importance for the Lower Wadi Howar's mid-Leiterband/Herringbone phase inhabitants, particularly for those from Abu Tabari 02/28. The much less uniform $\delta^{13}C$ values of the individuals from the slightly older Abu Tabari 02/1 site, on the other hand, were indicative of more varied dietary habits and, like the $\delta^{13}C$ values of Conical Hill 95/4 and 02/3-4, a subsistence in which C_4 plants featured less prominently. Comparing the individual $^{87}Sr/^{86}Sr$ values to the relevant soil samples, it was possible to demonstrate that all but one individual from Abu Tabari 02/1, namely 02/1-3, and Conical Hill 02/3-4 should probably be considered "non-local", either only at Abu Tabari 02/1 or in the Lower Wadi Howar as a whole. In closing, it was concluded that the observed isotopic differences were largely consistent with the likely changes in subsistence and mobility patterns suggested by the archaeological evidence (Schmitz 2008: 77-89, 106-112, 118-120, 133-139, 141).

I.C.4.b.2. aDNA analyses

As could be expected when dealing with remains from this hot and in the past often humid region, repeated inspections of the Wadi Howar remains by Prof. Dr. J. Burger, the head of the palaeogenetics group of the University of Mainz's Anthropological Institute, confirmed that the material was not sufficiently well-preserved to make any attempts to extract DNA from it seem reasonable (e.g. Babalini *et al*. 2002; Burger *et al*. 1999; Burger 2002: personal communication, 2004: personal communication; Fox 1997; Gilbert *et al*. 2003; Kéfi *et al*. 2005; Krings *et al*. 1999: 1175; Marota *et al*. 2002; Ottoni 2007: 69-72, 107-112; Pääbo 1985; Zink/Nerlich 2005).

I.D. Broader context

I.D.1. Anthropological background

I.D.1.a. Osteological studies

I.D.1.a.1. Sudanese Sahara

I.D.1.a.1.a. Material

All available human skeletal remains from the Sudanese Sahara, which were not part of the Wadi Howar series, were excavated in the context of the *B.O.S.* programme's 1982, 1983 and 1985 field activities in an area roughly 180 km south of the border between Egypt and Sudan. Apart from two extremely badly preserved and undated individuals from the Laqiya Arbain region, the material consists of seven skeletons from Burg et Tuyur and the Wadi Shaw. The members of this archaeologically heterogeneous sample have been dated to ca. 7800 to 1500 calBCE (e.g. Binder/Uerpmann 2004; Binder *et al.* 2005; Lange 2006; Schuck 2002; Simon *et al.* 2002).

I.D.1.a.1.b. Robusticity, stress and health

The original report on the Wadi Shaw material already contained a number of pertinent findings (Simon *et al*. 2002). 83/110-18-1 (1460±146 calBCE) exhibited extensive tooth loss in connection with severe dental abrasion. Stress-related degenerative changes of the cervical vertebrae (*Vertebrae cervicales*), observed in 83/110-11 (7824±525 calBCE) and -18-1, were noted. A description of the Schmorl's nodes and, at times pronounced, *Spondylosis deformans* of the thoracic and lumbar vertebrae (*Vertebrae thoracicae et lumbales*) of 83/110-14 (2254±212 calBCE), -15 (2374±85 calBCE) and -18-1 was provided. One individual, 83/110-12 (3713±358 calBCE), was diagnosed with *Spina bifida occulta*. Each *Patella* of an individual afflicted by enamel hypoplasia, 83/110-15, displayed a vastus notch (*Incisura vasta*). The fact that 83/110-14's *Phalanges*, left *Patella* and metatarsals (*Ossa metatarsalia*) showed traces of arthrosis and arthritis was also pointed out. Finally, the artificial removal of the Handessi phase individual 83/110-15's lower central incisors (*Dentes incisivi inferiores I*) was discussed more thoroughly. It was concluded that this particular type of dental ablation is a typically sub-Saharan custom which is well-known from the Central Sudanese Jebel Moya series (ca. 750-500 BCE) and particularly common among modern Nilo-Saharan-speaking groups, such as the Sara, Dinka or Maasai.

A re-examination of the material, which also included Burg et Tuyur 85/78-1 (ca. 5750 BCE), led to a new description of the entire sample, containing further observations and interpretations of certain occupational stress markers (Binder/Uerpmann 2004; Binder *et al.* 2005). 83/110-18-1's hypertrophy of the origin (*Origo*) of the superficial part (*Pars superficialis*) of the masseter (*Musculus masseter*) was emphasised. The enthesiopathic lesions of this individual's *Phalanges* and the robusticity of her clavicle's sternal end (*Extremitas sternalis claviculae*) were discussed as possible traces of milking and grinding activities. Various plausible indicators of the practice of carrying heavy loads were mentioned. Among them were the peculiarities of 83/110-18-1's mastoid process (*Processus mastoideus*) and the state of this skeleton's and 83/110-11's cervical vertebrae (*Vertebrae cervicales*). The degeneration of lumbar vertebrae (*Vertebrae lumbales*) and the prominence of muscle insertions (*Insertiones*), such as the deltoid (*Tuberositas deltoidea*) or radial tuberosity (*Tuberositas radii*), were also referred to in this context. The specific patterns of muscle markings on the bones of the arms and forearms were assumed to be connected with cleaning hides and the use of spears, rather than bows and arrows. Furthermore, it was hypothesised that the excessive pull of the triceps (*Musculus triceps brachii*), which caused the exostosis on 83/110-12's right *Olecranon*, was regularly exerted when casting nets. Squatting facets as well as 83/110-15's vastus notches were used as evidence of habitual squatting. High mobility levels in a demanding environment were cited as a likely cause of 85/78-1's hypertrophic soleal line (*Linea musculi solei*) and 83/110-14 as well as -18-1's various calcaneal abnormalities.

I.D.1.a.1.c. Metric and non-metric affinities

Simon *et al.* (2002) reported that the measurements and expressions of the relevant non-metric traits of the oldest skeleton from the Wadi Shaw, the Wavy Line phase individual 83/110-11, lay within the range of those published for the Late Pleistocene Wadi Halfa series. The metric analysis of the best preserved *Crania* of the Wadi Shaw sample highlighted both the remarkable variability and the biologically sub-Saharan nature of these three much younger Handessi period skulls. The principal component analysis on the basis of 29 metric variables, which also included Nubian Kerma period and Egyptian New Kingdom samples, allied 83/110-15 with the Kenyan Teita, placed 83/110-18-1 closest to Chamla's (1968) Saharan "*restes humains néolithiques et protohistoriques*" and positioned 83/110-14 between the Teita and the Saharan material (e.g. Chamla 1968; Jesse 2006(b); Kitson 1931; Schuck 2002; Simon *et al.* 2002: 266-267).

Figure 19: Wadi Shaw 83/110-15 *in situ* (Schuck 2002: 249; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

I.D.1.a.2. Non-Sudanese Sahara (south of the 25th parallel)

I.D.1.a.2.a. Material

A substantial amount of Early (ca. 10 000-7000 BCE), Middle (ca. 7000-3500 BCE) and early Late Holocene (< 3500 BCE) human skeletal remains has been recovered from a constantly growing number of sites and site areas in other parts of the Sahara. The, in the context of this study, most important of these are Chami and Tintan in Mauritania, Asselar, El Guettara, Erg Ine Sakane, Hassi el Abiod, Ibalaghen, Karkarichinkat, Kobadi, Tessalit and Tin Lalou in Mali, Amekni, Méniet, Tagdaït and Tamanrasset in Algeria, Adrar Bous, Afunfun, Arlit, Chin Tafidet, Dia Shoma, Emi Lulu, Gobero, Iwelen, Tamaya Mellet and Oued Inamoulay in Niger, Uan Muhuggiag, Wadi Tanezzuft and Wadi Teshuinat in Libya, Endpfanne (Enneri Bardagué), Enneri Dirennao (Gabrong), Erg Djourab, Yao, Yebbi Gué and Zoui in Chad and Abu Ballas, Gilf Kebir, Jebel Ramlah and Nabta Playa in Egypt (e.g. Achard *et al*. 1994; Agrilla *et al*. 2008; Bedaux *et al*. 2001; Bruner *et al*. 2002; Chamla 1968, 1986; Charon *et al*. 1974; Coppens/Chamla 1978; Di Lernia/Manzi 1998, 2002; Dutour 1984, 1989; Dutour *et al*. 1994; Facchini *et al*. 1998; Gehlen *et al*. 2002; Georgeon *et al*. 1993; Henneberg *et al*. 1980; Herrmann/Gabriel 1972; Irish 2001; Irish *et al*. 2003; Kobusiewicz *et al.* 2009; Mauny 1961; Paris 1996; Petit-Maire 1978, 1979; Petit-Maire/Riser 1983; Raimbault 1994; Raimbault/Dutour 1989; Ricci *et al*. 2002; Roset 1974, 1987; Schild *et al*. 2002; Sereno *et al*. 2008).

I.D.1.a.2.b. Robusticity, stress and health

The majority of the few available palaeopathological and otherwise relevant descriptions are part of the original publications on the remains in question. Although descriptive statistics summarising frequencies of particular findings are occasionally included in these reports, systematic studies of the Saharan material focusing on specific sets of robusticity traits, occupational stress markers or indicators of overall health have not yet been presented. The presence of *Spina bifida* was noted at

Adrar Bous (Agrilla *et al*. 2008). Besides cases of tibial and humeral fractures, *Spina bifida* and *Cribra orbitalia*, Dutour also described varying frequencies of dental caries, *ante mortem* tooth loss and dental abscesses found among the members of his sample from the Malian Sahara (Dutour 1983, 1989). Traces of masticatory stress were reported from various sites. Notched wear of the anterior dentition (*Dentes incisivi, canini et premolares superiores et inferiores*), believed to result from habitual paramasticatory fibre processing, a temporomandibular joint (*Articulatio temporomandibularis*) with degenerative changes and advanced as well as cupped wear were observed at Uan Muhuggiag, Hassi el Abiod and Nabta Playa respectively (Dutour 1989; Irish 2001; Minozzi *et al*. 2003). Not only the degeneration of cervical vertebrae (*Vertebrae cervicales*) at Erg Ine Sakane, Adrar Bous and the Wadi Tanezzuft but also certain lesions on thoracic as well as lumbar vertebrae (*Vertebrae thoracicae et lumbales*) and on bones of the upper extremities (*Ossa membrorum superiorum*) at Hassi el Abiod, Adrar Bous and the Wadi Tanezzuft were interpreted as evidence of lifting and carrying heavy loads (Agrilla *et al*. 2008; Arrighetti *et al*. 2002; Dutour 1983, 1986, 1989). The exostoses on an *Olecranon* from Hassi el Abiod were discussed in the context of activities like spear throwing, woodwork and using bows and arrows (Dutour 1989). The arthritic *Phalanges* of another individual from Hassi el Abiod could attest to routinely executed strenuous hand motions (Rothschild *et al*. 1999). A further publication also presented evidence of habitual stresses which affected the hands of the inhabitants of Hassi el Abiod (Masmejean *et al*. 1997). Repeated microtrauma, possibly induced by the production of stone tools, was cited as the most likely cause of the bilateral scapholunate advanced collapse (SLAC) and the general wrist arthritis observed in an adult male. The documented lesions were similar to those occasionally suffered by volleyball players or workers using pneumatic drills. Assumptions about locomotory habits were based on observations such as osteophytes on a *Patella* from Adrar Bous, eburnations on the superior articular surface (*Facies articularis superior*) of a right *Tibia* from the Wadi Tanezzuft, tibial *Myositis ossificans* from Erg Ine Sakane and arthrosis affecting foot bones (*Ossa pedis*) from Hassi el Abiod. That the material from Tintan, Erg Ine Sakane and Hassi el Abiod included *Patellae* of either the *Patella bipartita* type or displaying a vastus notch (*Incisura vasta*) might be seen as a related phenomenon (Agrilla *et al*. 2008; Arrighetti *et al*. 2002; Dastugue 1979; Dutour 1983, 1986, 1989). Finally, two females from Kobadi who had their upper lateral (*Dentes incisivi superiores II*) and lower central incisors (*Dentes incisivi inferiores I*) removed, four females from Karkarichinkat with upper anterior teeth (*Dentes incisivi et canini superiores*) filed down to achieve a fang-like appearance and isolated cases of artificial cranial deformations at Tigurmoyen (Niger) and in the Wadi Tanezzuft demonstrate the antiquity of the associated cultural practices (Coppens/Chamla 1978: 175; Finucane *et al*. 2008(a); Georgeon *et al*. 1993; Ricci *et al*. 2008).

I.D.1.a.2.c. Metric and non-metric affinities

Relying on metric and non-metric characteristics relevant to the estimation of biological ancestry, Chamla (1968) divided the Early and Middle Holocene inhabitants of the Sahara into three groups. The first and by far largest of these groups is made up of morphologically sub-Saharan material. It contains both gracile and robust specimens. The gracile individuals, for example Ibalaghen SO-58-30 and Tin Lalou SO-60-129, exhibit traits typically encountered among present-day West African populations. The robust remains, such as El Guettara 2, Tamanrasset II, Tamaya Mellet 24.128 and

Homme du Tchad 24.385, display features which are also common in Sudanese Early Khartoum samples. A morphology characterised by a mix of biologically sub-Saharan and North African or, in this sense, intermediate traits defines the members of the much smaller second group. It also comprises gracile and robust material, like Oued Inamoulay 1 and Yao 1 respectively. The third group is the smallest. It consists of individuals whose appearance is similar to that of modern North Africans, for instance El Guettara 1 (e.g. Chamla 1968, 1986; Coppens/Chamla 1978). Populations belonging to the first group probably occupied the entire area south of the 25th parallel from the beginning of the Early Holocene resettlement of the Sahara onwards. However, people of the third group, i.e. populations displaying morphological traits indicative of a North African origin, started to penetrate the northern parts of this territory during the Middle and Late Holocene. They seem to have replaced and/or mixed with the earlier inhabitants of areas like the Aïr Massif, the Fezzan and the Tibesti Mountains (e.g. Bruner *et al*. 2002; Chamla 1968, 1986; Coppens/Chamla 1978; Di Lernia/Manzi 1998; Herrmann/Gabriel 1972; Paris 1990, 1995, 1996, 1997; Pinhasi 2002: 311-312; Ricci *et al*. 2002; Roset 1987, 1995). The comparatively early Nabta Playa human remains (ca. 9800-5800 BP) from the southern part of Egypt's Western Desert were described as being most similar to modern populations living south of the Sahara. They also appear to exhibit affinities with the Late Pleistocene material from Jebel Sahaba, Tushka and Wadi Halfa. The younger sample from the close-by Jebel Ramlah cemetery (ca. 5700-5500 BP), on the other hand, probably already belonged to the decidedly less morphologically sub-Saharan post-Pleistocene Nubian cluster (e.g. Henneberg *et al*. 1980: 392; Irish 2001, 2005, 2008; Schild *et al*. 2002).

Questioning the validity of osteological estimations of biological ancestry, Dutour, Petit-Maire and a small number of other authors proposed a different classification scheme (e.g. Chevaux/Puech 1998; Dutour 1984, 1988, 1989, 1995; Georgeon *et al*. 1992, 1993, Petit-Maire/Dutour 1987; Petit-Maire/Riser 1983). Their approach uses so-called "Cromagnoid" characteristics and various robusticity traits. "Craniofacial disharmony" is created by a low face paired with a long cranial vault, i.e. the combination of a low upper facial (I39.: 48. / 45.) and a low cranial index (I1.: 8. / 1.). This "disharmony" is deemed to be a typically "Cromagnoid" attribute. The robusticity traits this system utilises include marked temporal lines (*Lineae temporales*), large mastoid processes (*Processus mastoidei*), prominent superciliary arches (*Arcus superciliares*), low rectangular orbits (*Orbitae*), broad mandibular rami (*Rami mandibulae*) and pronounced gonial eversion. Based on these diagnostic criteria, human remains are described as either "Mechtoid" or "non-Mechtoid". The Middle and Late Holocene samples form Hassi el Abiod and Kobadi in the Malian Sahara are thus described as both truly "Mechtoid" and very similar to North African material from Iberomaurusian and Capsian sites like Taforalt in Morocco or Mechta el Arbi, Afalou bou Rhummel and Columnata in Algeria. Following the same rationale, the remains from Asselar, Tin Lalou, Karkarichinkat, Tagdaït and Yao are likewise categorised as "Mechtoid". Moreover, the Late Pleistocene inhabitants of the Nubian Nile Valley, i.e. the Jebel Sahaba and Wadi Halfa series, are referred to as "eastern Mechtoids". Concluding that the Early Holocene population of Gobero was most similar to Iberomaurusians and Capsians, that the more gracile Middle Holocene individuals from the same site were members of a distinctly different group and that the former were replaced by the latter, Stojanowski is the latest author to employ a largely "Mechtoid" versus "non-Mechtoid" interpretative framework (Sereno *et al*. 2008).

I.D.1.a.3. Nile Valley

I.D.1.a.3.a. Material

Decades of archaeological activity both in Nubia, i.e. in the area between Aswan and Debba, and Central Sudan have led to the discovery of a large number of sites at which relevant human skeletal remains could be unearthed. Together with the Pleistocene finds from Nazlet Khater (37 570±350 BP) south of Asyut and Wadi Kubbaniya (ca. 19 000-17 000 BP) near Aswan, the Qadan series from Jebel Sahaba (13 740±600 BP), Tushka (ca. 12 000-10 000 BP) and Wadi Halfa (ca. 11 950-6400 BP) in Nubia constitute the most ancient of these remains. The following Early Khartoum period is represented by small samples from sites such as Khartoum Hospital and Saggai in the Khartoum region, Shabona on the White Nile, Jebel Shaqadud in the Western Butana and El Barga in the Kerma Basin. Kadero and Geili close to Khartoum, El Kadada and El Ghaba in the Shendi area, the Western Butana site of Jebel Shaqadud, R12 and El Multaga in the Dongola Reach as well as the Kerma Basin sites El Barga and Kadruka all yielded Neolithic skeletal populations. The youngest material, which needs to be explicitly mentioned in this context, has been excavated at Kerma, O16 and P37 in the Northern Dongola Reach, at various Lower Nubian A- and C-Group sites and at the numerous large New Kingdom, 25th Dynasty and Meroïtic cemeteries (e.g. Anderson 1968; Angel/Kelley 1986; Batrawi 1945, 1946; Bietak 1987; Bonnet 1992, 2004; Bouville 1982; Buzon 2006(a); Chaix 2003; Chamla 1967; Clark 1989; Collett 1933; Coppa/Macchiarelli 1983; Derry 1909(a), 1909(b), 1949; Dzierżykray-Rogalski 1977; Ehrgartner 1965; Fernández *et al*. 2003; Geus 1986, 1991; Greene/Armelagos 1972; Grimm/Hildebrandt 1972; Grimm/Zuhrt 1967; Haaland/Abdel-Magid 1992, 1995; Honegger 2004(a), 2004(b), 2005; Honegger *et al*. 2009; Irish 2005, 2008; Johnson/Lovell 1995; Judd 2001, 2008(a), 2008(b); Jungwirth 1968; Keita 2007; Lecointe 1987; Marks *et al*. 1985; Nielsen 1970; Otto 1964; Peressinotto *et al*. 2004; Pinhasi 2002; Pinhasi/Semal 2000; Promińska 1989; Reisner 1923; Simon 1980, 1982, 1987, 1997; Smith 1909; Smith/Derry 1910(a), 1910(b); Smith/Wood-Jones 1910; Strouhal 1975; Thoma 1984; Trancho/Robledo 2003; Zabkar/Zabkar 1982; Zuhrt 1967).

Qadan	ca. 13 000-8000 BCE
"Khartoum Mesolithic" (Early Khartoum)	ca. 8000-5000 BCE
"Khartoum Neolithic" (Khartoum Shaheinab)	ca. 5000-3000 BCE
A-Group	ca. 3700-2800 BCE
C-Group	ca. 2200-1500 BCE
pre-Kerma	ca. 3200-2500 BCE
Kerma period (*ancien*, *moyen*, *classique*)	ca. 2500-1500 BCE
Egyptian rule of Nubia	ca. 1500-1100 BCE
Nubian rule of Egypt	ca. 750-650 BCE
Napata	ca. 750-400 BCE
Meroë	ca. 400 BCE - 350 CE

Figure 20: Relevant periods of the Nubian and Central Sudanese Nile Valley.

I.D.1.a.3.b. Robusticity, stress and health

Similar to most publications concerned with Saharan material, the original reports on human remains from the Nile Valley usually describe observations relating to robusticity, stress and health. The relevant findings these reports list generally parallel those known from Saharan series (e.g. Anderson 1968; Coppa/Macchiarelli 1983; Dastugue 1967; Greene/Armelagos 1972; Judd 2001, 2008(a); Nielsen 1970). A large body of material from the Nile Valley has also formed an easily accessible part of well-known and frequently used osteological collections for a long time. Many studies testing specific hypotheses as well as various original descriptions of larger series have included such Nile Valley series in systematic comparisons involving stress markers, health indicators and pathologies (e.g. Anderson 1968; Calcagno 1986; Carlson 1976; Greene/Armelagos 1972; Judd 2008(a); Shackelford 2007; Starling/Stock 2007; Wapler *et al*. 2004).

Late Pleistocene, A- and C-Group, Pharaonic, Meroïtic and Christian Nubian samples were used to document a diachronic process in which teeth became smaller, *Viscerocrania* became more gracile and increasingly inferoposteriorly positioned and *Neurocrania* became shorter and higher. This craniodental reduction was interpreted as the result of reduced masticatory stresses and mounting selection pressures favouring more caries-resistant teeth. It was hypothesised that the reduced masticatory stresses were brought about by a growing reliance on softer as well as more processed food and that these softer, carbohydrate-rich diets created increased caries-related selection pressures. Some studies showed that the gracilisation was accompanied by a trend towards more oblique molar abrasion. Furthermore, these analyses demonstrated that C-Group individuals experienced heavier dental wear than their A-Group predecessors. Both the higher wear plane angles and the accelerated abrasion rates were attributed to the rising grit content of a diet in which ground cereals became gradually more important (e.g. Beckett/Lovell 1994; Calcagno 1986; Calcagno/Gibson 1988; Carlson 1976; Carlson/Van Gerven 1977; Greene *et al*. 1967; Small 1981; Smith 1984; Van Gerven *et al*. 1973; Van Gerven *et al*. 1977).

Numerous studies of Nubian samples utilised a wide range of data indicative of the degree to which populations were affected by occupational stress, nutritional deficiencies, physiological strain and diseases. Various researchers analysed frequencies of porotic hyperostosis, *Cribra orbitalia*, dental caries, enamel hypoplasia lesions, periapical abscesses, periostitis, specific arthrosis patterns and particular diseases. Other authors focused on the cross-sectional geometry and histological characteristics of long bones. Most of these studies came to the conclusion that the adoption of food-producing subsistence systems, agricultural intensification and the resulting population growth had various deleterious effects (e.g. Armelagos 1969; Armelagos *et al*. 1972; Beckett/Lovell 1994; Blakey *et al*. 1990; Buzon 2006(b); Buzon/Judd 2008; Carlson *et al*. 1974; Clark 1989; Coppa/Macchiarelli 1983; Fairgrieve/Molto 2000; Filer 1996; Greene *et al*. 1967; Greene/Armelagos 1972; Hillson 1979; Hummert/Van Gerven 1983; Judd 2008(a); Leek 1966; Mahoney 2006; Martin/Armelagos 1979, 1986; Promińska 1989; Pudło 1999; Rose *et al*. 1993; Shackelford 2007; Starling/Stock 2007; Van Gerven *et al*. 1995; Wapler *et al*. 2004; White/Armelagos 1997; Zuhrt 1967).

Lastly, analyses of injury patterns revealed that Neolithic Nubians experienced far less violent trauma than Kerma period Nubians, that the Kerma period inhabitants of the city of Kerma had to cope with higher levels of violence than their rural neighbours, that the number of traumatic injuries decreased during the course of the Egyptian occupation of Nubia and that the rocky Nubian landscape drastically increased the risk of suffering long bone fractures (e.g. Alvrus 1999; Buzon/Richman 2007; Judd 2002(a), 2002(b), 2004, 2006, 2008(a); Kilgore *et al*. 1997; Waldron 2000). Although it is not as widely quoted as the extraordinarily high incidence of traces of violent encounters at Jebel Sahaba, the evidence suggesting interpersonal violence at Wadi Halfa and Wadi Kubbaniya is certainly noteworthy as well (e.g. Anderson 1968; Greene/Armelagos 1972; Thorpe 2003; Wendorf 1968; Wendorf *et al*. 1986).

I.D.1.a.3.c. Metric and non-metric affinities

Taking the initial assessment of the Late Pleistocene material from Jebel Sahaba, Tushka and Wadi Halfa as well as the above-mentioned, later studies revealing the extend to which successive Nubian populations were affected by craniodental reduction into account, various authors have proposed or support models of long-term population continuity in Nubia. Most proponents of these models are dedicated to the modernisation of the understanding of human geographic variation and explain the morphological inter-group differences as the result of microevolutionary processes induced by changing selection pressures (see I.D.1.a.3.b. and for example: Calcagno 1986; Carlson 1976; Carlson/Van Gerven 1977; Robertson 1979; Robertson/Bradley 1978; Small 1981; Van Gerven *et al*. 1973; Van Gerven *et al*. 1977). However, the majority of researchers favour different scenarios. Countless studies of Nubian material relied on relevant metric and non-metric characteristics in order to estimate biological ancestry individually or to determine inter-population affinities statistically. The results of these analyses suggest that Nubia's population history from the Late Pleistocene through the Meroïtic period was shaped by a combination of migrations, gene flow and continuity. Accordingly, the various archaeologically defined Nubian samples are usually described as homogeneous groups, which are biologically either rather sub-Saharan or North African, or "mixed" populations, which consist of different proportions of individuals of biologically sub-Saharan, North African or "mixed", i.e. partly sub-Saharan and partly North African, ancestry.

Believed to be the descendants of earlier Lower Nubian Neolithic groups, the bearers of the A-Group culture seem to have formed a biologically fairly uniform population which was similar to the predynastic and dynastic inhabitants of Upper Egypt. More pronounced sub-Saharan features can, however, occasionally be observed as well (e.g. Batrawi 1945, 1946; Irish 2005: 530-531; Nielsen 1970; Smith/Wood-Jones 1910; Strouhal 1975: 33). Even though the descriptions of certain series imply an almost complete absence of traces of biologically sub-Saharan influences, on the whole, C-Group samples are characterised by stronger sub-Saharan affinities. Accordingly, the material from various sites is said to exhibit a harmonised mosaic of typically biologically sub-Saharan and Upper Egyptian traits. Since an influx of, at least, limited numbers of new people is suggested by certain differences between the two groups, the A-Group does not seem to have been wholly ancestral to the C-Group (e.g. Batrawi 1945; Ehrgartner 1965; Irish 2005: 531; Johnson/Lovell 1995; Nielsen 1970; Prowse/Lovell 1995; Smith/Derry 1910(a), 1910(b); Strouhal 1975: 34-35). Kerma's populace most likely grew out of the local pre-Kerma population. It has generally been portrayed as a homogeneous group in which biologically sub-Saharan and biologically North African elements were thoroughly mixed. Nonetheless, the samples also include a small number of individuals with marked biologically sub-Saharan traits. Moreover, a certain degree of relatedness to the A-Group may be assumed as well (e.g. Bonnet 1992; Collett 1933; Honegger *et al*. 2009; Irish 2005: 531-532; Reisner 1923; Simon 1980, 1982; Strouhal 1975: 35-36). Nubia's Pharaonic inhabitants were members of a "mixed" population consisting of biologically North African Egyptian immigrants and indigenous, biologically more sub-Saharan, Nubians. In addition, clear indications of intermarriage between these two groups are not infrequently encountered (e.g. Buzon 2006(a); Derry 1909(a); Irish 2005: 532; Nielsen 1970; Smith 1909; Smith/Derry 1910(b); Strouhal 1975: 37). Generally speaking, biologically sub-Saharan elements dominated in the "mixed" population of the Meroïtic state. The intensity of these biologically sub-Saharan elements appears to have increased from north to south. Almost certainly originating in more southerly areas, early Meroïtic groups probably absorbed remnants of other groups while expanding northward into Lower Nubia (e.g. Chamla 1967; Derry 1909(b); Fox 1997; Hrdy 1978; Irish 2005: 532; Jungwirth 1968; Keita 2007; Nielsen 1970; Smith/Wood-Jones 1910; Strouhal 1975: 38-39; Zabkar/Zabkar 1982). In sum, abrupt or total population replacements by biologically dramatically dissimilar peoples do not seem to have occurred in Nubia after the Early Neolithic. Middle Neolithic and later Nubian populations as a whole resemble groups from further north, especially those from Egypt, in several aspects. As an independent indigenous and largely biologically sub-Saharan complex, these populations may, nevertheless, not be perceived as a mere extension of non-Nubian groups.

The original descriptions of the Late Pleistocene material from Jebel Sahaba, Tushka and Wadi Halfa stressed its resemblance to similarly robust "Mechtoid" series from North Africa, treated its similarities with modern biologically sub-Saharan populations cautiously and pointed out that it might be ancestral to later Nubians. Later re-evaluations of the material were, however, able to invalidate the theories which attempted to interpret the remains in connection with "Mechtoid" series, to demonstrate the three samples' clear sub-Saharan affinities and to establish that these Late Pleistocene Nubians were most likely not the primary ancestors of the groups which inhabited the Nubian Nile Valley from the Middle Neolithic onwards (e.g. Anderson 1968; Bräuer 1983: 119; Di Lernia/Manzi 1998: 226; Dutour 1984, 1995; Ferembach 1985; Greene *et al*. 1967; Greene/Armelagos 1972; Groves/Thorne 1999; Irish 2000, 2005, 2008; Irish/Turner 1990; Keita 1990: 45; Lahr/Arensburg 1995; Petit-Maire/Dutour 1987; Pinhasi 2002: 311-312, 322-325, 328; Strouhal 1984; Turner/Markowitz 1990). The analyses of the Nazlet Khater and Wadi Kubbaniya remains also revealed strong sub-Saharan affinities. Their robust sub-Saharan appearance makes them highly reminiscent of the younger material from Jebel Sahaba, Tushka and Wadi Halfa. Both facts suggest a possible ancestor-descendant relationship (e.g. Angel/Kelley 1986; Dutour 1989: 273-278, 1995; Pinhasi 1998, 2002: 327; Pinhasi/Semal 2000; Thoma 1984). The Early Khartoum material from Khartoum Hospital, Saggai and Shabona is similarly characterised by affinities with the Late Pleistocene Nubian series. Like the Jebel Sahaba, Tushka and Wadi Halfa skeletons, these individuals are robust and display typically sub-Saharan trait combinations. The same appears to be true for the "Mesolithic" remains from El Barga and Jebel Shaqadud (e.g. Clark 1989: 395; Coppa/Macchiarelli 1983; Derry 1949: 32; Grimm/Hildebrandt 1972; Grimm/Zuhrt 1967; Honegger 2005, 2007: 207; Rightmire 1984: 194). Their morphology leaves little doubt that the inhabitants of the "Khartoum Neolithic" site of Kadero were among the direct descendants of these Early Khartoum populations. However, it does not appear to be likely that the majority of the ancestors of the other Neolithic series from Sudan also belonged to this population complex. It has already been demonstrated that the R12 material is most similar to the above-mentioned group of post-Pleistocene Nubian samples. In view of their appearance, it can be deduced that the Kadruka and, perhaps to a lesser extent, the El Kadada sample would cluster in much the same fashion. The description of the remains from Geili suggests that they have more in common with samples from further north as well (e.g. Bouville 1982; Dzierżykray-Rogalski 1977, 1978; Dzierżykray-Rogalski/Krzyżaniak 1978; Geus 1984; Irish 2008; Judd 2001, 2008(a), 2008(b); Promińska 1989; Reisner 1923; Simon 1987, 1997).

I.D.1.b. Isotope analyses

Although the information produced by isotope analyses of relevant human skeletal remains is still comparatively limited, the few published studies have already added to the present understanding of the biology of archaeological populations from the Sahara and the Nile Valley (e.g. Ambrose/DeNiro 1986; Buzon *et al*. 2007; Coppa/Palmieri 1988; Dupras/Schwarcz 2001; Dupras/Trocheri 2007; Finucane *et al*. 2008(b); Iacumin *et al*. 1998; Palmieri 1983; Sereno *et al*. 2008; Tafuri *et al*. 2006; Thompson *et al*. 2008; Trancho/Robledo 2003; Turner *et al*. 2007; White *et al*. 2004; White/Armelagos 1997; White/Schwarcz 1994).

I.D.1.b.1. Sahara

C_4 plants, for example wild grasses, as well as the cattle and ovicaprids consuming them, probably constituted the source of around 85% of the carbon in the diet of the Late Stone Age inhabitants of the Karkarichinkat Nord site (ca. 2600-2200 calBCE) in the Malian Tilemsi Valley (Finucane *et al*. 2008(b)). The strontium isotope signatures of the Early Holocene foragers from Gobero (ca. 7700-6200 BCE) indicate that they were rather sedentary and did probably not regularly visit areas such as the Aïr Highlands or the Hoggar Mountains (Sereno *et al*. 2008). In the Libyan Fezzan, $^{87}Sr/^{86}Sr$ values were found to be heterogeneous among Late Acacus hunter-gatherers (ca. 8900-7400 BP) and homogeneous among Early and Middle Pastoral phase herders (ca. 7400-5000 BP). High levels of residential mobility during the Late Acacus and the equalising effect of stable transhumance patterns during the Pastoral phase were cited as the most likely explanations for this situation. The sex-specific isotopic differences encountered after the Middle Pastoral phase, on the other hand, were interpreted as evidence for the emergence of patrilocal structures (Tafuri *et al*. 2006). Analyses of the stable oxygen and nitrogen isotope ratios of remains from a 3rd century CE cemetery in the Egyptian oasis of Dakhla showed that the values of two apparently "non-local" males were similar to those documented for Nile Valley dwellers. The presence of these "non-local" men was interpreted in connection with the caravan trade (Dupras/Schwarcz 2001).

I.D.1.b.2. Nile Valley

Early Khartoum, "Khartoum Neolithic" and Meroïtic material from Saggai and Geili in the Central Sudanese Nile Valley was subjected to isotope analyses. The results were indicative of a gradual transition from a subsistence system relying on riverine resources to an economy based on animal husbandry (Coppa/Palmieri 1988; Palmieri 1983). The $\delta^{13}C$ and $\delta^{15}N$ values observed in "*ancien*", "*moyen*" and "*classique*" period series from Kerma reflect a diet which consisted of animal protein as well as C_3 and C_4 plants. Carbon derived from C_4 plants seems to have played a more prominent role during the Kerma "*ancien*" phase. It also appears to have been generally more important at Kerma than at sites in the Egyptian Nile Valley. The C_4-plant-derived carbon was probably consumed directly, in the form of grass seeds, and indirectly, in the form of beef or the meat of ovicaprids. Moreover, the considerable variability of $\delta^{13}C$ values supports the hypothesis that the population of Kerma's cemeteries includes a large number of "non-local" individuals (Iacumin *et al*. 1998; Thompson *et al*. 2008). The isotope ratios which characterise Nubian material from Meroïtic and later sites imply both a renewed rise in C_4 plant consumption during the X-Group period (ca. 350-550 CE) and that domestic herbivores supplied the bulk of the dietary protein (Turner *et al*. 2007; White/Armelagos 1997; White *et al*. 2004; White/Schwarcz 1994). Buzon *et al*. (2007) studied material from the Nubian site of Tombos. The remains they analysed were dated to the period during which Nubia was ruled by Egypt. Comparing $^{87}Sr/^{86}Sr$ values, Buzon *et al*. (2007) were able to separate local from non-local specimens. By doing so, they demonstrated that the consumption of Nile water does not erase the signal which reflects the geological differences along the river and that strontium isotope analyses can thus be used successfully in the Nile Valley.

I.D.1.c. DNA analyses

I.D.1.c.1. ancient DNA

Attempts to extract DNA from prehistoric African remains rarely succeed. Consequently, only six aDNA studies need to be mentioned (e.g. Babalini *et al*. 2002; Burger *et al*. 1999; Fox 1997; Gilbert *et al*. 2003; Kéfi *et al*. 2005; Krings *et al*. 1999: 1175; Marota *et al*. 2002; Ottoni 2007: 69-72, 107-112; Pääbo 1985; Zink/Nerlich 2005).

I.D.1.c.1.a. Sahara

Babalini *et al*. (2002) reported that they had extracted mitochondrial and nuclear DNA from ten individuals excavated at four Late Pastoral phase sites (ca. 5000-3500 BP) in the Wadi Tanezzuft (Fezzan, Libya). A multidimensional scaling analysis placed the rather uniform HVS-I sequences from the three older sites close to each other and, as a group, in between the Eurasian and the sub-Saharan cluster of comparative samples. The decidedly more variable individuals from the fourth and youngest site were still close to those from the other three Wadi Tanezzuft samples but already inside the Eurasian cluster. The publication also confirmed five successful molecular sex diagnoses, all but one of which in accordance with the results of the morphological sex estimations. A later attempt to subject another 18 individuals from the Fezzan to aDNA analyses failed. Neither the 14 Late Acacus to Late Pastoral period (ca. 8900-3500 BP) nor the four Garamantian (ca. 2700-1800 BP) skeletons yielded any reproducible results (Ottoni 2007: 51, 69-72, 107-112). Kéfi *et al*. (2005) published an mtDNA study of the Moroccan remains from Taforalt (ca. 12 000 BP). Since none of the HVS-I sequences extracted from the 31 long bone samples were identified as sub-Saharan, the authors came to the conclusion that Iberomaurusian populations could not have originated in sub-Saharan Africa. They also deduced that genetic continuity in North Africa could therefore probably be assumed. Another team described the successful amplification of nuclear DNA from the β-globin region which had been extracted from two samples from Taforalt and one Malian specimen from Hassi el Abiod (ca. 7000 BP) (Beraud-Colomb *et al*. 1995).

I.D.1.c.1.b. Nile Valley

Pääbo (1985) examined 23 Egyptian mummies and found that the remains of one 2400-year-old individual still contained comparatively well-preserved DNA. The analysis of 29 individuals produced positive amplifications in 15 cases when Fox (1997) screened a Meroïtic Nubian sample for the mtDNA marker *Hpa*I (np3592). *Hpa*I (np3592) is virtually absent in North Africa but usually observed at frequencies of around 68.7% in biologically sub-Saharan populations. Only four (26.7%) of the 15 positive amplifications exhibited this selectively neutral mutation. The Meroïtic frequency was thus not significantly different from the 32.5% of Nubia's modern inhabitants. Consequently, Fox's results were interpreted as being more consistent with the models which rely on gene flow, rather than *in situ* evolution, to explain the diachronic morphological changes in Nubia (Fox 1997; Krings *et al*. 1999: 1175).

I.D.1.c.2. modern DNA

Research attempting to reconstruct prehistoric events by using the genetic variability of contemporary populations is unable to contribute to the biological positioning of prehistoric groups with unknown descendants. Accordingly, at least in the context of this study, not even the analyses of modern DNA which appear to be highly pertinent can be considered to have the same relevance as research focusing on germane skeletal series or aDNA extracted from them. The results of molecular investigations which do not directly relate to the population history of Sudan and the Sahara or which merely include samples drawn from modern groups of Saharan origin are even less relevant (e.g. Arredi *et al*. 2004; Bandelt *et al*. 2001; Blanc *et al*. 1990; Bosch *et al*. 2001; Černý *et al*. 2007; Černý *et al*. 2009; Coelho *et al*. 2009; Cruciani *et al*. 2002; Cruciani *et al*. 2004; Cruciani *et al*. 2007; Destro-Bisol *et al*. 2004; Excoffier *et al*. 1991; Flores *et al*. 2001; González *et al*. 2003; Hájek *et al*. 2008; Hassan *et al*. 2008; Krings *et al*. 1999; Lucotte *et al*. 2000; Lucotte/Mercier 2003; Luis *et al*. 2004; Manni *et al*. 2002; Nebel *et al*. 2002; Olivieri *et al*. 2006; Passarino *et al*. 1998; Poloni *et al*. 2009; Rando *et al*. 1998; Reed/Tishkoff 2006; Rosa *et al*. 2004; Rosa *et al*. 2007; Salas *et al*. 2002; Sanchez *et al*. 2005; Scozzari *et al*. 1999; Seielstad *et al*. 1998; Semino *et al*. 2002; Sirugo *et al*. 2008; Spendini *et al*. 1999; Tartaglia *et al*. 1996; Thomas *et al*. 2000; Tiercy *et al*. 1992; Tishkoff *et al*. 2007; Underhill *et al*. 2000; Watson *et al*. 1996; Watson *et al*. 1997; Wood *et al*. 2005).

I.D.1.c.2.a. Sahara

Studies of the Chad Basin's mitochondrial gene pool undertaken by Černý *et al*. (2007) and Černý *et al*. (2009) led to a number of findings upon which these authors based various conclusions. The haplogroups L3f3 and L3e5 are probably autochthonous to the Chad Basin. L3f, from which L3f3 is descended, most likely emerged around 57 100±9400 BP in East Africa. The L3f3 clade itself was dated to 8000±2500 BP. L3f3 appears to be almost entirely restricted to the Chad Basin. It is frequent among Chadic speakers and virtually absent in other groups. The clade's lack of internal variation was interpreted as evidence of a demographic expansion during the Holocene. L3e5 seems to have arisen during the period around 11 450±3800 BP. That this haplogroup is also present in North Africa was explained in connection with another expansion dated to 7100±3800 BP. It could, furthermore, be shown that linguistic and geographic factors had a negligible effect on the genetic structure of the inhabitants of the Chad Basin. 92.4% of the mtDNA variation was encountered within populations and only 3.4% could be attributed to linguistic affiliations. The sex-specific association between increased facial height and East African mtDNA haplogroups in Chad Basin females, on the other hand, appears to be indicative of an east-west oriented distribution of populations which remained stable for a considerable amount of time (Hájek *et al*. 2008). Finally, a multidimensional scaling analysis based on F_{ST} distances between HVS-I sequences placed the comparatively tight cluster formed by various Afro-Asiatic and non-Afro-Asiatic Chad Basin samples closer to Semitic- and Cushitic-speaking groups from Ethiopia and Somalia than to Semitic- and Berber-speaking populations from North Africa. This result as well as the agreement between the likely age of the L3f3 clade's most recent common ancestor and the assumed age of the Chadic language family was cited in support of Blench's "Inter-Saharan Hypothesis". This linguistic model assumes that Chadic developed out of languages spoken by Cushitic pastoralists from the Nile Valley who migrated to the Chad Basin via the Wadi Howar (Blench 1999; Černý *et al*. 2009).

I.D.1.c.2.b. Nile Valley

The analysis of phenotypic and genotypic data of 470 Sudanese, Kenyans and Tanzanians carried out by Tishkoff *et al*. (2007) provided valuable information on lactase persistence frequencies in East Africa and led to the identification of three new lactase persistence associated SNPs, C-14010, G-13907 and G-13915. The Northern Sudanese Beja, a population of Cushitic pastoralists, exhibited a lactase persistence frequency of 88%, the highest value of all groups in the study. The sample consisting of members of Nilo-Saharan-speaking populations from Southern and Western Sudan, like the Masalit, Shilluk, Dinka and Nuer, was characterised by lactase persistence and intermediate persistence frequencies of 54% and 31% respectively. The selection coefficient estimates of 0.035-0.097 and the assumed age of the oldest of the SNPs (C-14010) of ca. 7000 years indicate that the three newly discovered alleles have been acquired rather recently and spread extraordinarily quickly. However, the absence or presence of these three new and two other lactase persistence associated SNPs (T-13910 and A-22018), which were previously identified in European populations, failed to explain the entire observed phenotypic variation. This was particularly obvious in the case of the Nilo-Saharan-speaking Sudanese and the Tanzanian Hadza. None of the five SNPs were detected in either group. Both therefore probably carry additional, possibly older, lactase persistence associated alleles. That it could not be determined if C-14010 originated in Kenyan Nilo-Saharans or Tanzanian Cushites was interpreted in the context of other evidence for far-reaching admixture between Nilo-Saharan and Afro-Asiatic pastoralists. The ancestors of groups like the Maasai, Nandi, Pokot, Samburu and Tugen are widely believed to have come from Southern Sudan. As mentioned above, C-14010 was not detected in the Nilo-Saharan Sudanese sample. This indicates that the C-14010 allele either arose in or was introduced into these Kenyan and Tanzanian groups of Nilo-Saharan-speaking pastoralists after their ancestors had left Southern Sudan (e.g. Enattah *et al*. 2008; Fujita *et al*. 2004; Ingram *et al*. 2009; Itan *et al*. 2010; Itan *et al*. 2009; Poloni *et al*. 2009; Tishkoff *et al*. 2007).

The remaining relevant genetic studies are all similar in nature and their results are mutually supportive. These molecular investigations prove that the inhabitants of the Nile Valley are connected by mitochondrial as well as Y-chromosomal clines which stretch from the confluence of the Nile to its delta. The analyses, however, also show that Nubians and other Northern Sudanese groups are genetically closer to Egyptians than they are to the distinct cluster formed by the Nilo-Saharan-speaking populations of Southwestern and Southern Sudan. Egyptians from the part of the Nile Valley between the delta and Kena, Nubians from the area between Aswan and Dongola and Southern Sudanese from Shilluk, Dinka, Nuer and Nuba communities provided the 224 mtDNAs analysed by Krings *et al*. (1999). Distinguishing northern from southern types on the basis of the mtDNAs' HVS-I and *Hpa*I (np3592) sequences, the authors were able to establish that the diversity of northern mtDNA types decreases from north to south, that the diversity of southern mtDNA types decreases from south to north, that the similarity of mtDNA types decreases as geographic distance increases, that the genetic changes occur along a smooth cline and that Egyptians and Nubians are more similar to each other than either group is to the sampled Southern Sudanese populations. These results were considered to be most consistent with long-term interactions along the Nile in which gene flow from north to south was either earlier or less pronounced and gene flow from south to north either later or more intense. Lucotte/Mercier's (2003) study of the Y-chromosomal p49a,f *Taq*I haplotypes observed in 274 Egyptians from Lower Egypt, Upper Egypt and Lower Nubia may be perceived as a partial counterpart to Krings *et al*.'s (1999) mitochondrial investigation. Their analysis revealed that V (39.4%), XI (18.9%) and IV (13.9%) are the three most common Egyptian haplotypes. Outside of Egypt, V is widespread in Arab populations, XI in Ethiopia and IV in sub-Saharan Africa. In Egypt, V decreases from 51.9% in Lower Egypt to 17.4% Lower Nubia, XI increases from 11.7% in Lower Egypt to 30.4% in Lower Nubia and IV decreases from 39.1% in Lower Nubia to 1.2% in Lower Egypt. Comparing ten Y-chromosomal Unique Event Polymorphisms (UEPs) of 164 Egyptians, Moroccan Arabs and Moroccan Berbers with those of various European, North African and Middle Eastern populations, Manni *et al*. (2002) concluded that the modern Egyptian Y chromosome gene pool reflects ancient and recent gene flow from Europe, the Middle East and sub-Saharan Africa (e.g. Keita 2005; Keita/Boyce 2005; Lucotte/Mercier 2003; Manni *et al*. 2002).

Hassan *et al*. (2008) examined the Y chromosomes of 445 males from 15 Sudanese populations. These populations included both indigenous and non-indigenous groups. Indigenous populations were represented by the Northern Sudanese Nubians and Beja, the Western Sudanese Borgu, Masalit and Fur and the Southern Sudanese Shilluk, Dinka, Nuer and Nuba. Copts, Fulani and Hausa as well as Gaalien, Meseria and Arakien Arabs were used as non-indigenous samples. The study found that the haplogroups F, I, J, K, R are common among the Niger-Congo-speaking Fulani and the Afro-Asiatic-speaking Arabs, Copts, Beja and Hausa. A, B and E, on the other hand, are more frequent among the Nilo-Saharan-speaking Borgu, Masalit, Fur, Shilluk, Dinka and Nuer. Linguistic and genetic affinities were shown to be strongly correlated. Furthermore, unlike the other groups, most Nilo-Saharan-speaking populations only exhibited limited traces of gene flow. A principal component analysis of the F_{ST} values of the Sudanese, a Senegalese and two Ethiopian samples produced a plot with two clearly separated clusters. The first cluster consisted of the Nilo-Saharan-speaking groups from Western as well as Southern Sudan, i.e. the Borgu, Masalit, Fur, Shilluk, Dinka, Nuer and Nuba. It also included the Cushitic-speaking Oromo from Ethiopia. Except for the Senegalese, which were positioned far away from either grouping, all remaining samples formed the second cluster. Two lines could be distinguished within this second cluster. The first line, which was closer to the first cluster, was comprised of Amhara, Beja, Hausa and Fulani. The second line, which was further removed from the first cluster, constituted an alignment of Copts, Nubians and the three Arab groups. All of Hassan *et al*.'s (2008) findings confirmed those of earlier haematological studies. These studies had already documented that different Sudanese groups have been shaped by varying degrees of gene flow and admixture and that the Nilo-Saharan-speaking populations of Western and Southern Sudan occupy a somewhat special position (e.g. Bayoumi *et al*. 1985; Bayoumi/Saha 1987; Saha/el Seikh 1987; Tay/Saha 1988).

I.D.2. Relevant indirect evidence

I.D.2.a. Linguistic studies

Genetic classifications of languages and biological classifications of human populations usually show considerable similarities. Additionally, a proto-language's lexicon can contain information relating to ancient homelands and prehistoric activity patterns. Thus, linguistic research concerned with the prehistory of the region has the potential to provide clues as to who may have once populated the Wadi Howar and what activities these groups were probably habitually engaged in (e.g. Blench 1999; Blench/MacDonald 2000; Cavalli-Sforza 1997: 7721-7724; Cavalli-Sforza *et al.* 1994: 71-105; Dimmendaal 2007(a), 2007(b); Dimmendaal/Weber 2004; Dyen 1956; Ehret 1993, 2000, 2001, 2002; Ehret/Poznańsky 1982; Fox 1995: 308-322; MacDonald 1998; Nichols 1997).

I.D.2.a.1. Broader context

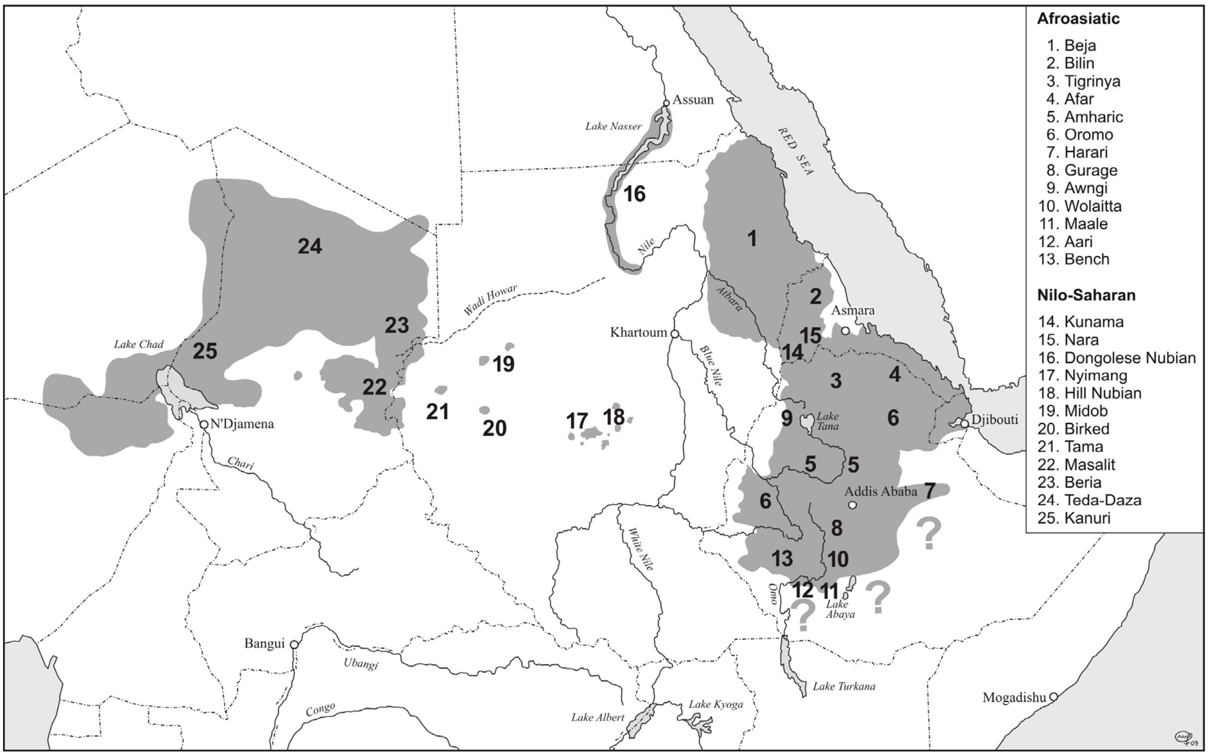


Figure 21: Present location of selected Afro-Asiatic and Nilo-Saharan languages sharing features indicative of a former typological convergence zone (Dimmendaal 2007(b): 45).

Although the presence of Kordofanian in the Nuba Mountains demonstrates that speakers of Niger-Congo languages must have at least passed through regions relevant to the population history of the Wadi Howar, it is the history of the Afro-Asiatic and the Nilo-Saharan phylum which is inextricably linked to the prehistory of the Nile Valley and the Sahara. The linguistic evidence which indicates that early expansions and migrations led to a wide range of interactions between different languages belonging to these two phyla is plentiful. Probable cases of rather superficial contact, widespread bilingualism, language replacement and absorption of groups by populations of speakers of other languages have all been documented (e.g. Bechhaus-Gerst 1989, 2000, 2004(a); Blench 2006; Dimmendaal 2007(a), 2007(b); Ehret 1999(a), 1999(b), 2002, 2006(a), 2006(b); Ehret/Poznański 1982; Arendt/El-Sayed 2004; MacDonald 1998; Rilly 2006; Tosco 2008).

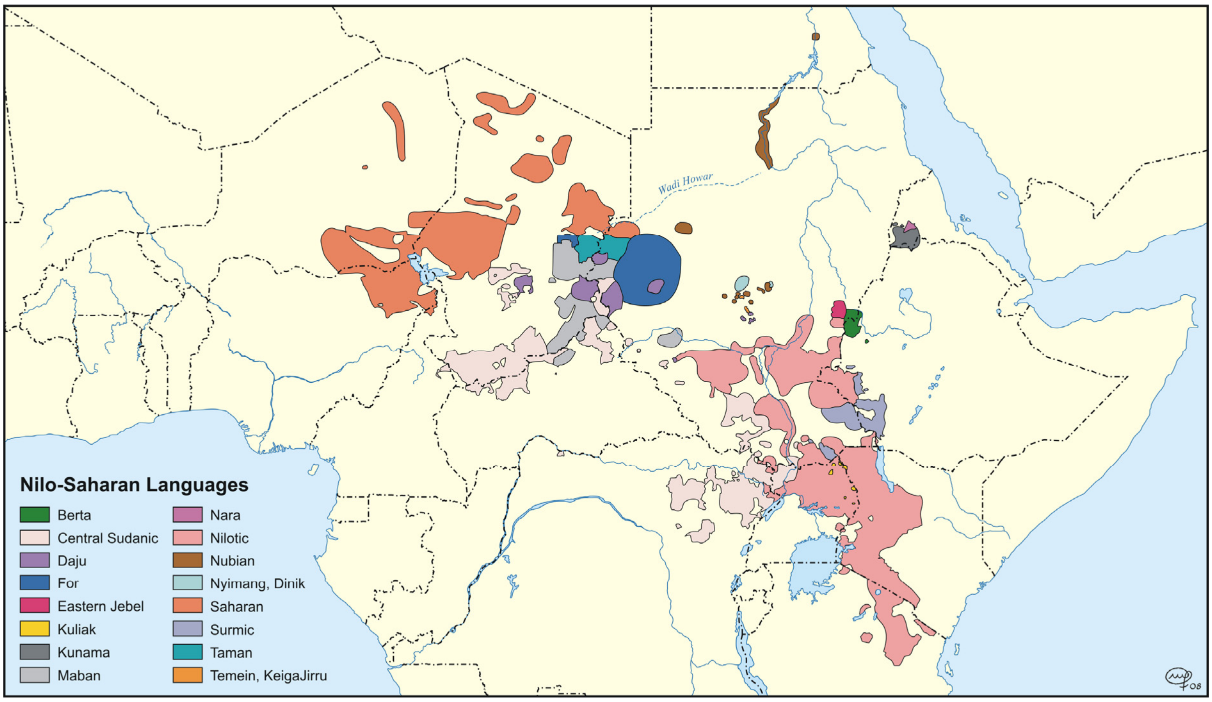


Figure 22: Present location of Nilo-Saharan languages without Songhai, Koman and Gumuz (after Dimmendaal 2007(a): 149).

The speakers of proto-Nilo-Saharan are thought to have inhabited the part of the Nile Basin which lies south of the Nile confluence in Southern Sudan. Various authors have associated the diversification of the phylum with, firstly, the Early Holocene recolonisation of the Sahara by pottery-using hunter-gatherer-fishers and, secondly, the later spread of cattle pastoralism throughout the Sahara and East Africa (e.g. Blench 2006: 95-108; Ehret 1993, 1999(a), 1999(b), 2000: 286-287, 2002, 2006(a); Haaland 1992; Jesse 2003(b): 285-287; Sutton 1974: 535-540). Extant Nilo-Saharan languages are spoken by more than eleven million people spread out over an area stretching from Mali to Tanzania. Groups speaking Nilotic languages, such as the Western Nilotic Shilluk, Dinka, Nuer, Acholi, Lango and Luo or the Eastern Nilotic Bari, Karimojong, Turkana and Maasai, are encountered in Southern Sudan, Northern Uganda, Western Kenya, Northern Tanzania and Western Ethiopia. Saharan languages, like Kanuri, Kanembu, Beri (i.e. Beria: Zaghawa and Bideyat), Tubu (Teda and Daza) and Berti, are distributed throughout Northern Nigeria, Eastern Niger, Chad and Western Sudan. The territories of the ethnic groups which speak Fur and the Maban language Masalit lie in Western Sudan and Eastern Chad. The speakers of Nubian languages, such as Kenzi, Nobiin, Dongolawi, Midob and Dilling, live in Sudan and Southern Egypt. Lastly, Songhai, whose classification as a Nilo-Saharan language remains controversial, covers parts of Mali and Burkina Faso (e.g. Bender 1996, 2000; Ehret 2001; Greenberg 1963; Lewis 2009; Nicolaï 1996; Ruhlen 1987).

Although the Levant, the Northwestern Sahara and even the Nile confluence have also been proposed, the Ethiopian Highlands, or the region north of these, are usually considered the most likely birthplace of proto-Afro-Asiatic. Numerous hypotheses seeking to connect languages belonging to the Afro-Asiatic phylum with specific archaeological complexes have been put forward. For example, the Capsian industry is believed by many to represent the material culture of proto-Berbers, the members of the C-Group are assumed to have spoken a more recent Berber language, Kerma's ancient inhabitants are commonly thought of as Cushites and the archaeological correlates of Egyptian are indisputable (e.g. Bechhaus-Gerst 1989, 2000: 457-458, 2004(b): 108; Behrens 1981, 1984/1985; Bender 1997; Blench 2001, 2006: 139-162; Diakonoff 1998; Diamond/Bellwood 2003: 601; Ehret 1999(a), 1999(b), 2002, 2006(a), 2006(b); Haaland 1992; Klein-Arendt/El-Sayed 2004; MacDonald 1998: 50-51; Militarev 2002; Nichols 1997: 376). Over 350 million people in Africa and Southwest Asia speak modern Afro-Asiatic languages. Apart from the rather recently adopted Mauritanian, Moroccan, Algerian, Tunisian, Libyan, Egyptian, Sudanese and Chadian variants of Arabic, Amharic, Tigrigna and Tigré in Ethiopia and Eritrea constitute the most prominent Semitic languages in Africa. Berber languages, like Kabyle, Tamazight, Tamasheq, Tamajaq, Nafusi and Siwa, are spoken in the Central and Northern Sahara as well as in adjacent areas in Morocco, Algeria, Libya, Egypt, Mali and Niger. Groups speaking Cushitic languages, such as the Northern Cushitic Beja, the Eastern Cushitic Afar, Oromo, Rendille and Somali and the Southern Cushitic Iraqw and Dahalo, are distributed throughout Sudan, Eritrea, Ethiopia, Somalia, Kenya and Tanzania. The best-known Chadic languages are Hausa and Buduma. Whereas Buduma is more or less limited to the Chadian shores of Lake Chad, Hausa speakers may be encountered all over the Sahel. They are, however, most numerous in Nigeria, Niger, Sudan and Cameroon. The few speakers of Omotic languages, like Aari, Karo and Hamar, live in Southwestern Ethiopia (e.g. Greenberg 1963; Lewis 2009; Ruhlen 1987).

I.D.2.a.2. Activities

Reconstructions of lexical roots relating to habitually performed tasks, or objects with which they are associated, can identify possible causes of occupational stress and pathologies. Moreover, these lexical reconstructions' positions within the linguistic stratigraphy of proto-languages make it possible to draw conclusions about the relative age and the spread of such activities. The earliest Nilo-Saharan subsistence-related roots have not yet been satisfactorily reconstructed. The fact that today's distribution of Nilo-Saharan languages largely coincides with the area which used to be occupied by the producers of Wavy Line pottery has nevertheless encouraged a number of researchers to develop models which associate the speakers of proto-Nilo-Saharan and its earliest daughter languages with the Early Holocene exploitation of aquatic resources. There is, however, linguistic evidence that suggests words carrying meanings like "*to drive (livestock)*", "*to water (livestock)*", "*cow*", "*to milk*", "*grain*", "*grinding stone*", "*to produce pottery*" and "*temporary dwelling*" appeared very early on in the later history of Nilo-Saharan, probably already around 8500 BCE. After about another 1000 years, at a time which still predates the splits which gave rise to proto-Saharan, proto-Nubian and proto-Nilotic, terms for "*granary*", "*to winnow*" and "*to weed*" seem to have been added to the lexicon (e.g. Bender 1996; Blench 2006; Blench/MacDonald 2000; Ehret 1993, 1999(a), 1999(b), 2001, 2002, 2006(a), 2006(b); Haaland 1992; Hassan 2000; Jesse 2003(b): 285-287; MacDonald 1998; Sutton 1974).

Likely proto-Afro-Asiatic roots, such as those denoting "*to separate ears of grain*", "*processed grain*" and "*grinding stone*", indicate that the speakers of this language were probably engaged in subsistence practices involving the collection of wild grasses by the end of the Late Pleistocene. The lexicon of a subsequent Afro-Asiatic language, the one which was ancestral to Egyptian as well as all Berber, Chadic, Cushitic and Semitic languages, most likely already contained words for "*flour*", "*cooked grain*" and "*bread*". Although there are certain arguments in favour of an early use of milk by Afro-Asiatic-speaking populations, reliable linguistic evidence for domestic animals, predominantly ovicaprids, only dates from about 6500 BCE, the period after proto-Cushitic, proto-Chadic, proto-Berber and proto-Semitic had become separate languages (e.g. Bechhaus-Gerst 2000, 2004(b); Blench 1999, 2006; Clutton-Brock 2000; Ehret 1999(a), 1999(b), 2002, 2006(a); Haaland 1992; Hassan 2000; MacDonald 2000).

There are countless examples of subsistence terms which entered Nilo-Saharan languages from Afro-Asiatic languages and vice versa. The Northern Cushitic word for "*ovicaprid*" appears to have been borrowed by pastoralists speaking a language representing a comparatively ancient branch of Nilo-Saharan. Egyptian probably acquired Nilo-Saharan loanwords like "*cattle byre*", "*bull*", "*jar*" and "*kind of beer*". Nobiin seems to have adopted agricultural terms of Cushitic origin (e.g. Bechhaus-Gerst 1989, 2000; 2004(a); Ehret 1999(a), 1999(b), 2002, 2006(a); Klein-Arendt/El-Sayed 2004; Rowan 2006; Tosco 2008).

I.D.2.a.3. The Wadi Howar

The Wadi Howar features prominently in linguistic theories concerning the spread of specific groups of Afro-Asiatic and Nilo-Saharan speakers. The results of the linguistic research focusing on the relevant languages suggest that the Wadi Howar was probably the homeland of the speakers of proto-Eastern Sudanic, that proto-Chadic speakers might have migrated westward through the wadi, that the area was most likely a zone in which multilingualism was commonplace and that the populations which emerged from the Wadi Howar played key roles in the prehistory and history of Sudan.

Eastern Sudanic constitutes a well-defined genetic grouping within the Nilo-Saharan phylum. It includes Nubian, Surmic languages, such as Mursi and Murle, and the Nilotic subgroup, containing, for example, Dinka, Nuer, Lango, Acholi, Turkana, Luo and Maasai. Certain members of this group, mainly those encountered in the north, like Nubian, Tama, Nyimang and Nara, share specific typological traits with various Ethiopian Afro-Asiatic languages and a number of languages representing other branches of Nilo-Saharan, such as Saharan, Maban, Fur and Kunama. A verb-final constituent order, a complex case marking system and the frequent use of converbs are three examples of these typological traits. Berta, Temein, Daju, Nilotic and Surmic, on the other hand, are examples of more southerly members of the Eastern Sudanic group which do not display these features. Instead, they have a verb-second or verb-initial constituent order and a reduced case marking system in common. These features are also observed in certain Kordofanian languages, i.e. languages of Sudan's Nuba Mountains which belong to the Niger-Congo phylum. The typological differences between northern and southern Eastern Sudanic languages are mirrored by the distribution of various loan words (e.g. Dimmendaal 2007(b)).

Eastern Sahelian (Eastern Sudanic)
- Astaboran
    - I. Nara
    - II. Western Astaboran
        - A. Nubian
        - B. Tama
- Kir-Abbaian
    - I. Jebel
        - A. Eastern Jebel
        - B. Berta
    - II. Kir
        - A. Nuba Mountains
            - 1. Temein, Jirru
            - 2. Nyimang, Dinik
        - B. Daju
        - C. Surma-Nilotic
- Rub (Kuliak)

Figure 23: The sub-classification of Eastern Sudanic (based on Dimmendaal/Weber 2004: 98, after Ehret 2001).

Analysing this situation, Dimmendaal developed the “Wadi Howar Diaspora” model. Firstly, he interpreted these findings as evidence for two former convergence zones in which cultural contacts were accompanied by multilingualism. Secondly, he identified an original settlement area and routes away from it. This process was guided by the search for homelands and migration patterns most compatible with both the present geographic distribution of the Eastern Sudanic languages and the typological dichotomy characterising the group. Lastly, Dimmendaal considered the lexical evidence indicating that proto-Eastern Sudanic speakers were pastoralists in the context of the archaeological sequence of the Wadi Howar (e.g. Dimmendaal 2007(a), 2007(b); Dimmendaal/Weber 2004). The “Wadi Howar Diaspora” model assumes that the increasing aridification during the Middle Holocene initiated an exodus of populations speaking various Eastern Sudanic and other Nilo-Saharan proto-languages. This exodus from the Wadi Howar started around 3000 BCE and had created a fully formed diaspora by 1000 BCE. In this scenario, the proto-languages which were to become Daju and Temein were initially spoken in the Upper Wadi Howar. The ancestors shared by the speakers of the extant Nilotic and Surmic languages originally occupied the area through which the Lower Wadi Howar and the Wadi el Milk pass. The Wadi Howar as a whole was part of the diffusion area in which the Eastern Sudanic languages presently spoken in the north acquired the typological features they share with members of other Nilo-Saharan groups, for instance Masalit, Fur and Beria. Interactions in the Central Sudanese Kordofan region during the later southward migrations provided the context in which the other set of typological traits became a characteristic of the Eastern Sudanic languages ancestral to those currently spoken in the south. These contacts most likely also led to language shifts and the absorption of groups speaking typologically different languages.

When Dimmendaal formulated the hypotheses underpinning the “Wadi Howar Diaspora” model he was still unaware of Rilly's earlier research. Rilly (2004) had already drawn very similar conclusions. Translating Meroïtic texts, he unveiled this ancient language's likely close genetic association with the Eastern Sudanic sub-group Astaboran. This sub-group contains Nubian, Tama and Nara. Taking the modern geographic position of these languages into account, Rilly suggested the Wadi Howar as their shared place of origin. His theory assumes that the worsening Saharan climate of the 4th millennium BCE forced pastoral groups to retreat to the then still inhabitable Wadi Howar region. Living in close proximity to each other in the Wadi Howar during the following centuries, they started to speak the same language. When the wadi itself became less and less hospitable during the 3rd millennium BCE, these speakers of proto-North Eastern Sudanic (i.e. proto-Astaboran) finally started to leave the area. The ancestors of the speakers of Meroïtic were one of the first groups migrating towards the Nile Valley. Later, another group, the proto-Nara speakers, left the Nile Valley behind and moved further east, following the Atbara and its tributaries to Eritrea. When Nubian-speaking populations migrated towards the Nile they were among the last people who left the Wadi Howar. They reached the Kingdom of Meroë in the 1st century CE and went on to found their own kingdoms along the Nile. Speakers of other Nubian proto-languages, the ones which were to develop into Midob, Birked and the modern Nubian languages of the Nuba Mountains, sought refuge further south in Darfur and Kordofan. Probably at the same time, proto-Tama-speaking groups migrated to the area where the Wadi Howar begins its course (e.g. Dimmendaal 2007(a): 148, 2007(b): 47-52; Rilly 2004, 2006, 2010; Rowan 2006).

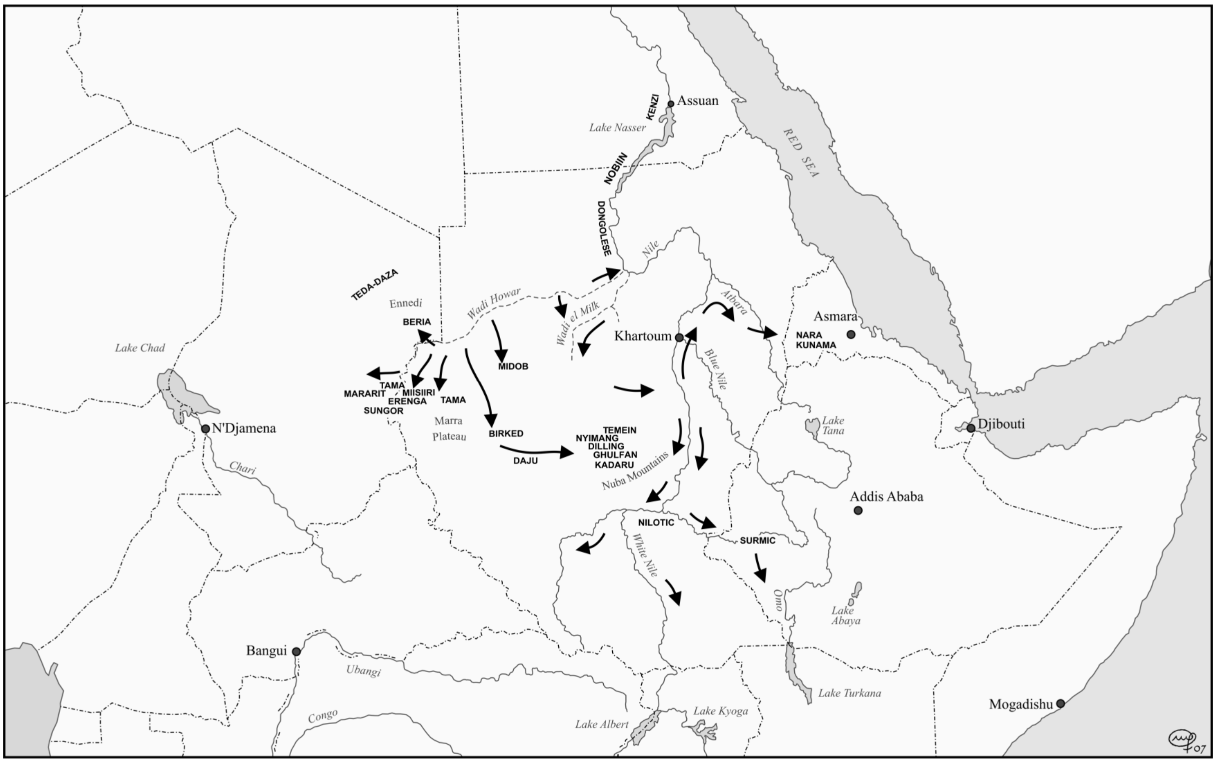


Figure 24: The “Wadi Howar Diaspora” model (Dimmendaal 2007(b): 50).

Relying on various strands of geographic, archaeological and lexical evidence, Bechhaus-Gerst (2000, 2004(b)), on the other hand, suggested a scenario in which proto-Tama-Nubian-Nara pastoralists lived in Darfur and Kordofan around 6000 BP. Splitting off from the proto-Tama-Nubian-Nara population, proto-Tama-Nubian speakers left this original homeland and settled in the Laqiya region. The later proto-Nubian postdated proto-Tama-Nubian by at least 2000 years. Finally, one of its offshoots, proto-Nobiin, entered the Nile Valley between the 1st and 4th cataract before 1500 BCE. Furthermore, Bechhaus-Gerst noted not only livestock- and agriculture-related Cushitic and Berber loanwords in Nobiin but also certain phonological traits and lexical roots shared by a number of Cushitic and Chadic languages. Based on these observations, she assumed an early presence of Berber-, Cushitic- and proto-Chadic-speaking populations in the Nile Valley. Bechhaus-Gerst also stressed that these findings were in accord with the proto-Chadic migration from the Nile Valley through the Wadi Howar proposed by Blench (e.g. Bechhaus-Gerst 1989, 2000: 450-452, 457-458, 2004(a): 105-106, 2004(b): 108-109; Blench 1999, 2006: 159-162; Dimmendaal/Weber 2004: 101; Klein-Arendt/El-Sayed 2004).

Blench's (1999) "Inter-Saharan Hypothesis" states that certain pastoralist groups left their Ethiopian "*Urheimat*" during the 6th millennium BP. These pastoralists were the ancestors of the Cushitic inhabitants of the prehistoric Nile Valley. Some of these Nile Cushites eventually continued their westward migration about 4000 years ago. Gradually spreading along the Wadi Howar and growing increasingly isolated from the Nile Valley in the process, they finally became the Chad Basin's proto-Chadic population approximately 1000 years later. In addition to suggesting that the Nile Cushites might have initiated the "Khartoum Neolithic", the "Inter-Saharan Hypothesis" also proposes that the Cushitic migrants who passed through the Wadi Howar were the bearers of the Leiterband culture. Blench endorses the view that Cushitic and Chadic form an exclusive sub-clade within Afro-Asiatic. The "Inter-Saharan Hypothesis" was primarily an attempt to explain the geographic distribution of these two families within a framework which is compatible with this assumption. Blench presented Afro-Asiatic livestock-related roots which also appear in Nilo-Saharan languages in support of his theory. He argued that these lexical roots constituted linguistic traces of interactions between the Cushitic migrants and the Nilo-Saharan groups they encountered on their way through the Wadi Howar (e.g. Bechhaus-Gerst 2004(a): 105; Blench 1999, 2006: 159-162; MacDonald 1998: 51).

Ehret (2006(b)) favours an alternative scenario which is both geographically parsimonious and supported by linguistic evidence. He has come to the conclusion that Chadic and Berber, not Chadic and Cushitic, derive from a common ancestor and regards the North African Capsian as this proto-language's most likely archaeological correlate. Ehret's model of the origins of Chadic assumes that the ancestors of the proto-Chadic speakers broke away from the proto-Berber-Chadic population when they moved south through the Central Sahara. Reaching the Chad Basin some time in the 6th or early 5th millennium BCE, they were absorbed by a larger Nilo-Saharan-speaking population which adopted their pre-proto-Chadic language. The following early spread of Chadic involved the repetition of this process. Migrations of small groups led to the formation of new Chadic-speaking populations which mainly consisted of people who originally spoke Nilo-Saharan languages. The hypothesis that important parts of the evolution of Chadic were shaped by multiple episodes during which splinter groups were incorporated into larger Nilo-Saharan societies is based on the presence, distribution, origin and nature of Nilo-Saharan loanwords in extant Chadic languages. Proto-Chadic, for example, is characterised by a set of roots which were borrowed from a language probably closest related to the Nilo-Saharan Maban sub-group. Many of these roots carry basic meanings, a situation typically observed after a language shift induced by the absorption of a newly arrived minority (e.g. Barreteau/Jungraithmayr 1993; Ehret 1999(a), 1999(b), 2000, 2002, 2006(a), 2006(b); Ehret/Poznańsky 1982; Fox 1995).

I.D.2.b. Rock art

The age, classification and interpretation of the paintings and engravings known from Saharan rock art sites are often controversial. These pictorial sources nevertheless offer unique insights into the life of the early inhabitants of the Sahara and the complexities of the population history of the Sahara. Although the Sahara as a whole is dotted with rock art, the most important sites are concentrated in the Southern Algerian Hoggar and Tassili, the Aïr in Niger, Libya's Acacus and Messak, the Tibesti and Ennedi in Chad, the Gilf Kebir in the heart of Egypt's Southwestern Desert and the Jebel Ouenat region which is divided by the borders between Libya, Egypt and Sudan (e.g. Coulson 2007; Denyer 2007; Dupuy 2007; Gauthier 2007; Jelínek 2004; Le Quellec 2003, 2008(a), 2008(c); Lhote 1966, 1978; MacDonald 1998: 46-47; Monod 2004; Mori 1978; Muzzolini 1986, 2000, 2001; Rhotert 1952; Shaw 1936; Simonis *et al*. 2007; Treinen 1965; Van Albada/Van Albada 2007).

I.D.2.b.1. Broader context

The system according to which the Saharan petroglyphs and pictographs are usually classified is based on the occurrence of specific animal motifs and the styles in which anthropomorphic figures are depicted. The original defining feature of the engravings of the "Bubaline Style", i.e. "*période bubaline*", "*style bubalin*" or "*Bubalin*", is their association with Africa's large wild fauna. The name itself is derived from the now extinct *Pelorovis antiquus*, which was originally placed in the genus *Bubalus*. The "*têtes rondes*" or "Round Head" pictures, which are mainly painted, have human figures with large round heads in common. Domesticated animals, particularly cattle, play a central role in the numerous and varied paintings of the "Pastoral Period". Engravings are a lot less frequently encountered within this school, which Lhote described as the "*période bovidienne*" and Muzzolini as well as Aumassip/Tauveron called "*Bovidien*". Horses, either carrying riders or drawing chariots, gave the "Horse Period", which is also known as the "*période caballine*", "*période du cheval*" or "*Caballin*", its name. The presence of camels defines the "Camel Period", which is variously referred to as the "*période cameline*", "*période du chameau*" or "*Camelin*". Lhote, Muzzolini and Aumassip/Tauveron, considered the "Round Head" pictures to be largely contemporaneous with the "Bubaline Style" engravings. However, Mori believed that the former succeeded the latter. Analysing Algerian rock art, Lhote suggested that the "*période bubaline*" and the "*têtes rondes*" artists were active between ca. 8000 and 5000 BCE. Mori assumed that both schools probably predate the 7th millennium BCE in the Acacus. Evaluating the situation in the Tassili and the Acacus, Aumassip/Tauveron shared his view. Muzzolini mainly based his conclusions on analyses of sites in the Atlas, Fezzan and Tassili. According to him, both the "*style bubalin*" and the "*têtes rondes*" date to the same period as the "*Bovidien ancien*" of the Tassili. This stylistic coexistence lasted from the late 5th to the middle of the 3rd millennium BCE. In addition to these late dates, he further proposed that the "*têtes rondes*" images were produced until the middle or end of the 2nd millennium BCE. Like Muzzolini's "*Bovidien final*" of the 2nd and early 1st millennium BCE, Lhote's, Mori's and Aumassip/Tauveron's respective versions of the "*période bovidienne*" postdate both the "Bubaline Style" and the "Round Head" phase. The "Horse Period" is generally believed to have started around 1000 BCE. Finally, the "Camel Period" probably began about a millennium later (e.g. Aumassip 1993; Aumassip/Tauveron 1993; Bailloud 1960; Lhote 1978; Monod 2004; Mori 1978, 1998; Muzzolini 2000, 2001).

I.D.2.b.2. Activities

Often remarkably detailed scenes document activities the prehistoric Saharans appear to have regularly engaged in. Countless paintings and engravings revolve around cattle. Various images clearly show cattle being watered (e.g. Jabbaren, Tassili, "Pastoral Period"), people riding cattle while herds are being driven (e.g. Sefar, Tassili, "Pastoral Period"), human figures milking cows (e.g. Shekitiye, Ennedi, "Pastoral Phase" or Wadi Tiksatin, Messak, "Bubaline Style"), adorned cattle (e.g. Wadi Tiduwa, Messak, "Bubaline Style") or just the animals themselves (e.g. Sefar, "Round Head"). Other, less unambiguous, scenes seem to document rituals which involved slaughtering cattle (e.g. Wadi Alamas, Messak), bleeding cattle (e.g. Jebel Ouenat), leaping over cattle (e.g. Mossei, Tibesti) or bowing before cattle (e.g. Wadi Sura, Gilf Kebir). "Pastoral Period" paintings recorded at Jabbaren and Sefar show men with bows and arrows hunting a large antelope, accompanying a herd of cattle and fighting over cattle. These paintings may be regarded as particularly beautiful examples of the numerous depictions of archers pursuing game, guarding cattle or fighting each other. Men confronting a lion with spears in a "*Bovidien final*" painting at Iheren (Tassili) and the camel riders holding spears at Archei (Ennedi), illustrate the use of spears. Whereas "Bubaline Style" and "Pastoral Period" pictures in general often feature bows and arrows, only late "Pastoral Period" and younger images frequently show spears. A "Pastoral Period" figure brandishing a Darfur axe at Sefar and "Camel Period" hunters attempting to bring down a giraffe by attacking its legs with an axe at Tigui Cocoïna (Tibesti) suggest that these tools were also used as weapons. "Round Head" pictographs from the Wadi Ekki and Tin Tazarift (Tassili), "Bubaline Style" petroglyphs from the Wadi Imrawen (Messak) and engravings from the Jebel Ouenat reveal that ropes were used to hunt animals like hippopotami, buffaloes, mufflons and giraffes. Additionally, studies of the Tassili sites Jabbaren, Abaniora and Iheren have documented "Pastoral Period" paintings of men handling objects which could be interpreted as throwing sticks. Figures wearing hunting or ritual masks or headdresses, such as the horned "Round Heads" of Uan Tamauat (Acacus), are very widespread. The masked humans in the Wadi Tilizzaghen (Messak), for instance, were first described by Barth. Movers interpreted them as the "*Apollo*" and "*Hermes*" of the Garamantes. The groups of dancers painted at Jabbaren and the Erg Imzittene in the Tassili during the "Pastoral Period" are only two of the many examples of rock art dedicated to this popular, albeit less common, subject. Paintings in which men drink out of a large vessel using long straws and women carry jars, like those of the "Pastoral Period" at Iheren and Jabbaren respectively, exemplify functions pottery could have fulfilled. Probably dating to the "Horse Period", a woman kneeling in front of a grinding stone at the Erg Imzittene (Tassili) demonstrates the position in which this implement was used. Considering the pictures of women building and using beehive-shaped huts at Iheren and the ground plan of a circular structure at Sefar, round man-made shelters must have been common in the Tassili during the "Pastoral Period". A "Pastoral Period" pictograph at Sefar, which shows a woman carrying a load on her head, and "Bubaline Style" engravings in the Wadi Bedis (Messak), which depict hunters transporting ostrich carcasses in the same manner, prove the antiquity of this technique. Representations of boats, most likely canoes and reed rafts, occur occasionally. Examples have been discovered at Tin Tazarift (Tassili), Bodhoué (Ennedi) and in the Selima depression (Northern Sudan). Both these pictures and the famous swimmers in the Wadi Sura indicate that the Saharans were able to take full advantage of rivers and lakes. Nevertheless, fish and related motifs are rare. The either “Round Head” or “Pastoral Period” depiction of a large fish at Jabbaren and the fish-like object held by a “Round Head” figure at Sefar, referred to as the “*grand dieu pêcheur*” by Lhote, may, however, be cited in this context. Moreover, certain 7th to 5th millennium BCE engravings from El Hosh in Upper Egypt have controversially been interpreted as labyrinth fish traps (e.g. Bagnold *et al*. 1939; Balfour Paul 1956; Barich 1978; Barth 1857-1858; Hallier/Hallier 2001(a), 2001(b); Hamapaté Ba/Dieterlen 1961; Huyge 2005; Jelínek 2004; Jesse *et al*. 2007; Kröpelin 2004; Le Quellec 2003, 2008(a), 2008(b), 2008(c), 2008(d); Lenssen-Erz 2007; Lhote 1966, 1978; Monès 1988; Muzzolini 2001; Newbold 1928; Passemard/de Saint-Floris 1935; Rhotert 1952; Shaw 1936; Smith 2002: 450-451; Spassov/Stoytchev 2004; Striedter 1978).

I.D.2.b.3. Populations

Studies of Saharan rock art suggest that the Sahara was populated by a culturally and biologically diverse mix of peoples. Certain images appear to show morphologically sub-Saharan humans while others seem to depict members of “mixed” or biologically North African groups. The humans of the “Bubaline Style” petroglyphs are generally considered to be biologically North African. Although the heads of the human “*têtes rondes*” figures do not normally exhibit interpretable anatomical structures, faces in profile can sometimes be observed. Muzzolini recognised such profiles at Ti-n-Zoumaïtak in the Tassili as biologically North African. The facial features of other “Round Head” silhouettes at Sefar and Ti-n-Tazarift, also in the Tassili, were identified as biologically sub-Saharan by Lhote. Not unlike Lhote, Mori also believed that at least the later “*têtes rondes*” paintings were created by biologically sub-Saharan populations. Certain other details of “Round Head” pictures suggest sub-Saharan affinities as well. The “*têtes rondes*” masks from Sefar and Aouanrhet (Tassili), for instance, resemble modern masks from sub-Saharan Africa. Furthermore, marks on the bodies of “Round Head” humans have been repeatedly compared with scarification and body painting patterns of sub-Saharan ethnic groups. For example, a woman from Aouanrhet, female figures at Ti-n-Zoumaïtak and steatopygous women from Niola Doa (Ennedi) all exhibit such body decorations (e.g. Barich 1978; Hallier/Hallier 2001(a); Jelínek 2004; Lhote 1959, 1966, 1970, 1978; Mori 1978, 1998; Muzzolini 1981(a), 1981(b), 1986, 2000, 2001; Striedter 1978).

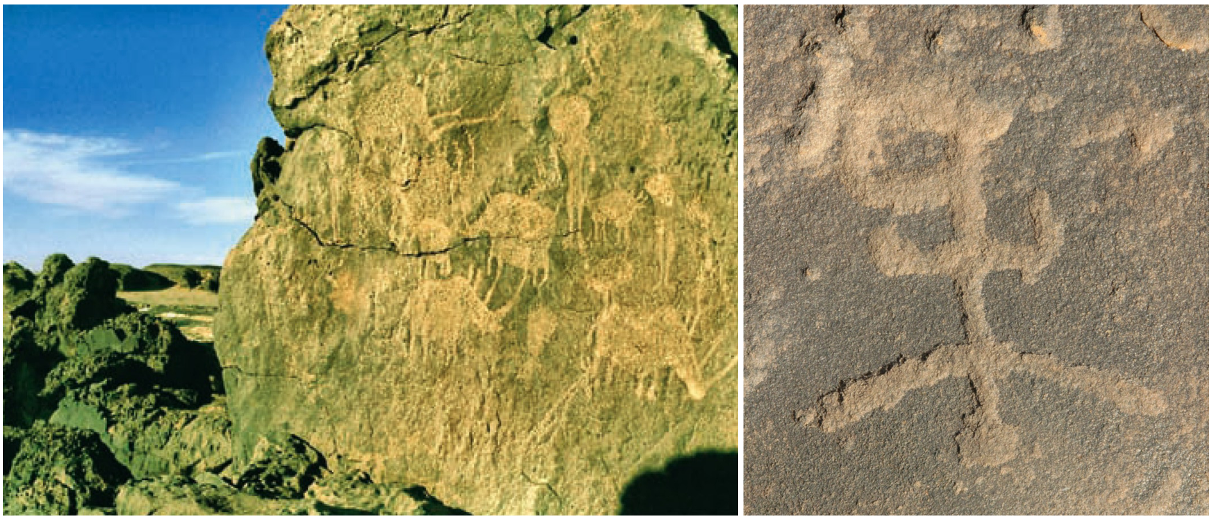
Muzzolini distinguished between three morphologically distinct groups of humans within his “*Bovidien*” of the Tassili. He described the oldest phase, the late 5th to middle 3rd millennium BCE “*Bovidien ancien*”, as the era of the “*groupe de Sefar-Ozanéaré*”, a “*groupe négroïde*”. Moreover, he considered the “*Bovidien final*” of the 2nd and 1st millennium BCE a period dominated by a “*groupe mixte*”, i.e. the older “*groupe d’Abaniora*”, and a “*groupe europoïde*”, i.e. the younger “*groupe d’Iheren-Tahilahi*”. Analysing the clearly discernible facial features of numerous “Pastoral Phase” paintings of humans from Jabbaren, Sefar, the Wadi Ahloun, Abaniora, Iheren and Tahilahi in the Tassili, various earlier and later researchers not only drew similar conclusions but also put further, more specific hypotheses forward. Many striking ethnographic parallels, such as the distinctive coiffure, have led to comparisons between the Fulbe, who are also known as Fulani, Fula or Peul, and the humans depicted in various “Pastoral Period” paintings. Pictures of the “Uan Amil type”, which Mori defined for his “*Pastorale antico*” of the Acacus, and “*groupe d’Abaniora*” images frequently feature figures with cultural attributes reminiscent of those of modern members of this far-flung ethnic group. Most authors support the theory that Muzzolini's "*groupe d'Iheren-Tahilahi*" pictographs and similar paintings show "proto-Berbers". "Horse Period" images, and to a certain extent also "Camel Period" pictures, are usually interpreted in connection with North African groups as well. Especially "flying gallop chariots", like the ones at Tamajert (Tassili) and Ti-n-Anneuin (Acacus), have been repeatedly linked to the Garamantes. Crude "Horse" and "Camel Period" petroglyphs which are vaguely reminiscent of Ancient Egyptian pictures of plumed "Libyans" have become known as "Libyan Warriors". More or less limited to the Adrar des Ifoghas (Mali), the Aïr and the Northern Tibesti, they typically depict men armed with spears whose heads are adorned with large feathers. As far as the "Pastoral Period" and the later phases are concerned, it appears that, generally speaking, biologically sub-Saharan populations were gradually replaced by biologically "mixed" and biologically North African groups in the Sahara's more northerly regions. It should, however, be borne in mind that this change was probably not a uniform process. For instance, Mori's interpretation of the situation in the Acacus suggests that the biologically North African "Uan Amil type" preceded the biologically sub-Saharan "Uan Tabu type" in this region. Finally, it is noteworthy that Saharan rock art does not share many similarities with the usually more schematic traditions of the areas south of the Sahara (e.g. Barich 1978; Coulson 2007; Hallier/Hallier 2001(a), 2001(b); Hamapaté Ba/Dieterlen 1961; Jelínek 2004; Le Quellec 2003; Lenssen-Erz 2007; Lhote 1959, 1966, 1970, 1978; MacDonald 1998: 46-47; Mori 1978, 1998; Muzzolini 1981(a), 1981(b), 1986, 2000, 2001; Striedter 1978).

I.D.2.b.4. The Wadi Howar

Over 500 engravings have so far been discovered in the Wadi Howar. The three sites, at which all but one isolated petroglyph were recorded, are situated in the vicinity of the fortress Gala Abu Ahmed. They are distributed along a ca. 40-km-long stretch of the Lower Wadi Howar which starts approximately 110 km west of the Nile. The engravings feature a range of styles. They depict abstract motifs, for example grids and ovals, a wide range of animals, such as cattle, gazelles, ostriches, giraffes and elephants, and some anthropomorphic figures. Even though it can be reported that a *terminus ante quem* date of 1200 to 1300 calBCE could be assigned to a giraffe petroglyph at Gala Abu Ahmed 02/2, it has to be pointed out that it cannot be assumed that the comparatively varied Wadi Howar engravings all date to the same period. Newbold (1928) described rock pictures from two small ridges in the Abu Sofian area. Interestingly, some of the images at these sites between the Jebel Tageru and the Wadi el Milk are highly reminiscent of the anthropomorphic figures in the Wadi Howar. Furthermore, many of the Wadi Howar petroglyphs also bear stylistic and thematic similarities to those at Zolat el Hammad (e.g. Berger 2006; Gauthier 2007; Jesse 2005; Kröpelin 2004; Le Quellec 2008(a); Newbold 1928).

Decorated with numerous petroglyphs on its western and eastern side, Zolat el Hammad is located about 50 km north of the Middle Wadi Howar and roughly 450 km west of the Nile. Similar to the engravings in the Lower Wadi Howar, the diverse petroglyphs carved into this sandstone formation west of the Jebel Rahib appear to belong to different schools. The images on the western side of Zolat el Hammad mainly show cattle, dogs, ostriches, giraffes, elephants and comparatively schematic human figures. The eastern side displays very similar pictures of cattle, ostriches and men with dogs.

Here they are, however, superimposed onto more carefully crafted giraffes, ostriches and people with large round heads. The same peculiar round-headed humans also appear together with rhinoceros in a different scene engraved on a less accessible rock face. Considering the state of the patina by which they are covered, the rhinoceros surrounding some of them and the fact that they have been partly obscured by later petroglyphs, it seems likely that these Sudanese "Round Heads" represent Zolat el Hammad's earliest rock art. Moreover, both their proportions and their association with large, clearly non-domestic species distinguish them from the painted "*têtes rondes*" of other regions of the Sahara. Finally, Newbold (1928) had already pointed out parallels between the rock pictures at Gelti um Tasawir in the Jebel Tageru and the images on the western side of Zolat el Hammad. One of the illustrations accompanying his comparison is particularly striking. It shows very similar engravings of elephants and humans from both sites (e.g. Berger 1999, 2006; Gauthier 2007; Kröpelin 2004; Le Quellec 1999, 2008(a), 2008(b); Newbold 1924, 1928; Rhotert 1952).



(a) (b)

Figure 25: Petroglyphs in the Wadi Howar region. Rhinoceros and round-headed figures at Zolat el Hammad (a), humanoid figure near Gala Abu Ahmed in the Lower Wadi Howar (b) (a: Kröpelin 2004: Plate S; b: D. Haberlah).

I.D.2.c. Historical sources

Historical documents and artefacts can not only contain information pertaining to the appearance, origin and fate of ethnic groups which were probably related to the prehistoric inhabitants of the Wadi Howar, they can also shed light on activity patterns and biologically relevant inter-group interactions. Historic accounts and depictions are usually heavily biased. In addition, translations are often problematic. Nevertheless, particularly Ancient Egyptian and classical sources constitute important windows into the past of the region.

I.D.2.c.1. Ancient Egypt

Given the long-lasting and complex interactions between Egypt and the groups occupying the regions south of the 1st cataract, Egyptian sources are often surprisingly uninformative. In most instances, names of ethnic groups and their territories are either generic or cannot be securely correlated with archaeologically or otherwise defined populations. "*Ta-Seti*", the land of the bow, for instance, could refer to the area around Aswan, the Edfu region or Nubia in general. However, Weni and Harkhuf already employed more specific terms during the Old Kingdom's 6th Dynasty (ca. 2350-2200 BCE). "*Irtjet*", "*Setju*" and "*Wawat*" are usually associated with Lower and "*Yam*" with Upper Nubia. "*Wawat*", which stayed in use, was also the designation of the northern administrative unit during the much later Egyptian occupation of Nubia. At this time, "*Kush*" referred to its southern counterpart. The word "*Kush*" most likely made its first written appearance on Senusret I's 20th century BCE victory stele at Buhen. It was to become synonymous with Upper Nubia in more recent texts. "*Kush*" is generally assumed to be the Egyptian name for the Kerma region and its culture. The C-Group population, on the other hand, is widely held to be the archaeological equivalent of the people of "*Wawat*". It seems reasonably safe to assume that the "*Medjay*" were nomads from the Eastern Desert. Many scholars believe that the individuals buried in Pan Graves were members of this group. Although it most likely mainly described Libyan populations, "*Tjemehu*" appears to have been a somewhat more general designation for the people of the Western Desert. The word commonly used to refer to Egypt's southern neighbours, especially those in the Nile Valley, was "*Nehesiu*". For example, Weni not only applied it to the inhabitants of "*Irtjet*", "*Setju*", "*Wawat*", "*Kaau*" and "*Yam*" but also to the "*Medjay*" (e.g. Bianchi 2004; Edwards 2004; Herzog 1973/1974; MacMichael 1922; Mwanika 2004; O'Connor 1986; O'Connor/Reid 2003; Redford 2004; Snowden 1983; Trigger 1976).

Records of the goods with which Egyptian raids and trade expeditions returned from the south reach back to the 4th Dynasty (ca. 2600-2500 BCE). Both these records and the depictions of people from "*Wawat*" and "*Kush*" paying tribute suggest that cattle must have been of paramount importance to the "*Nehesiu*". Perhaps not surprisingly, certain documents imply that the Egyptians considered the "*Nehesiu*" cattle thieves. Other typical goods, such as elephant tusks, giraffe tails, leopard skins and live wild animals, indicate that hunting probably still played a major role in the economic life of, at least, some of Egypt's southern neighbours. Egyptian sources also reveal that the "*Nehesiu*" engaged in pottery, basketry and weaving. That the "*Nehesiu*" had a reputation as skilled archers, were renowned wrestlers, practised stick fighting and used throwing sticks seems to have made it relatively easy for them to get recruited by Egyptian officials. Accordingly, numerous "*Nehesiu*" came to Egypt to serve as mercenaries or policemen. Moreover, not least the 19th century BCE Semna Dispatches document that many inhabitants of the southern deserts tried to enter the Egyptian controlled parts of the Nile Valley with the declared intention of escaping from their increasingly uninhabitable tribal areas. As far as their presence in Egypt is concerned, it is, however, undoubtedly far more important to note that "*Nehesiu*" were systematically enslaved from the Old Kingdom (ca. 2700-2200 BCE) onwards. The defence of the southern border and the administration of occupied Nubian territories also brought a considerable number of Egyptians south. Additionally, there are sporadic reports of Egyptians who fled to Nubia or went there to work for the southern rulers. Marriages between Egyptians and "*Nehesiu*" do not seem to have been discouraged. There are no indications that the children resulting from such unions carried any sort of social stigma (e.g. Bianchi 2004; Brunson 1989; Carroll 1988; Fischer 1961; Friedman 2002; Kuhlmann 2002; MacMichael 1922; O'Connor 1971, 1993; Redford 2004; Seidlmayer 2002; Shaw 2003; Snowden 1983; Taylor 1991; Trigger 1976).

The expression "*Nehesiu*" may or may not have always explicitly referred to groups with a biologically sub-Saharan appearance. In any case, Egyptians did variously describe the "*Nehesiu*" as people with "*burnt"* faces and "*curly/plaited*" hair. They also noticed the different complexion and physical attributes of other peoples. For example, Senusret III's 12th Dynasty (ca. 2000-1800 BCE) Semna Steles or the 18th Dynasty (ca. 1550-1300 BCE) "*Hymn to Aten*" and inscriptions regarding Thutmose I's activities in Nubia clearly demonstrate this fact. Although stylistic restrictions and other factors complicating the interpretation of these often schematic representations have to be borne in mind, Egyptian artists undeniably depicted physical differences among the "*Nehesiu*". This was apparently already the case during the 6th Dynasty and later, less ambiguous representations show clearly distinguishable groups of "*Nehesiu*". Distinctly prognathous "*Nehesiu*" with short, broad and flat noses, large and prominent lips and dark brown or black skin are depicted in the New Kingdom (ca. 1550-1050 BCE) tombs of Sebekhotep, Huy, Horemheb and Seti I. Generally adorned with large, round earrings, these mostly tall figures are usually wearing their hair in tightly coiled plaits. "*Nehesiu*" portrayed in this fashion sometimes also have horizontal lines on their foreheads. These lines probably symbolise specific patterns of decorative scars mentioned in certain texts. The archers from the 11th Dynasty (ca. 2150-2000 BCE) tomb of Mesheti and the Nubian representatives in the 18th Dynasty tomb of Huy appear to belong to a different group of "*Nehesiu*". They are shown in different shades of brown and exhibit less pronounced biologically sub-Saharan features. Nevertheless, these figures are still associated with typical attributes of "*Nehesiu*", like plaited hair and large earrings. One mural in the tomb of Huy shows that the various Nubian nobles were not a physically homogeneous group. Furthermore, this mural also features a group of "*Nehesiu*" with more pronounced biologically sub-Saharan traits. These "*Nehesiu*", who resemble those in the tomb of Horemheb, are depicted as prisoners. The representations of the members and officials of the Nubian 25th Dynasty (ca. 750-650 BCE) also bear witness to the presence of physical traits ranging from decidedly to only faintly biologically sub-Saharan (e.g. Bianchi 2004; Bothmer 1982; Brunson 1989; Buzon 2006(a); Carroll 1988; Fischer 1961; Herzog 1973/1974; MacMichael 1922; Mwanika 2004; O'Connor 1971, 1993; O'Connor/Reid 2003; Redford 2004; Rossellini 1832-1844; Simpson 1962; Snowden 1983, 1993; Strouhal 1975; Trigger 1976; Vercoutter *et al*. 1976; Yurco 1989).

I.D.2.c.2. Classical period

Studies of the pertinent Greek and Roman sources do not yield many new results. Most classical documents merely confirm older reports about the biological characteristics of Egypt's southern neighbours and the composition of the Nubian population. Nonetheless, they do contain some additional details relating to the groups which occupied "*Inner Libya*", i.e. the hinterland west of the Nile. Greek documents referred to the Nubian rulers of the 25th Dynasty as "*Ethiopians*". The word "*Aithiops"* first appeared in the 8th century BCE works of Homer. Considering its meaning, "*burnt face*", this expression appears to have been slightly less biologically ambiguous than the Egyptian "*Nehesiu*". The 6th/5th century BCE philosopher and poet Xenophanes described the "*Ethiopians*" from the regions south of Egypt as "*black*" and "*flat-nosed*". Slightly later, in the 5th century BCE, Herodotos distinguished between "*Libyan Ethiopians*" with "*woolly*" and "*Eastern Ethiopians*" with "*straight*" hair. He also pointed out that the "*Ethiopians*" of the Nile Valley were often exceptionally tall. Eratosthenes was probably the first to employ the term Nubian. He used "*Noubai*" as the name for a tribe which occupied the area west of the Nile between Meroë and Dongola during the 3rd century BCE. Strabon included this tribe in a list of "*Ethiopian*" groups in the 1st century BCE. In the same century, Diodoros wrote that the "*Ethiopians*" encountered close to the Nile were "*black*", "*flat-nosed*" and "*woolly-haired*". Herodotos did not only locate "*Ethiopians*" along and on either side of the Nile but also south of the Fezzan. Strabon mentioned "*Nubae*" in "*Inner Libya*", as did Ptolemaeus in the 2nd century CE. Both Ptolemaeus and the 1st century CE author Plinius the Elder did, however, refer to small groups of "*white Ethiopians*" in "*Inner Libya*" and "*Libyan Egyptians*" as well. Moreover, various passages written by, for example, Herodotos, Strabon and Ptolemaeus indicate that the Garamantes of the Fezzan used chariots to raid the "*Ethiopians*" of the African interior. These sources also imply that the Garamantes were, in regard to their own status as "*Ethiopians*", either not a homogeneous group or a population whose ancestry was "mixed". Describing an ethnic plurality reminiscent of the situation in "*Inner Libya*", Procopius reported that many different ethnic groups inhabited the Aswan region in the 6th century CE. Among these groups were large tribes of "*Blemyae*" and "*Nobatae*", i.e. Nubians (e.g. Alexander 1993; Dafa'alla 1993; Fage/Tordoff 2002; Georgii 1838; MacMichael 1922; Newbold 1928; Snowden 1970, 1983, 1993; Thompson 1989; Vercoutter *et al*. 1976).

I.D.2.c.3. Later history

The increasing temporal distance from the three main occupation phases of the Wadi Howar, the generally low ethnographic precision of the accounts and the usually encountered serious interpretative problems drastically diminish the relevance of later historic sources. Nevertheless, they do establish certain facts which must not be ignored when modern populations are used in studies which attempt to unravel Africa's population history. Various kingdoms and empires, which rose and fell during the last 1500 years, either had an ethnic background which connected them to the Wadi Howar or were geographically close to it. Meroë's decline gave rise to three successor states in the Sudanese Nile Valley: Nobatia in the north, Makuria in the centre and Alodia in the south. Makuria, which conquered Nobatia in the 7th century, and Alodia remained in place until the 14th century. Their respective capitals were at Old Dongola, near Debba, and Soba, close to Khartoum. Sennar, over 250 kilometres south of Khartoum on the Blue Nile, was the capital of the Funj Sultanate. People who had entered the area earlier from the south founded this state in the 16th century. At its height, the sultanate extended from Kordofan to the Red Sea. The Funj Sultanate only came to an end when it was absorbed by the expansion of the Ottoman Empire during the 19th century. Far outside the Nile Valley, the Daju had formed a state southeast of the Jebel Marra in the 13th century. During the 16th century another state, that of the Tunjur, was located in the northern part of the Jebel Marra region. The powerful sultanate of the Fur also emerged in the Jebel Marra region. It was established in the 17th century. Later, El Fasher became the sultanate's permanent capital. Like the Funj Sultanate, it was conquered by the Ottoman Empire in the early 19th century. The Maba's Wadai Kingdom in Eastern Chad controlled the region west of the Fur Sultanate from the 17th until the beginning of the 20th century. The area around Lake Chad was the centre of two other large states. The empires of Kanem and Bornu, which were both ruled by people speaking Saharan languages, dominated the Chad Basin from the 8th to the 14th and from the 14th to the 19th century respectively. Even further west, the 15th and 16th century Songhai Empire grew out of its nucleus along the Niger River in Mali and Niger. It broke away from the Mali Empire which had succeeded the earlier empire of Ghana as the main power of the region. Much later, the late 19th century Mahdist state covered most of present-day Sudan. During the 19th and early 20th century, British and French colonial administrations united the territories which later became the multi-ethnic republics of Sudan and Chad (e.g. Adams 1993; Alexander 1993; Bertaux 1999; Connah 1981; Cooley 1966; Davies 1991; Edwards 2004; Fage/Tordoff 2002; Holl 2002; Holt 1999; Holt/Daly 2000; Iliffe 1997; Kapteijns 1985; Lange, D., 1984, 2007, 2008; Lange/Barkindo 1988; O'Fahey 1973, 2006; O'Fahey/Spaulding 1974; Palmer 1929, 1930).

Extensive trade networks, frequent raids and population movements created complex patterns of regional and supra-regional interactions. Well-established trade routes linked Southern Sudan with Ethiopia, Egypt and Chad. Caravans taking the shortest possible route from the Mediterranean to the Lake Chad area formed the backbone of the lucrative trade between the Chad Basin and the North African coast. Other routes, crossing the Sahara obliquely or straight from north to south, connected the Niger Bend to different North African commercial centres. Slaves were one of the major commodities. Not surprisingly, the empires of Kanem, Bornu and Songhai as well as the states of the Maban, Fur and Funj were heavily involved in the African slave trade. The nomads of the Sahara and the Sahel often played key roles. They could organise, guide, protect or attack caravans. The Teda of the Tibesti and the Bideyat of the Ennedi, for example, were the groups which organised most of the caravans between the Libyan oasis of Kufra and Wadai in the 19th century. Violent conflicts between the above-mentioned states, between different groups within these states and between these states and nomadic groups not integrated into them were commonplace. Remarkably, the relevant reports indicate that many of the ethnic groups which are most likely related to the prehistoric inhabitants of the Wadi Howar have been occupying their modern tribal territories for centuries. In sharp contrast to this, the history of certain other populations was shaped by migrations covering enormous distances. For instance, some of the nomadic Arab tribes which were to give rise to the Baggara entered Sudan from the 14th century onwards. These Arabs appeared in the Chad Basin soon afterwards. Coming to Sudan from Egypt, they reportedly initially followed the course of the Wadi el Milk on their way west (e.g. Barth 1857-1858; Beck 2003; Browne 1799; Bruce 1790; Holl 2003; Holt 1999; Holt/Daly 2000; Insoll/Shaw 1997; Lange, D., 1984, 2007, 2008, 2009; Lange/Barkindo 1988; Levy/Holl 2002; Lewicki 1992; MacMichael 1922; Mercer 1971; Murdock 1959; Nachtigal 1879, 1881, 1889; Newbold 1928; O'Fahey 1978; O'Fahey/Spaulding 1974; Rhotert 1978; Seligman/Seligman 1932: 414; Spaulding 2006; Sutton 2001; Tambo 1976; Záhořík 2007).

I.D.2.d. Ethnographic sources

Ethnographic studies afford an invaluable interpretative framework. Scientific and historic descriptions of ethnic groups can draw attention to the continuity of cultural practices, reveal causes and mechanisms of economic and societal change, highlight osteologically and biologically relevant activity and interaction patterns, make key contributions to the reconstruction of the diet, health and demography of prehistoric populations and offer unique insights into the population history of a region. Ethnographic models may, however, not be chosen arbitrarily. It is also absolutely imperative to bear in mind that the groups of the recent ethnographic past neither constitute the product of millennia of cultural and biological stasis nor do their members necessarily still lead lives resembling those portrayed in the ethnographies[5]. Furthermore, since the bias of ethnographers and their informants may distort the representation of a society as a whole or specific aspects of its culture, the reliability of ethnographic sources always needs to be critically evaluated (e.g. Axtell 1979; Balfour Paul 1956; Carroll 1988; David/Kramer 2001; DeMallie 1993; Haaland 1995; Inskeep 1978; Kohl 1993; London 2000; Lurie 1961; Murdock 1959; O'Connell 2006; Peel 1942; Renfrew/Bahn 1996; Tobert 1988; Willcox 1978).

I.D.2.d.1. Ethnic groups

Ideally, groups selected for ethnographic comparisons should live in geographic proximity to the Wadi Howar, should be adapted to ecological conditions comparable to those in the prehistoric Wadi Howar, should have economies relying on the subsistence strategies which characterised the Wadi Howar's occupation phases and should be descended from the same population complex the prehistoric inhabitants of the Wadi Howar probably belonged to. The availability of sources containing information on the pertinent aspects of the lives of such groups is a further limiting factor. Whereas the extensive body of research focusing on Southern African foragers, such as the !Xõ, Žu/'hoãsi, ≠Au//eisi, G/wi, Nharo or Hai//om, can unquestionably also add to the understanding of the situation during the Wavy Line/Laqiya phase, the literature on East African hunter-gatherers, especially the Tanzanian Hadza and Sandawe, has to be considered the most important source of information in this context (e.g. Barnard 1992; Gordon 1992; Lee 1978; Marlowe 2002, 2004; Murdock 1968; Newman 1970; Porr/Müller-Beck 1997; Seligman/Seligman 1932; Widlok 1999; Woodburn 1968). Studies of Southern Sudanese mixed economy pastoralists, like the Nuer, Dinka or Shilluk, as well as descriptions of the various Nuba and other tribes of the region form a basis upon which it appears possible to draw reasonably reliable ethnographic conclusions about the Leiterband/Herringbone phase (e.g. Evans-Pritchard 1940, 1948; Lienhardt 1970; Nadel 1947; Seligman 1913, 1925; Seligman/Seligman 1932; Southall 1976). The Teda and Daza, who are collectively known as the Tubu, the Beri, who most authors divide into Zaghawa and Bideyat, and the Berti are the most prominent examples of Nilo-Saharan-speaking herders and agropastoralists who survive in the Handessi phase-like environments of the Eastern Sahara and the Eastern Sahel (e.g. Baroin 1997; Fuchs 1961, 1978; Holý 1974; Tobert 1988; Tubiana/Tubiana 1977). Lastly, publications on certain other groups are likely to offer additional, if somewhat less relevant, perspectives. Such groups include the Buduma, a tribe which raises livestock and engages in fishing on the shores of Lake Chad, the Baggara, a cluster of groups of nomadic cattle pastoralists of Arab and Southern Sudanese ancestry roaming the Eastern Sahel, and the Turkana, a tribe of Nilotic herders that inhabits one of East Africa's most arid regions (e.g. Asad 1970; Cunnison 1966; Gulliver 1952; Heiß 2006; Keane 1885; Little/Leslie 1999; Lydall/Strecker 1979(a), 1979(b); MacMichael 1922; McCabe 2000; Paul 1971; Seligman 1913; Seligman/Seligman 1918, 1932; Talbot 1911; Wilson 1888).

[5] Unless it seemed important to emphasise the continuity or discontinuity of a certain situation or custom, they were described in the tenses used by the researchers whose publications contain the ethnographic information presented in this thesis.

I.D.2.d.2. Activities

Pastoralists generally invest more time in subsistence activities than foragers. Observing a group of on average 32 Žu/'hoãsi in Botswana's Dobe area for four weeks during 1964, Lee (1968) famously estimated that the typical adult of this group spent approximately twelve to nineteen hours per week acquiring food. Woodburn (1968) studied the Eastern Hadza near Lake Eyasi in Tanzania in the late 1950s and early 1960s. According to him, members of this group did not spend more than two hours a day acquiring their food either. Historic Southern Sudanese mixed economy pastoralists appear to have devoted significantly more time to subsistence activities. Nevertheless, Evans-Pritchard's (1940: 36) account of the workday of male Nuer and Seligman/Seligman's (1932: 208) description of a day in a Nuer dry-season camp imply that they were still able to live rather leisurely lives. The modern African herders who live in less well-watered environments are undoubtedly subjected to higher levels of occupational stress. For example, depending on the season, unmarried Turkana men devote approximately 45 to 60% of their time to subsistence-related work, married men 25 to 50% and married women 25 to 45%. These numbers do, however, strongly suggest that even the workloads of groups like the Turkana are still substantially smaller than those of most African agriculturalists (e.g. Barnard 1992; Bentley *et al*. 2001: 206-207, 211; Curran/Galvin 1999; Di Lernia 2006: 51-52; Evans-Pritchard 1940; Holý 1974; Lee 1968, 1978; Lienhardt 1970; Nadel 1947; O'Connell 2006; Seligman/Seligman 1932; Southall 1976; Tubiana/Tubiana 1977; Woodburn 1968).

Studies of the daily lives of the Hadza and Sandawe provided detailed descriptions of the activities the members of these groups habitually engage in. The Hadza live in the savannah-woodland environment around Lake Eyasi in Northern Tanzania. Hadza women, men and children collect roots, berries, fruit and honey. Digging sticks are required to excavate tubers. Gathered food is often transported in leather karosses. Particular types of plant food, for instance the seeds of the fruit of the baobab tree (*Adansonia digitata*), are processed with hammer stones. The men hunt an astonishingly wide range of large, medium-sized and small mammals as well as birds. Their standard weapons are bows and poisoned arrows but nets, traps, sticks and even spears are occasionally used as well. The Sandawe also exploit riverine resources. During the fishing season in April and May, fish, mainly Catfish (*Clarias gariepinus*) and carp (*Labeo cylindricus*), are caught with bare hands, conical wicker baskets, basket traps, branch barriers, gaffs and spears. Additional activities carried out by Tanzanian foragers include the construction of shelters, mainly beehive grass huts, and the production of the artefacts necessary to gather and hunt. Distances travelled by the Hadza are modest. Normally, camps are no more than 1 or 2 km from the nearest water source. Vegetable food is not usually gathered in areas which are further than a 60-minute walk away from the camp sites. Camps are moved six to twenty times a year. Distances between camps are small. One study in the Mangola area in 1980-1981 found them to be 3 km on average. Wet season camps are made up of 20 to 30 people. However, over 100 individuals can congregate at dry season camps close to permanent water sources (e.g. Bentley *et al*. 2001: 211; Blurton Jones *et al*. 1996; Johnson 2002; Marlowe 2002, 2004; Newman 1970; Porr/Müller-Beck 1997; Wood 2006; Woodburn 1968).

Like the Shilluk, Dinka or Bari, the Nuer are prototypical Southern Sudanese mixed economy pastoralists. The main features of their daily lives and the tasks they regularly perform are common to all mixed economy pastoralists of this part of Sudan. The Nuer live along watercourses, on floodplains and in marshes. Several large rivers cross their tribal territory, among them the White Nile, which is known as the Bahr el Jebel in this region, the Bahr el Ghazal, the Bahr el Zeraf and the Sobat. The Nuer see themselves as cattle herders. The men look after the livestock. They drive their animals to pasture and water them. If necessary, the men also dig wells for their herds. Although milking is exclusively done by men in other groups, it is the Nuer women and children who milk the cows, goats and sheep. The women prepare the food as well. They grind or pound grain with grinding implements or pestles and mortars and produce porridge, beer, butter and cheese. The Nuer have gardens in which millet (*Sorghum vulgare*) plays the most prominent role. These gardens are cultivated by both men and women. Fishing is very important, particularly from December until June. It is often carried out in large parties. Women typically fish with baskets in shallow water. While they occasionally also use nets, men prefer spears or harpoons. These weapons are often thrown from dams or canoes. Collecting wild food, especially desert dates (*Balanites aegyptiaca*) and water lilies (*Nymphaea lotus*), is a common activity throughout the dry season. Although they generally do not do so on a large scale, the men hunt with spears and clubs. Animals which come close to the camps, such as buffaloes, antelopes, leopards and lions, are hunted by sight. The Nuer refuse neither turtle nor crocodile meat and harpoon hippopotami. They also have a reputation as elephant hunters. Moreover, the Nuer systematically track giraffes in March and April. Ceramics, gourds, baskets, bags, mats, grinding equipment, pestles, spears, clubs, shields, bead belts, ivory bracelets and virtually all other artefacts they need are produced by the Nuer themselves. Strings, cords and ropes, for instance, are predominantly made by the men. This process consists of two steps. First, the men soften fibres with their teeth. Then, they twist the soften fibres into strings. The men also prepare the hides they use for shields or ox collars. Pottery, on the other hand, is almost exclusively produced by women. Loads, for example bundles of reed, wood or water, are habitually carried on the head by women and men. Further noteworthy, albeit only irregularly performed, tasks include building and maintaining huts and byres as well as building temporary shelters, usually windbreaks or beehive huts, in dry season or fishing camps. Distances travelled during the dry season depend on how far the closest reliable water sources are from the permanent wet season villages. For instance, the Lou, an Eastern Nuer tribe, stay “inland” as long as they can. In wet years, they do not even attempt to camp on the banks of the Sobat. Nuer tribes with wetter territories, like the Dok or Eastern Jikany, merely move to the closest marshes or nearby pools in temporarily dry beds of streams. Each village has a particular site at which its dry season camp is normally established. Generally, at first, only the youths take the herds to camps a few kilometres away from the villages. These temporary camps are moved several times before the actual dry season camps are set up. The married Nuer only leave their villages to join the youths later on during the dry season. Accordingly, the dry season camps grow in size as the dry season advances. A typical permanent village west of the Bahr el Jebel has about 200 inhabitants. The Nuer villages in the Zeraf Valley are usually inhabited by around 300 people. Villagers from arid areas often congregate in big dry season camps at major watercourses. These camps can consist of the inhabitants of a considerable number of wet season villages (e.g. Austin 1901; Evans-Pritchard 1940, 1948; Johnson 2002; Kelly 1985; Lienhardt 1970; Muchomba/Sharp 2006; Ness 1928; Seligman/Seligman 1932; Southall 1976; Stevenson-Hamilton 1920).

The Teda, Daza, Bideyat, Zaghawa and Berti are fairly well-studied Nilo-Saharan-speaking herders and agropastoralists who live in Saharan and Sahelian areas close to the Wadi Howar. The Teda inhabit the Tibesti, the Daza occupy the Borkou region, the Bideyat live in the Ennedi Mountains, the territory of the Zaghawa is located in the Chadian-Sudanese border region south of the Wadi Howar and the Tagabo Hills area is dotted with the villages of the Berti. The Sahelian Zaghawa and Berti own cattle, goats, sheep, donkeys and camels. Additionally, they use hoes to grow crops, mainly sorghum and millet. The Berti see agriculture as the most important part of their economy. Most Zaghawa, on the other hand, consider themselves breeders. Although they increasingly focus on raising camels, the Zaghawa typically rely on cattle to express their wealth. The Zaghawa men herd their livestock, water the bulk of the animals, look for pastures and maintain wells. Similarly, the male Berti take care of their herds and dig wells. Whenever possible, these wells are dug in dry river beds. Furthermore, the Berti men carry out most of the more strenuous agricultural work. Usually, the most able-bodied Berti draw water from wells and transport it to the villages during the dry season. The significance of hunting continues to decrease. Zaghawa men traditionally use nooses, slings, nets, ropes, throwing sticks and spears to hunt animals like small birds, guinea fowl, rabbits, ostriches, antelopes, foxes, hyenas, leopards, lions and elephants. The Berti pursue gazelles, ostriches, rabbits, guinea fowl and pigeons. Especially hunting rabbits with dogs, throwing sticks and axes in parties of 30 to 40 men is popular among the Berti. Apart from taking care of their gardens, the Zaghawa women collect a variety of wild grasses as well as the fruits of a surprisingly wide range of bushes and trees. Small groups of women can embark on foraging expeditions lasting several days. Sticks or hooks as well as baskets are required to harvest some of the wild crops. Sometimes the ears of wild grasses are threshed as well. Most wild cereals and the seeds of many of the collected fruits are treated as substitutes for grain. Like domesticated cereals, these grain alternatives are often processed with grinding stones and eaten as porridge, drunk as beer or used as flour. Furthermore, the Zaghawa women are well-known potters and utilise their products to store grain. Although they also occasionally grind the seeds of wild grasses into flour and incorporate certain wild vegetables into meals, gathering wild food is less important for the Berti. However, it is the Berti women who are responsible for bringing in the millet harvest. Working in small groups, they accomplish this task in a matter of days. The Berti women are also in charge of most of the milking, the treatment of milk and the production of butter. Additionally, they brew the Berti’s millet beer, a beverage which fulfils important social functions. The Zaghawa do not drive their livestock to pastures further than 50 km away from their villages. Nevertheless, they raise their livestock in a semi-nomadic fashion. The Zaghawa do so by taking advantage of Saharan pastures during the wet season and returning to the permanent water sources of their core territory during the dry season. Conversely, the fully sedentary Berti establish cattle camps during the dry season. Typically manned by young adults, these camps of about ten to twenty shelters are normally located close to wells outside the villages (e.g. Barbour 1954; Haaland 1995: 165; Holý 1974; Jánszky 2007; Johnson 2002; Jungstand 2007; Muchomba/Sharp 2006; Nachtigal 1879, 1881, 1889; Tobert 1988; Tubiana 1964; Tubiana/Tubiana 1967, 1977). The nomadic or semi-nomadic Teda, Daza and Bideyat of the Southeastern Sahara breed camels, goats and sheep. The Bideyat also own comparatively large herds of cattle. Looking after this livestock is one of the main duties of the male members of these groups. Since the Teda, Daza and Bideyat are all involved in the long-distance trade of commodities like salt and dates, many of their men frequently accompany caravans, usually for weeks at a time. Hunting only plays a minor role. The men do, however, hunt antelopes, Barbary sheep and ostriches with traps, spears and dogs. Whereas the Teda traditionally preferred barbed throwing spears and throwing knives as weapons, the Bideyat and Daza normally used long lances. Oval shields covered with antelope skin were widespread throughout the Tibesti and Borkou region in earlier times. Leather clothes, particularly skins worn around the waist, were common as well. The Tubu women are responsible for the young animals, milk the camels as well as the cattle and use milk to produce butter. They prepare the meals and ensure that there is enough water and firewood. Collecting and processing wild food, such as grass seeds, berries and the fruits of certain trees, are other activities the women regularly engage in. The seeds of colocynths (*Citrullus colocynthis*), for instance, are repeatedly soaked and ground. Being able to follow localised rains is of paramount importance for the Teda, Daza and Bideyat. Their yearly migrations cover considerable distances. Unlike the Berti and most Zaghawa, they are highly mobile. Consequently, they frequently move their camps and related task are performed fairly regularly. The size of the camps of nomadic Daza fluctuates seasonally. Accordingly, camps can comprise as few as five and as many as twenty oval tents. These tents, which are the property of the women, consist of sticks and woven mats made of palm leaves (e.g. Baroin 1997; Beck 2003: 131-139; De Bruijn/Van Dijk 2003: 285; Fuchs 1961, 1978; Hassanein Bey 1924; Johnson 2002; MacMichael 1922: 52-54; Peel 1942: 77, 80-86; Thesiger 1939; Tubiana/Tubiana 1967).

Finally, the Turkana live as nomadic pastoralists in Kenya's arid northwest. They own camels, goats, sheep, cattle and donkeys. Their sex-specific activity patterns are comparable to those of the Beri and Tubu. The men often walk considerable distances herding and protecting their livestock. While doing so, they often perform tasks aimed at producing additional fodder, for instance shaking seed pods out of trees. Furthermore, men dig and look after wells. Older herders occasionally hunt animals like gazelles with bows and arrows. They also rely on bows and arrows to bleed camels and cattle. The women milk all the livestock. They are also responsible for processing milk. For instance, the production of butter and cheese involves filling a vessel with milk and shaking it vigorously. Moreover, they cook the evening meals. The women manufacture and maintain food storage and transport vessels as well. Preparing the hides which are used as clothes or parts of shelters is another female responsibility. In addition, the Turkana women collect the firewood and fetch the water, often carrying the loads on their heads. Wells or springs can be up to 20 km away from the camps and, inside the wells, water is lifted overhead. Particularly during the dry season, the women collect small amounts of wild plant foods, such as the fruits of doum palms (*Hyphaene ventricosa*) or toothbrush trees (*Salvadora persica*). Apart from packing and transporting the households when camps are moved, the women also build the shelters and thorn bush corrals. During the wet season, the Turkana return to their home areas to live in relatively dispersed groups of 100 to 150 families. These large groups break up into single households during the dry season when most of the migratory movements take place. Such a dry season unit usually consists of about 15 to 30 people, 30 to 80 camels, 40 to 120 head of cattle and 100 to 900 goats and sheep. Throughout a year, an average household relocates five to twenty times. Single movements cover distances between 10 and 25 km and, in total, a household travels approximately 60 to 325 km each year. The young men of a household usually set up satellite camps to look after specific parts of the herds, for instance groups of non-milking camels. These satellite camps move two to twenty times in twelve months, travel 5 to 40 km per move and cover 10 to 370 km per year (e.g. Barkey *et al*. 2001: 393-394; Curran/Galvin 1999; Di Lernia 2006: 51-52; Gulliver 1952: 9-13; Johnson 2002; Leslie *et al*. 1999(a): 262; Leslie *et al*. 1999(b): 281; Little/Leslie 1999; McCabe 2000; McCabe *et al*. 1999).

I.D.2.d.3. Nutrition

In 1964, Lee (1968) estimated that the average Žu/'hoãsi of the Dobe area consumed ca. 2100 calories a day. In comparison, Turkana and Maasai make do with about 1400 and 1000 calories per person per day respectively. Periods characterised by serious food shortages were virtually unheard of among Eastern and Southern African foragers. Not surprisingly, the examination of over 450 Hadza in 1966 and 1967 showed that the nutritional status of children and adults was good by tropical standards. The Nuer studied by Evans-Pritchard (1940), on the other hand, were described as not receiving as much nourishment as they required, even in normal years. Evans-Pritchard also pointed out that crop failures frequently caused starvation. The 18 to 27% of global and the 3 to 5% of severe malnutrition recorded in areas mainly inhabited by Dinka, Nuer and Shilluk between 1999 and 2004 can therefore probably be considered to be representative. Even more severe malnutrition is anything but rare among the pastoralists of Kenya's arid northwest. For example, 35% of the children of the nomads in the northern part of the Turkana District were affected by acute malnutrition in 2004. That the Northern Kenyan Ariaal refer to the dry season as "*the long hunger*" merely illustrates that such rates are probably not just a modern phenomenon (e.g. Barkey *et al*. 2001: 394, 400; Blackhurst 2000; Brunson *et al*. 2009; Evans-Pritchard 1940: 22-28, 69-85; Fratkin 2001; Fujita *et al*. 2004: 284-285; Galvin/Little 1999; Lee 1968; Muchomba/Sharp 2006; Nadel 1947: 517-520; Nathan *et al*. 1996; Sellen 2000; Woodburn 1968).

Mangetti nuts (*Ricinodendron rautanenii*), baobab fruit (*Adansonia digitata*) and sour plums (*Ximenia caffra*) were the plant foods the Žu/'hoãsi of the Dobe area primarily relied upon during a normal month in 1964. In terms of weight, nuts, fruits and vegetables made up 67% of all the food they consumed. The rest of their diet consisted of hunted or gathered animals, such as warthogs, antelopes, guinea fowl, porcupines, tortoises, hares, rock pythons and flying ants. Woodburn (1968) came to the conclusion that meat and honey amounted to approximately 20% of the weight of the Hadza food. Based on observations made during nine months in five different Hadza camps from 1995 to 1996, Marlowe (2002) calculated that tubers contributed 22.8% of the calories brought into a camp on a normal day, honey 21.4%, berries 21.2%, baobab fruit 13.5%, meat 11.1% and non-wild foods about 10% (e.g. Kratz 1999; Lee 1968, 1978; Marlowe 2002, 2004; Murray *et al*. 2001; Newman 1970; O'Connell 2006; Porr/Müller-Beck 1997; Widlok 1999; Wood 2006; Woodburn 1968).

According to Evans-Pritchard (1940), fish formed the main part of the Nuer diet during one half of the year, while grain and meat were the main food items during the other half of the year. In addition, milk and milk products provided a moderate but very significant amount of food throughout the year. Evans-Pritchard also described the seasonal consumption of certain bush products and pointed out their special importance during "famine years". Surveys carried out among the predominantly Dinka, Nuer and Shilluk population of the White Nile, Sobat, Western Flood Plains and Eastern Flood Plains regions between 2000 and 2004 demonstrated that Evans-Pritchard's observations were, at least for the most part, still valid. During this period, crops contributed 25-35% to the total dietary energy intake of the inhabitants of this area, wild plant foods and game 15-25%, fish 15-20%, purchased food 10-20%, livestock products 10-15%, food distributed in predominantly traditional contexts 0-10% and food acquired through paid labour 0-5% (e.g. El Bushra *et al*. 1994; Evans-Pritchard 1940: 22-28, 69-85, 1948; Grosskinsky/Gullick 2000; Lienhardt 1970; Muchomba/Sharp 2006; Nadel 1947: 517-520; Seligman/Seligman 1932; Southall 1976).

Milk, meat and blood are important staples of the diet of the nomadic pastoralists who exploit East Africa's arid environments. Interestingly, cattle do not usually play the most prominent role in this context. For example, camels supply 56%, sheep and goats 23% and cattle 18% of the calories milk, meat and blood products contribute to the diet of the Turkana. Seasonally, milk and milk products can account for 60 to 65% of the caloric intake of tribes like the Samburu, Rendille, Turkana and Maasai. The meat these groups eat is usually that of goats or sheep from their own herds. Cereals are obtained through trade or self-grown. The Toposa and Murle pastoralists occupy Southern Sudan's driest region along the Ethiopian and Kenyan border. Their situation appears to be typical of most herders in this region. Trade (50%), livestock (30%), naturally occurring foods (15%) and crops (5%) constituted the sources of the calories they consumed in the period between 2000 and 2004 (e.g. Barkey *et al*. 2001: 394, 400; Baroin 1997; Blackhurst 2000; Brunson *et al*. 2009; Bussmann *et al*. 2006; Curran/Galvin 1999; Fratkin 2001; Fratkin/Mearns 2003; Fratkin/Roth 2005; Fuchs 1978; Fujita *et al*. 2004: 284-285; Galvin/Little 1999; Leslie *et al*. 1999(a): 262; Muchomba/Sharp 2006; Nathan *et al*. 1996; O'Connell 2006; Ryan *et al*. 2000; Sellen 2000; Tobert 1988: 33-41; Tubiana/Tubiana 1977).

I.D.2.d.4. Health

The total fertility rate, the life expectancy at birth in years, the probability to survive to the age of 15 years and the life expectancy in years at the age of 15 years of an average Hadza individual are 6.2, 32.5, 0.57 and 44.0 respectively. Similar to Southern African foragers who most frequently suffer from tuberculosis, rheumatic fever, leprosy, malaria and trachoma, the Hadza are affected by tuberculosis, malaria, African trypanosomiasis (i.e. sleeping sickness) and viral diarrhoea. Eye infections, backaches, fractures and wounds are also prevalent among the Hadza. Complications during childbirth are often fatal. Hunting and gathering-related accidents occasionally lead to deaths as well. Animal attacks, for example by injured buffaloes or large predators defending their kills, and falls from trees, especially while collecting honey, are rather frequently reported. The homicide rates of East and Southern African foragers of 1/2500 to 1/3000 per year are comparatively low. Nevertheless, episodes of interpersonal violence are not unusual in these groups (e.g. Bentley *et al*. 2001; Blurton Jones *et al*. 1992; Blurton Jones *et al*. 1996, 2002; Conrad 1994; Davis/Kotowski 2007; Durrheim/Leggat 1999; Freer 2004; Hewlett 1991; Hill *et al.* 2007; Khan/Olumide 2006; Lee 1978; Marlowe 2002, 2004; Migliano *et al*. 2007; Newman 1970: 102-104; Pickles 1987; Sugiyama 2004; Szalay 1995; Walker *et al*. 2006; Widlok 1999; Willcox 1978; Wood *et al*. 1992: 367; Woodburn 1968; Wrangham *et al*. 2006).

Dracunculiasis (i.e. Guinea worm), leishmaniasis, malaria and various forms of diarrhoea are particularly prevalent in the areas of Southern Sudan occupied by the Dinka and Nuer. Eye infections, yaws, meningitis and African trypanosomiasis are widespread as well. Furthermore, in some areas, tuberculosis infection rates reach 65% and in excess of 20% of sufferers seeking treatment are affected by spinal tuberculosis. It can be assumed that the thick smoke the Dinka and Nuer use to keep insects, like mosquitoes (*Culicidae*) and black flies (*Simuliidae*), at bay affects their respiratory systems negatively. In view of the fact that the Dinka and Nuer breed livestock, fish, gather and hunt, a variety of related traumatic injuries are to be expected. Dangerous tribal sports and rituals constitute a further possible source of traumata. Finally, interpersonal violence, which traditionally involved the use of clubs and spears, is commonplace both in the context of frequently perpetrated cattle raids and within Dinka and Nuer communities (e.g. Ayele *et al*. 2004; Bosch 2010; Boyle *et al*. 1997; Busch *et al*. 1986; Caputo 1982; Carroll 1988; Carruth *et al*. 2002; Conrad 1994; Coote 1994; Criddle 2001; Crognier 1973: 57-61; Daniel 1998; Davis/Kotowski 2007; Demelash *et al*. 2009; Durrheim/Leggat 1999; Evans-Pritchard 1940; Fisher 1984; Freer 2004; Khan/Olumide 2006; Kouimintzis *et al*. 2007; Kucera *et al*. 2008(a); Kucera *et al*. 2008(b); Langley 1999; Lienhardt 1961: 145; Lydall/Strecker 1979(a): 83, 130-131, 118-119, 146; Marshall *et al*. 2004; Muchomba/Sharp 2006; Nadel 1947: 514-520; Norwood *et al*. 2000; O'Rear 1947; Pickles 1987; Pratt *et al*. 1992; Ryle 1982; Seligman/Seligman 1932; Sugiyama 2004; Ugboko *et al*. 2002; Weber/Rutala 1999).

Nomadic Turkana have a total fertility rate of around 6.5, a chance of survival to the age of 15 years of ca. 76% and a life expectancy at the age of 15 years of about 46.6 years. Malaria, gastrointestinal problems, backaches and ailments resulting from prolonged malnutrition are among the primary health complaints of the pastoralists of East Africa’s arid areas. Acute respiratory infections, such as tuberculosis and pertussis (whooping cough), are also very common. Diseases affecting the eyes, especially *Xerosis conjunctivae*, affect the vast majority of the adult members of these nomadic groups. Traumata caused by the close interaction with livestock, encounters with wild animals and violence in connection with cattle raids are probably frequent as well (e.g. Ayele *et al*. 2004; Barkey *et al*. 2001; Blackhurst 2000; Blystad/Rekdal 2004; Boyle *et al*. 1997; Busch *et al*. 1986; Bussmann *et al*. 2006; Carruth *et al*. 2002; Conrad 1994; Criddle 2001; Curran/Galvin 1999; Daniel 1998; Davis/Kotowski 2007; Demelash *et al*. 2009; Durrheim/Leggat 1999; Fratkin 2001: 10; Fratkin/Roth 2005; Freer 2004; Fujita *et al*. 2004; Galvin/Little 1999; Gray *et al*. 2003; Gulliver 1952: 6-7; Hewlett 1991; Khan/Olumide 2006; Kouimintzis *et al*. 2007; Langley 1999; Leslie *et al*. 1999(a); Leslie *et al*. 1999(b); Migliano *et al*. 2007; Muchomba/Sharp 2006; Nathan *et al*. 1996; Norwood *et al*. 2000; O'Rear 1947; Pickles 1987; Pratt *et al*. 1992; Roth 1993; Sellen 2000; Sugiyama 2004; Ugboko *et al*. 2002; Walker *et al*. 2006; Weber/Rutala 1999).

I.D.2.d.5. Group interactions

By documenting the intra- and inter-tribal relations of the recent past, ethnographic studies of relevant groups reveal which interaction patterns most likely prevailed during the Wadi Howar’s prehistoric occupation phases. The distinctions between foragers, herders and agriculturalists are often blurry. In many cases, groups define themselves according to the cultural significance of a particular subsistence activity, regardless of its actual economic importance. The Nuer, for example, consider themselves pastoralists. There is, however, no evidence that they actually ever mainly subsisted on livestock products. Instead, their diet was, and is, dominated by crops, fish and varying amounts of gathered and hunted food. Especially poor Nuer, i.e. families owning only one or two cows, have little choice but to depend heavily on fishing, hunting and gathering. The same is true of the Shilluk, Dinka, Bari and most other Southern Sudanese "herders". It should also be borne in mind that certain populations may temporarily change their subsistence strategy entirely. Many pastoralists, such as various Maasai, Datoga, Herero, Nama and Cape Khoekhoe groups, repeatedly survived extended periods as foragers after they had lost their herds. At times, members of food producing societies took refuge with hunter-gatherers as well. For instance, some Bantu-speaking Isanzu agriculturalists lived and foraged with the Hadza during a famine from 1918 to 1920. Occasionally, men belonging to Nuba tribes voluntarily chose to live as hunters rather than agropastoralists. Certain foragers may also be mistaken for pastoralists or agropastoralists. Tribes like the Burun and Moru formerly only engaged in food production on a very limited scale. Accordingly, they would have probably been more accurately described as foragers or forager-agropastoralists. Instead, they were portrayed as agropastoralists for whom hunting and gathering remained important. The first Dutch settlers who reached South Africa encountered "*Strandlopers*". These coastal foragers also possessed some livestock. Similarly, the Ugandan Tepeth, originally a tribe of hunter-gatherers, have acquired cattle in recent decades. Groups of mixed Hadza-Isanzu descend have been regularly cultivating crops since the 1970s. Finally, there are also examples of more or less acculturated groups who remain, or at least remained for some time, hunter-gatherers. The Moñ Thañ, who have ties with the Dinka, still mainly rely on exploiting riverine resources. The originally forest-dwelling Yari foragers were incorporated into the Bari society. Nevertheless, they continued to live as hunter-gatherers (e.g. Barnard 1992; Blackburn 1996; Blurton Jones *et al*. 1996: 179; Evans-Pritchard 1940, 1948; Fratkin 2001: 2-3; Gordon 1992; Grosskinsky/Gullick 2000; Herskovits 1926; Inskeep 1978; Kratz 1999; Marlowe 2002; Nadel 1947: 15; Newman 1970; Seligman/Seligman 1932; Sellen 2000: 761-762; Szalay 1995; Waller 1976: 533-534; Widlok 1999; Willcox 1978).

Violence did not only often dominate the inter-group relations, it was also a very prominent aspect of intra-group interactions. Four out of a total of over 125 Hadza deaths between 1985 and 1997 were considered homicides. Lee (1978) reported a minimum of 22 murders among the Žu/'hoãsi between 1920 and 1955. It is noteworthy that the Žu/'hoãsi had a fierce reputation. Arguments caused by improper food sharing or adultery easily lead to very serious fights. Evans-Pritchard (1940) provided several relevant descriptions of the Nuer's attitudes towards inter-personal violence. The Nuer's views on this issue seem to have been representative of all historic Southern Sudanese mixed economy pastoralists. Readiness to fight was a cardinal Nuer value. They were instantly prepared to fight when wronged or insulted. Clubs were frequently and spears sometimes used in such fights. Fights with clubs were also an accepted mechanism to resolve certain types of arguments, for instance when two men had seized the same cow during a cattle raid. Reports on Nilo-Saharan-speaking Saharan pastoralists are suggestive of similar norms. The Daza, among whom even women carried knives or antelope horns, were especially feared (e.g. Blackburn 1996; Blurton Jones *et al*. 2002; Evans-Pritchard 1940: 128-129, 156, 170-171; Fuchs 1978; Hill *et al*. 2007; Kelly 1985; Lee 1978; MacMichael 1922; Marlowe 2002, 2004; Peel 1942: 83; Sarsfield-Hall 1922; Seligman/Seligman 1932; Widlok 1999; Wrangham *et al*. 2006).

According to the code of Southern African foragers, a group had the right to kill any animal in its territory. Hunting in the territory of another group without permission constituted an act of war.

Accordingly, although there does not seem to be much historic evidence of such conflicts, fighting between different groups of hunter-gatherers did probably occasionally break out. Wars between Southern African foragers and other groups, on the other hand, were commonplace. Most hunter-gatherers of the Cape were already at war with local Khoe herders in 1652. Many other South African, Botswanian and Namibian forager groups also fought extremely bitter and, at times, temporarily successful guerrilla wars against various later intruders in the following centuries. Among others, these autochthonous hunter-gatherers went to war with the Nama, Tswana, Xhosa, Herero and Europeans. Probably mainly due to the inability of this comparatively small group to put up more effective resistance against incoming populations, armed conflicts between the Hadza and non-hunter-gatherers appear to have been less common. The Hadza did, however, explain to Erich Obst that they always had to be ready for war with the Isanzu, Iraqw and Maasai. They also told this German geographer, who spent two months with them in 1911, that the Isanzu sometimes kidnapped Hadza women and children. Abductions and killed cattle apparently led to several violent episodes involving the Datoga as well (e.g. Barnard 1992; Blackburn 1996; Gordon 1992; Marlowe 2002; O'Connell 2006; Obst 1912; Szalay 1995; Widlok 1999; Willcox 1978).

Raiding, often on a very large scale, was a part of the everyday life of many groups. Again, the Nuer may be used as a representative example of the attitudes and behaviour of Southern Sudanese mixed economy pastoralists in general. The Nuer regarded raids as noble undertakings. They were a legitimate means of increasing one's wealth. War against other tribes was entirely for plunder. Since this was the time during which the men were better nourished, raids were normally perpetrated during the wet season. Weaker Dinka groups were the preferred targets but wars against other Nuer tribes also occurred. Armed inter-tribal conflicts were primarily fought with spears. Raiders often spent several weeks in the territory of their enemies. Crops and dwellings were destroyed. Livestock, young women and children were captured. Older women and babies were clubbed to death. If the Nuer did not want to establish a settlement in the conquered area, they returned home, taking their booty with them. Comparable practices prevailed among the largely sedentary Nuba tribes as well. Organised attacks on other communities, even neighbouring groups of the same tribe, were commonplace. They were opportunities to display one's courage by killing enemies, abducting slaves and bringing back livestock. Raids, usually in the context of long-standing feuds, were entirely without code. Men, women and children were killed indiscriminately. Well-established alliances and feuds also continue to characterise the relations between the herders of East Africa's arid regions. Virtually all groups still raid each other more or less regularly. The Murle are said to loot the communities which agree to let them use their dry season pastures shortly before returning to their own territory. The Turkana fight the Pokot, Samburu and Rendille. The Samburu and Rendille are also in armed conflicts with Somalis, the Oromo and other groups. The situation in the Eastern Sahel and the Eastern Sahara was not much different. Various Beri and Tubu groups habitually raided their southern sedentary neighbours, continually fought each other, regularly pillaged oases and frequently attacked caravans. As in Southern Sudan, raids were often sizeable operations during which livestock, women and children were captured. Their mobility made the nomadic groups especially successful raiders. Attempts made by kingdoms, empires and colonial administrations to bring them under their administrative control were usually not overly successful for the same reason (e.g. Baroin 1997; Barth 1857-1858; Beck

2003; Evans-Pritchard 1940: 50, 84, 120, 128-129; Fratkin 2001: 10; Fuchs 1978; Gray *et al*. 2003; Gulliver 1952 6-7; Hassanein Bey 1924; Jalata 2005 80-82; Jánszky 2007; Johnson 1982; Jungstand 2007; Karega-Mũnene 2002: 51; Keane 1885: 97-98; Kelly 1985; Lienhardt 1970; MacMichael 1922; Muchomba/Sharp 2006; Nadel 1947: 147; Peel 1942: 83; Sarsfield-Hall 1922; Seligman/Seligman 1932; Southall 1976; Spaulding 2006; Thesiger 1939; Tignor 1972; Waller 1976).

Several intra- and inter-tribal integration mechanisms made it possible for groups to exchange members. Generally, foragers and pastoralists alike broke up into smaller groups during one season and came together to live in large camps during the other. People could usually easily join different sub-sections of their own tribe, and sometimes even other tribes, when they met in the course of such annual migratory movements. Especially hunter-gatherers often left one group to live with another to avoid or escape conflicts. In Southern Africa, for example, visiting networks greatly facilitated these moves. Members of different camps frequently visited each other. Joining a different group was thus logistically more or less identical to such a normal friendly visit. Crises could lead to the temporary or permanent integration of refugees into other ethnic groups. Some of the Maasai who had lost wars against other Maasai tribes in the late 19th century took refuge with Okiek foragers. Other members of these defeated tribes were absorbed into Kikuyu or Chaga communities. During droughts, Namibian hunter-gatherers, especially Hai//om, often joined Ovambo families with whom they had previously traded. Voluntary intermarriage between foragers and food producers usually followed specific patterns. For example, it was mostly Ovambo men who married female foragers. Nonetheless, male hunter-gatherers also married Ovambo women. The children of mixed marriages were not discriminated against. This situation is illustrated by the fact that various well-known Ovambo leaders were said to be half Hai//om. Intermarriage rates between Sandawe and non-Sandawe showed similar tendencies. Newman (1970) reported that 40% of Sandawe children with a non-Sandawe parent had a Nyaturu father and 29% a Nyaturu mother. Intermarriage with groups other than the Nyaturu was far less common and decidedly more unbalanced. Sandawe men could not marry Maasai women. When a Sandawe woman married a Maasai man she had to become a Maasai. According to Marlowe (2002), ca. 5% of Hadza had an Isanzu parent. As expected, it was normally Isanzu men who took Hadza wives. However, during the 1918-1920 famine, Isanzu women also married Hadza men. The Hadza trace their descent bilaterally. As a result, any child with a Hadza parent was accepted as a Hadza. Conversely, in Southern Sudan, children with a Nuba and a Hawazma parent were considered members of this latter Baggara group. People of mixed Nuba-Hawazma descend did therefore normally not become members of Nuba tribes (e.g. Barnard 1992; Barkey *et al*. 2001: 394; Bayoumi *et al*. 1985; Bayoumi/Saha 1987; Blackburn 1996; Blurton Jones *et al*. 1996: 179; Fratkin 2001: 8; Gordon 1992; Herzog 1979: 602; Lee 1968, 1978; Leslie *et al*. 1999(b); Marlowe 2002; McCabe *et al*. 1999; Newman 1970: 50-56; O'Connell 2006; Szalay 1995; Tay/Saha 1988; Tubiana/Tubiana 1977; Waller 1976: 534; Widlok 1999; Willcox 1978; Woodburn 1968).

Cases in which smaller groups were integrated into larger, expanding tribes have also been documented. Apparently, entire Khoe-speaking groups, most likely both herders and foragers, were absorbed by Nguni tribes. For instance, the Xhosa-speaking Thembu could almost be described as a hybrid group. In Southern Sudan, migrating pastoralists seem to have frequently incorporated foragers into their tribes. The "*turtle men*", reportedly absorbed by the Shilluk, and the various Dupi groups, which were part of the traditional Bari society, are two well-known examples. Prolonged geographic proximity often acted as a catalyst for integration. Non-Nuer groups, for example Dinka or Anuak communities, whose lands had been surrounded by expanding Nuer tribes were not necessarily annihilated. Instead, they were frequently assimilated, regardless of their original ethnic background. Similarly, non-Dinka families who settled in Dinka territories with Dinka permission were eventually accepted as fellow Dinka. Zaghawa chiefdoms often encompassed members of different Zaghawa clans and other ethnic groups. Such non-Zaghawa frequently adopted the culture of the ruling clans and, at times, even seized power. True hybrid groups appear to have been less common but definitely exist as well. For example, the Ariaal of Northwestern Kenya are the result of an alliance between the Rendille, Cushitic-speaking camel breeders, and the Samburu, Nilotic-speaking cattle pastoralists, against their common enemies, the Oromo and Turkana. Extensive intermarriage and intermigration encouraged by this alliance eventually gave rise to the Ariaal. The members of this fairly young tribe, who own camels as well as cattle, goats and sheep, speak both Samburu and Rendille (e.g. Barnard 1992; Blackburn 1996; Fratkin/Roth 2005; Fuchs 1978; Fujita *et al*. 2004: 278; Kelly 1985; Lienhardt 1970; McConvell 2001; Seligman/Seligman 1932; Szalay 1995; Tubiana/Tubiana 1977; Waller 1976: 534; Willcox 1978).

The treatment of the women and children who were enslaved during raids constitutes a particularly noteworthy mechanism of inter-tribal integration. After they had returned from a raid, it was legitimate for Nuer men to have sexual relations with the women they had brought home. Like many other Southern Sudanese and East African herder societies, the Nuer had also developed procedures which formally made captured children members of their own tribe. The men ritually "adopted" the children they had kidnapped. Thus, the children's captors officially became their "fathers". Later, when they were older, boys were initiated and accepted as members of their captors' lineages. Although captured girls were not incorporated into the lineages of their Nuer "fathers", they were given the right to receive bridewealth. Practices of this kind could have far-reaching side effects. It was, for instance, probably not least such "adoptions" which helped to establish kinship ties between certain Nuer and Dinka communities of the Sobat and Bahr el Zeraf region after the Nuer had conquered this area. These ties formed the basis upon which various Nuer groups later established increasingly close relations with specific Dinka communities. Ultimately, this process even led to the formation of mixed Nuer-Dinka groups in this region at the end of the 19th century. The usually rather quick de facto biological, and often also social, integration of serfs or slaves and their descendants into groups like the Daza and Baggara was a process which produced similar outcomes (e.g. Bayoumi *et al*. 1985; Bayoumi/Saha 1987; Charpin 1961; Cunnison 1966; Evans-Pritchard 1940: 221-222; Fuchs 1961, 1978; Gulliver 1952: 7; Herzog 1979: 602; Johnson 1982; Kelly 1985; Nadel 1947: 226; Spaulding 2006; Tay/Saha 1988; Tubiana/Tubiana 1977).

The exchange of goods could bring different ethnic groups into contact with each other. The Hadza traded with their agropastoralist neighbours, for example honey and other bush products for metal items, jewellery, tobacco and beer. Many Southern African foragers occupied important positions in pre-colonial trade networks. Other hunter-gatherer groups only traded occasionally. The Hai//om were heavily engaged in the regional salt and copper trade. The Žu/'hoãsi exchanged ostrich feathers, necklaces, horns and skins for pots, knives, axes and tobacco. Various Southern African hunter-gatherer groups also traded with each other. Most Southern Sudanese mixed economy pastoralists rarely got involved in peaceful exchanges of goods. The Nuer generally preferred raiding their neighbours. Nevertheless, some Nuer tribes did trade ivory with Arabs or Oromo. Trade, particularly livestock for crops, was and remains more important for the herders who inhabit the Eastern Sahel and East Africa's arid areas. Despite this fact, even today, raids still constitute an important source of goods and livestock for these groups. The Nilo-Saharan-speaking pastoralists of the Eastern Sahara profited greatly from long-distance trade. They traded goods, organised caravans, collected tribute from caravans and robbed caravans (e.g. Barnard 1992; Baroin 1997; Beck 2003: 131-139; Evans-Pritchard 1940: 87-88; Fuchs 1978; Gordon 1992; Kratz 1999; Marlowe 2002, 2004; Muchomba/Sharp 2006; Peel 1942: 83; Seligman/Seligman 1918; Waller 1976: 533; Widlok 1999).

The attitudes of the relevant hunter-gatherer and herder societies towards certain subsistence activities and other ethnic groups reveal the rational behind many inter-tribal relations. The Hadza prefer crops to the wild plants they mainly subsist on. However, they think that the amount of work required to grow them makes cultivating crops unattractive. This view was also frequently expressed by Southern African foragers, including those who had previously experimented with raising livestock and growing crops. For most historic pastoralists, on the other hand, subsistence activities were inextricably linked to social status. As a result, they approached this subject far less rationally. Cattle were the most prestigious livestock and a means of displaying wealth in virtually all African herder societies. They were usually also the most important part of the payments which had to be made to arrange a marriage. These two facts are probably the most important reasons why cattle played such a prominent role in the ritual and social life of pastoralists. Maasai who survived as hunter-gatherers after loosing their livestock had to break important social and dietary rules. Consequently, they were unable to fully participate in the social life of their tribes. Moreover, the profound loss of prestige continued to affect them long after they had become herders again. The Nuer considered horticulture an unfortunate necessity, neglected most wild foods in normal years and were of the opinion that only poor people needed to hunt or rely heavily on riverine resources. The Namibian Nama looked down on all non-pastoralists. "*San*" was the derogatory term they used for fellow Nama who had lost their livestock, all hunter-gatherers and poor European settlers. Most African pastoralists shared this feeling of superiority and were extremely conservative. The Kenyan Nandi reportedly expressed this sentiment as follows: "*We are Nandi. All other people are nothing*" (Tignor 1972: 272). The Nuer felt that they did not need any of the products or innovations of other groups, including those of the Europeans, and often openly showed their contempt for them. As did most other Southern Sudanese and East African pastoralists, the majority of the Maasai and Samburu managed to resist the attempts of colonial and later national administrations to modernise their societies for a long time (e.g. Agyemang *et al*. 1991; Evans-Pritchard 1940: 27, 70, 72-81, 88, 93, 134; Gordon 1992; Guenther 1986; Hanotte *et al*. 2003; Heiß 2006; Herskovits 1926; Holý 1974: 22; MacMichael 1922; Nadel 1947: 59-68; Ryan *et al*. 2000; Seligman/Seligman 1932; Sellen 2000: 761-762; Tignor 1972; Waller 1976; Widlok 1999; Woodburn 1968).

I.D.2.d.6. Population history

Unfortunately, the oral history of most relevant groups appears to recount only rather recent events. Nevertheless, some accounts, especially those which can be corroborated by additional independent sources, can be very informative. Several migrations which took place in the last few centuries demonstrate that, whereas, on the whole, populations were moving south, individual groups did not necessarily do so at all times. The Shilluk believe that they originated south of their modern territory. They claim to have migrated along the Bahr el Jebel, looking for a new home in the northeast. Their former territory was almost certainly much larger. Apparently, it extended along the White Nile as far north as Aba Island in the 19th century. Shilluk raiders are occasionally also credited with founding the Funj Sultanate. The Bari probably reached the banks of the Bahr el Jebel from the east. Later, they seem to have incorporated local tribes occupying the area west of this river into their society. Most oral traditions of Nuba tribes referring to migrations describe movements from west to east. Attacks by other groups and land or food shortages appear to have been the most common reasons for these migrations. Some tribes of the Nuba Mountains are able to provide more detailed accounts. The Daju trace their origin to Dar Sila, a region on the Chadian border. The Kadaru believe their history is linked to the Funj Sultanate. Certain Dinka tribes migrated northward into the region north of the Sobat and east of the White Nile during the 18th century. The Atwot most likely separated from the Nuer in the 16th century. Conflicts with other Nuer groups prompted them to embark on an approximately 200-km-long southward migration through the territory of the Dinka. When they reached the area they occupy today it was inhabited by groups of hunters, fishermen and iron workers, whom they presumably absorbed (e.g. Evans-Pritchard 1948; Fage/Tordoff 2002: 39; Holt/Daly 2000: 3; Karega-Mũnene 2002: 51; Kelly 1985; Lienhardt 1970; Nadel 1947: 4-7; Seligman/Seligman 1932: 37-38, 108-113, 239-242, 297, 366-412; Southall 1976: 478-482).

The history of the Nuer does not only lend a certain amount of support to the “Wadi Howar Diaspora” model, it also provides an example of a fairly rapid population expansion. The Nuer acknowledge that they and the Dinka once were one people. Furthermore, according to Nuer oral history, the Nuer originally inhabited an arid area somewhere northwest of the Bahr el Ghazal. They claim to have only left this arid area because they were on the verge of starvation. The Nuer also distinguish between “*naath cieng*”, the “*homeland Nuer*” west of the Bahr el Jebel, and “*naath doar*”, the Nuer east of the Bahr el Jebel. Indeed, before conquering an enormous area east of the Bahr el Jebel, absorbing numerous members of other tribes in the process, the Nuer only lived west of the White Nile. Their eastward expansion, the so-called “Nuer conquest”, seems to have been the cumulative result of recurrent annual, often quite sizeable, raids. For example, a party of up to 1500 organised Jikany Nuer warriors could overrun as many as 30 Dinka villages in one season. Moving progressively deeper into Dinka territory, such a raiding party could steal over 2000 head of cattle. In the 19th century alone the Nuer increased the size of their territory fourfold. Today, the Nuer territory stretches from the area where the Bahr el Arab, Lol, Jur and Bahr el Ghazal meet to Western Ethiopia’s Baro-Akobo region (e.g. Evans-Pritchard 1940: 3-4, 59, 128; Gulliver 1952: 6-7; Johnson 1982; Kelly 1985; Lienhardt 1970; Seligman/Seligman 1932: 206-207; Southall 1976: 478-482).

The available ethnohistorical information about the population of the Wadi Howar and the adjacent regions leaves little doubt that groups like the Beri and Tubu formerly controlled areas which they have now largely abandoned. The Tubu seem to have originally roamed areas stretching from the Niger Bend to the Nile Valley. The Daza, for example, are sometimes also referred to as Guraan or Goran. There is evidence which suggests that their territory originally included areas close to the Nile. The desert regions around Old Dongola, especially the Bayuda, were reportedly known as the "*Desert of Goran*" until the 17th century. The people who inhabited this desert, "*the people of Goran*", were apparently a biologically sub-Saharan group. Furthermore, the medieval Nubian kings are said to have been constantly at war with "*the people of Goran*". Regardless of whether or not these reports are actually reliable, it is a well-established historical fact that Daza raiders could still cause considerable damage as far south as Northern Darfur in the early 20th century. At the beginning of the 1920s, the Kababish Arabs allegedly claimed that they were still ousting "*Nuba*" from the small hills of Northern Kordofan just five to six generations earlier. Further west, the Zaghawa only started to move south as a result of the drought in the 1960s. Finally, the early reports pertaining to the Wadi Howar itself further underline the importance of the Beri as a whole. As already mentioned in chapter I.C.2., according to King's informants, the Wadi Howar was "*a clay valley with much water in winter, but dry in summer*" which formed "*the boundary between the Zaghawa and the Bedayat*" (King 1913: 278). Twenty-three years later, Shaw *et al*. (1936: 199) wrote the following about the Wadi Howar: "*Natives of N. Darfur use it as a convenient route to the saltpans of Bir Natrun, and we met a party of Zaghawa hunting addax, but otherwise it is little visited. … The Zaghawa now occupy the country towards the west end of the wadi, and their tradition is that they once extended farther east*" (e.g. Baroin 1997; Barth 1857-1858; Beck 2003: 131-139; Fuchs 1961, 1978; Hassanein Bey 1924; Jánszky 2007; Jungstand 2007; King 1913; MacMichael 1922: 31-33; Nachtigal 1879, 1881, 1889; Newbold 1928: 264-265; Peel 1942; Shaw *et al*. 1936; Thesiger 1939; Tobert 1988: 33).

I.D.2.d.7. Continuity of cultural practices

Several ethnographic publications on relevant modern groups appear to refer to customs which have been either documented by archaeological finds from the Wadi Howar, depicted in images at Saharan rock art sites or described in Ancient Egyptian sources. Dinka, Nuer and Mandari men and women as well as Turkana and Samburu women adorn themselves with ostrich eggshell bead belts and necklaces similar to those worn by, for example, the Leiterband/Herringbone phase individual Abu Tabari 02/28-7. Drop-shaped and oval stone beads, like those recovered from the Leiterband burials Djabarona 96/1-1 and -2, are popular among Tubu women. Leiterband/Herringbone phase "cattle burials" and bone pits, such as those at Abu Tabari 02/28, call to mind customs of certain Southern Sudanese tribes. Although they do not raise herds for slaughter, the Nuer frequently sacrifice goats, sheep and cattle. Most of the regular, larger Nuer ceremonies take place during the wet season. Considerable numbers of cattle, including cows in milk, can be slaughtered on important occasions, for example in the course of funerals. From time to time, during the wet season, young Nuer men also slaughter oxen merely to feast on their meat. Certain rich Nuer tribes are notorious for killing oxen without any ritual causes as well. Various Nuba tribes, for example the Otoro, Heiban, Koalib and Tira, place more emphasis on bulls than cows. Especially these groups display wealth through the wasteful use of livestock and its products. Slaughtering animals during celebrations is a means of increasing one's prestige. The more wealth a family can afford to destroy, the more prestige it gains. The scale of the ritual destruction of wealth therefore acts as an indicator of social status. Each November the Nuer deliberately burn off the rank grasses of the plains. These grasses would otherwise impede both the movement of their herds and the regeneration of their pastures. Perhaps, it was superficial annual fires like these which created the fritted structures encountered in the Wadi Hariq. These burnt trees have been dated to 3100 to 2400 calBCE. The Berti and Nuer are just two examples of the countless Sudanese ethnic groups which use wells surrounded by shallow mud troughs. Such watering places are highly reminiscent of the structures discovered at Abu Tabari 03/13. The settlements of various Southern Sudanese tribes recall sandbank sites like Abu Tabari 02/1 and Abu Tabari 02/28. The Nuer build their permanent villages on sandy ridges. Small groups of homesteads are spread out along these mounds. The surfaces of the Nuer settlement sites largely consist of accumulations of debris. The ridges are chosen to make sure that the settlements are not damaged by the wet season floods. These annual floods completely inundate the surrounding plains. The Shilluk, the Dinka communities which occupy the open savannah and the Murle of the Pibor County are further examples of groups using the same settlement strategy. Not only are their villages water-logged during the yearly floods as well, the height of the mounds on which their settlements are situated is also continually increased by anthropogenic deposits. Interestingly, the Buduma occupy comparable villages. Like the Dinka and Nuer, the Buduma grow small amounts of crops, rely heavily on fishing, consider cattle breeding the most important part of their economic life, are exceedingly ethnocentric and have a reputation for raiding neighbouring tribes. This Chadic-speaking group lives on the northern and eastern shores of Lake Chad. They build their permanent settlements on elevations which become islands when the waters of the lake are sufficiently high (e.g. Evans-Pritchard 1940: 25, 54, 59-61, 64, 1948: 4; Fisher 1984; Heiß 2006; Holý 1974: 29-30, 108-109; Jesse 2006(a); Jesse *et al*. 2004; Jesse/Keding 2002; Lange 2005; Lebon/Robertson 1961; Lienhardt 1970; Nadel 1947: 59-68; Seligman/Seligman 1932).

The bodies of certain “Round Head” humans depicted at several Saharan rock art sites are decorated with elaborate patterns. Similar scarification patterns can be observed among various Nuba tribes, the Surma, the Bari, the Mandari, the Nuer and the Shilluk. Women in Southern Sudan, the Sahel and the Sahara use grinding stones like those frequently encountered at archaeological sites in the Wadi Howar. Like the figures with grinding stones in Saharan rock paintings, they do so by kneeling in front of these implements. All kinds of loads continue to be habitually carried on the head by men and women in many parts of Africa. The “Pastoral Period” and “Bubaline Style” images which show prehistoric Saharans carrying loads on their heads prove that this technique has been used for thousands of years. Ancient pictographs of people drinking out of large vessels with long straws have been recorded in the Tassili. Old men of the Nilotic-speaking Luo tribe traditionally consume locally brewed sorghum beer in exactly the same way. These similarities imply that beer was as important for the prehistoric inhabitants of the Sahara as it is for the Dinka, Nuer, Nuba, Fur, Berti, Zaghawa, Datoga, Maasai and Luo. Bows and arrows were undoubtedly the dominant weapons during the “*période bubaline*” and much of the “Pastoral Period”. Spears only appeared more frequently from the late “Pastoral Period” onwards. Bows and arrows do, however, not play an important role in the lives of the relevant ethnic groups. Instead, spears and clubs are the standard weapons of the vast majority of the historic agropastoralists, mixed economy pastoralists and herders of the Eastern Sahara, the Eastern Sahel and Southern Sudan. Nevertheless, some tribes, other than the Hadza and Sandawe, do regularly hunt with bows and arrows. These groups include the Burun and Mabaan of the Blue Nile Province close to the Ethiopian border, the Moru and Dongotono from Sudan's southern tip, the Kipsigis in Kenya and the Tanzanian Datoga. The Bari favour spears but traditionally used bows and arrows as well. Finally, the Maasai and Turkana, for instance, bleed their livestock with bows and arrows. Otherwise, bows and arrows are mainly, although not exclusively, used by the boys of these two tribes. Some Saharan rock pictures could be interpreted as scenes in which cattle are being bled. Should they actually depict this practice, then groups like the Nuer, Mandari, Turkana, Maasai and Datoga have probably been bleeding their cattle for millennia. Prehistoric depictions of human figures leaping over cattle appear to document some sort of ritual. The Hamar are a group of Omotic-speaking agropastoralists who live in Southwestern Ethiopia. A ceremony which involves jumping over cattle is still an important part of this tribe's ritual life. Rock art scenes in which cattle are sacrificed further underline the antiquity of this custom. As mentioned above, cattle sacrifices are commonplace all over Southern Sudan. A number of "Pastoral Period" paintings show men fighting over cattle. These pictographs suggest that mutual raiding became a part of the daily life of African herders soon after the adoption of animal husbandry. The Kordofanian Baggara traditionally ride oxen, particularly when moving camp. Several "Pastoral Period" paintings prove that at least some groups of early Saharan pastoralists also employed their cattle in this fashion. Representations of boats are present at a few Saharan rock art sites. These ancient vessels share many characteristics with the dugout canoes, ambatch (*Aeschynomene elaphroxylon*) rafts and papyrus boats of groups like the Anuak, Dinka, Nuer, Shilluk and Buduma. Both various rock paintings at Iheren (Tassili) and a Meroïtic bronze bowl from Karanog show beehive huts. Many ethnic groups use comparable structures. For example, the camps of the Hadza consist of such shelters, the Bideyat live in beehive tents, the Nuer erect beehive grass huts in their cattle camps and the grass huts of traditional Kanembu villages are also dome-shaped (e.g. Alexander 1993: 52-53; Blurton Jones *et al*. 1996: 168; Brocklehurst 1922; Cunnison 1966; Evans-Pritchard 1940: 27-28, 65-66, 128; Fage/Tordoff 2002: 59; Fisher 1984; Fratkin 2001; Fratkin/Roth 2005; Fuchs 1978: 136, 141; Galvin/Little 1999; Gray *et al*. 2003; Haaland 1995: 164-166; Holý 1974: 162-163; Jánszky 2007; Jungstand 2007; Le Quellec 2003; Lienhardt 1970; Lydall/Strecker 1979(a), 1979(b); Marlowe 2002, 2004; Meldon 1913; Miruka 2001; Murray *et al*. 2001: 5; Nadel 1947: 59-68, 147, 162; Ness 1931; Newman 1970: 43; Peel 1942; Rodd 1923; Seligman/Seligman 1932; Sellen 2000: 761-762; Tubiana/Tubiana 1977).

The "*Nehesiu*" depicted in Ancient Egyptian art are usually adorned with large, round earrings. They almost invariably wear their hair in tightly coiled plaits. Often, they are dressed in animal skins. Furthermore, many of them have big, single feathers stuck in their hair. More detailed representations of "*Nehesiu*" also frequently show parallel, horizontal lines on their foreheads. Men and women of countless biologically sub-Saharan groups traditionally wear earrings. Some tribes, like the Turkana, Maasai and Datoga, have even taken this practice to extremes. It is nevertheless worth noting that earrings which closely resemble those worn by the "*Nehesiu*" are far less widespread. They are, however, common among the Dinka, Nuer and Mandari. The stereotypical hairstyle of the "*Nehesiu*" is a type of pageboy. This pageboy consists of thin plaits which are reminiscent of dreadlocks. Similar coiffures are very popular among Nilo-Saharan-speaking groups. For example, Shilluk, Dinka, Burun and Ingessana men traditionally wore their hair in this fashion. Tubu, Bideyat, Kanuri, Fur, Ingessana, Mandari and Nubian women frequently choose comparable coiffures as well. Two further examples demonstrate that tightly coiled plaits can also function as signs of age-group membership in certain Nilo-Saharan societies. Young Midob men traditionally wear long plaits prior to an annual harvest ritual. Long thin plaits are also typical of young Maasai men in the "*warrior*" stage of their tribe's age set system. Historically, leather and fur clothes are a trademark of the inhabitants of the Southeastern Sahara. Leatherwork continues to be an important craft among the Tubu and Beri. Turkana nomads make clothes out of hides. The traditional attire of the Datoga includes a beaded leather cape as well. Moreover, Nuer "priests" famously wear a leopard skin. The men of many Southern Sudanese and related groups, such as the Shilluk, Dinka, Nuer, Mandari, Bari, Mursi, Acholi, Turkana and Samburu, decorate themselves with big, single feathers. The feather is stuck in the hair at the back of the head. Different patterns of facial scars are important markers of tribal identity in Southern Sudan. The parallel, horizontal lines on the foreheads of many "*Nehesiu*" are thus perhaps their most interesting feature. The facial scars of the Nuer are indistinguishable from these lines. Nuer men have six parallel, horizontal lines cut into their foreheads during their initiation into manhood. The men and women of various Dinka tribes are adorned with almost identical scars. Among the Shilluk such lines are often dotted. Comparable dotted facial scarifications around the eyes are typical of the Datoga. According to Ancient Egyptian sources, the "*Nehesiu*" had their own distinctive styles of wrestling and stick fighting. The young men of the tribes occupying the Nuba Mountains still fight each other in large wrestling and stick fighting tournaments. Both the fighting styles and the paraphernalia associated with these tribal sports are strikingly similar to those of the wrestlers and stick fighters of the "*Nehesiu*". Many other Southern Sudanese and East African groups also practice stick and spear fighting. For example, the Dinka, Nuer, Karimojong and Turkana do so in preparation for fights, raids and wars. The weapons that the Egyptians associated with the "*Nehesiu*" are throwing sticks and bows and arrows. As already discussed, relevant groups primarily fighting or hunting with bows and arrows are comparatively rare. Throwing sticks, however, are in use in Darfur and along the central part of the Sudanese-Ethiopian border. The Zaghawa and Berti, for instance, hunt certain animals with throwing sticks. Tribes like the Ingessana, Burun and Mabaan even consider throwing sticks their principal weapons. The men of these groups hunt as well as fight with them. Moreover, the Teda traditionally used throwing knives highly reminiscent of throwing sticks (e.g. Austin 1901: 503; Barbour 1954; Blystad/Rekdal 2004; Caputo 1982; Carroll 1988; Coote 1994; Curran/Galvin 1999; Evans-Pritchard 1940: 249; Fisher 1984; Fratkin/Roth 2005; Fuchs 1978: 142-143; Gibbons 2006: 1672; Hassanein Bey 1924; Herzog 1956; Holý 1974: 90-91; Larson 2006: 80, 86; Lienhardt 1961: 145; MacMichael 1922; Meldon 1908; Nadel 1947; Ness 1928: 4-5, 1931; Ryle 1982; Sarsfield-Hall 1922; Seligman/Seligman 1932; Tobert 1988: 39-41, 44-46).

I.D.2.d.8. Funerary customs

"Delayed-return" hunter-gatherers, like the pottery-using Wavy Line/Laqiya phase groups of the Wadi Howar, are often associated with fairly complex funerary customs. However, "immediate-return" hunter-gatherers, like the Hadza or !Xõ, typically invest little time and effort into laying their dead to rest. Hadza burials are extremely simple. Bodies can simple be left behind in the open. Sometimes a hut is pulled down over the deceased. Huts demolished in this manner may also be set alight.

Occasionally, a hut is destroyed on top of a grave. A grave can be covered with branches as well. If graves are dug, they are shallow and frequently trodden down after the burial. In the grave, the body normally lies on its left side facing a mountain. Personal belongings are either buried with the person or distributed within the group. In any case, camps are always abandoned soon after deaths occur. Although Southern African foragers often disposed of their dead in similarly unassuming ways, their funerals could be more elaborate. For instance, a !Xõ who died in 1974 received a relatively complex burial. His rectangular grave was north-south oriented. A burial chamber was dug into the eastern wall of the pit. The body was wrapped in a blanket. The deceased was laid on his side inside the chamber. Thereafter, a pillow was put under the body's head. Finally, the pit was filled and the grave covered with grass and branches (e.g. Barnard 1992; Marlowe 2004; Porr/Müller-Beck 1997: 54-57; Testart 1982; Woodburn 1982).

Southern Sudanese mixed economy pastoralists bury their dead in simple, reasonably deep graves. The deceased are wrapped in skins, normally those of sacrificed cattle, goats or sheep. The bodies are interred on their sides in foetal positions. Various non-permanent grave superstructures are constructed by many groups. Grass or reed roofs and wooden poles, scaffolds or shelters can be frequently observed. Grave goods, on the other hand, are not common. There are no cemeteries. Graves are dug inside the villages, close to or inside the huts of the deceased. Villages are not moved after a death. Most Southern Sudanese tribes follow certain additional group-specific traditions. The Nuer bury their dead in the typical Southern Sudanese fashion. Their plain graves are approximately 120 cm deep. The Nuer constrain the bodies of their deceased. Some Nuer groups lay their men to rest facing east and their women facing west. Others inter all their dead with their faces towards the west. In special circumstances, Nuer may also be laid to rest facing other directions. The graves of old Cic Dinka men are dug inside cattle byres. Married Dinka women are buried beside their husbands. The members of the Dupi, a low status group within the Bari society, are sat rather than laid in their graves. The Shilluk prefer full length burials. The Shilluk also break cooking pots and other household utensils after a funeral. These objects are put in a hole which is dug near the deceased's head. This ritual is not sex-specific. Additionally, the horns of cattle are placed on top of Shilluk graves. Dead Didinga are buried outside their villages. The funerary customs of some groups, however, deviate even more from the standard Southern Sudanese burial procedures. For example, family graves with chambers are common in the Nuba Mountains. The various Nuba groups bury grave goods with their dead. Common Nuba grave goods include bead belts, spears, knives, hoes, gourds, goats and sheep. Grave goods, like axes and hoes, are also part of the Uduk's burial rites. The Uduk lower their dead into graves with excavated dome-shaped chambers. Inside the chambers, the tightly bound bodies are arranged in squatting positions. Not unlike the Uduk, the Bongo dig shaft graves with terminal chambers for bound corpses. After a body has been placed in a grave, the entrance of the chamber is sealed with wooden stakes and plaster. A Bongo burial is completed by filling the shaft and erecting a stone mound on the grave. The Lotuko do not bury those who have died a violent death. The Bor Dinka have the same tradition. The bodies of unimportant members of the Rek Dinka are sometimes simply left in the bush as well (e.g. Jedrej 1979; Nadel 1947; Seligman/Seligman 1932: 103-105, 112-113, 133-134, 201-205, 234-237, 290-295, 334-339, 358-359, 361-363, 404-410, 441, 445-447, 455-457, 470-472).

The burial practices of most East African arid zone pastoralists are very basic. Except for chiefs, the Murle do not inter their dead. Instead, they simply lay the bodies on the ground outside their villages. The heads of the Murle corpses are usually put on headrests in the process. The Maasai, Turkana and Samburu traditionally merely abandon their corpses. Nevertheless, more important members of their tribes are either buried under cairns or left in huts with walled up doors. In such cases, camps are moved afterwards. The relevant Saharan and Sahelian groups have now all long adopted Islamic funerary customs. However, both the Tubu and the Zaghawa reportedly originally used quite distinctive graves. Such a grave was marked with a circle of flat, upright stones around a low, round burial mound (e.g. Bagnold 1931; Baroin 1997; Little/Leslie 1999; Peel 1942; Seligman/Seligman 1932: 334-339, 361-362; Tubiana 1964).

II. Material

Chapter synopsis

Apart from the Wadi Howar series, the skeletal material used in this study comprised both prehistoric and modern comparative samples. The three sets of primary prehistoric comparative data were collected from Jebel Sahaba/Tushka, A-Group and Malian Sahara specimens (see II.B.1.). There was one further prehistoric comparative sample, the "Sudanese Hotchpotch" sample. This mixed sample was, however, excluded from the main analyses. It contained data collected from material excavated at El Kadada, Saggai and the Jebel Shaqadud. The modern comparative samples consisted of Southern Sudanese, Chadian, Mandinka, Somali and Haya Crania *(see II.B.2.). Before the comparative samples were introduced separately, the rationale behind their selection was briefly explained. Information about the number of specimens, their sex and age at death as well as when and where they were examined was provided for every comparative sample. Each prehistoric group's sites, age and economy as well as each modern group's area of origin, ethnic affiliation, language and economy were also mentioned.*

II.A. The Wadi Howar sample

The Wadi Howar sample consisted of the above-mentioned 32 individuals (see I.C.4.a.). The initial reconstruction and analyses of ten of the as yet unpublished skeletons were completed at the *Institut für Anthropologie* at the *Johannes Gutenberg-Universität Mainz* (e.g. Becker 2005, in press; Jesse 2008(b); Lange 2005). These preliminary analyses were carried out in the course of six months in 2004 and 2005. The study was resumed in October 2006. The reconstruction, documentation and osteological analysis of all remains were concluded in April 2008. A list of 984 cranial, dental and postcranial measurements and traits was used to gather a wide range of data from each of the 23 individuals (see III.B.1.b.). These 23 data sets were collected between July 2007 and April 2008 in the University of York's Department of Archaeology. Each one of the eight previously published individuals was processed according to the same data collection protocol. This re-examination was conducted at the *Institut für Anthropologie* from the 9th until the 20th of August 2007 (e.g. Becker in press; Henke *et al*. 2002; Jesse/Keding 2002). The Duckworth Laboratory at the University of Cambridge was entrusted with the curation of the Wadi Howar series in July 2009.

II.B. Comparative samples

A shortened protocol was used to gather the comparative data. The list contained 212 cranial and dental traits and measurements (see III.B.1.b). Altogether 173 comparative data sets were used in the regular discriminant function analyses. The 65 prehistoric and 108 modern data sets were collected from the 7th of July until the 5th of December 2008.

II.B.1. Prehistoric samples

The choice of the prehistoric comparative samples was guided by archaeological, morphological and practical considerations. Both the A-Group material and the remains from the Malian Sahara were selected according to archaeological criteria (see I.C.3.). The decision to include the Jebel Sahaba/Tushka series in the analyses was based on a number of morphological observations (see

I.C.4.a.). Ideally, comparative data should have also been collected from additional Early Khartoum, “Khartoum Neolithic” and Early/Middle Holocene Saharan samples. Unfortunately, this proved impossible. Often, it was simply not logistically feasible to inspect such material. Some series were not available for study. Other samples were too small or too heterogeneous. Lastly, in one case the data collection could not be finished successfully.

Table 2: Prehistoric comparative samples.

	Sites	**Sex**	**Age**	**Institution**
21 Jebel Sahaba/Tushka	18 Jebel Sahaba (Site 117); 3 Tushka 8905	10 female, 11 male	18 adult or older, 3 sub-adult	British Museum, London
21 A-Group	3 Site 25; 1 Site 90; 3 Site 95; 1 Site 230; 7 Site 277; 2 Site 308; 4 Site 401	8 female, 10 male, 3 indeterminate	19 adult or older, 1 sub-adult, 1 indeterminate	*Københavns Universitet*, Copenhagen
23 Malian Sahara	4 Erg Ine Sakane AZ56, 12 Hassi el Abiod (1 AR7, 1 MK37, 1 MN6, 4 MN10, 4 MN27, 1 MN36), 1 Kesert el Gani MT32, 5 Kobadi KBD89, 1 Tagnout Chaggeret MK42	6 female, 11 male, 6 indeterminate	18 adult or older, 5 sub-adult	*Université de la Méditerrannée*, Marseille
24 “Sudanese Hotchpotch”	9 Jebel Shaqadud, 11 El Kadada, 4 Saggai	12 female, 10 male, 2 indeterminate	20 adult or older, 3 sub-adult, 1 indeterminate	*Humboldt-Universität zu Berlin* (Berlin), *SFDAS* (Khartoum), various publications
16 Kadruka	-	-	-	*Université de Genève*, Geneva

II.B.1.a. Jebel Sahaba/Tushka

The material was examined in the Department of Ancient Egypt and Sudan at the British Museum in London. The data were gathered from the 6th until the 24th of October 2008. 21 individuals were processed according to the shortened protocol. Eighteen of these 21 skeletons were recovered from Site 117, the remaining three from Tushka 8905. Additional stress and robusticity data were collected from 15 of the 18 Jebel Sahaba individuals (see Appendix I.A.1.). The additional protocol contained another 115 entries taken from the full list of 984 measurements and traits (see III.B.1.b.).
The material which forms this series was excavated in the Nubian Nile Valley (see I.D.1.a.3.). Site 117 (Jebel Sahaba) lies just north of Wadi Halfa in Northern Sudan. The Southern Egyptian site Tushka 8905 is located about 250 km south of Aswan. The stone artefacts of both sites belong to the Late Palaeolithic/Epipalaeolithic Qadan industry (ca. 13 000-8000 BCE). Site 117 and Tushka 8905 were probably occupied from ca. 14 000 to 12 000 BP and 12 000 to 10 000 BP respectively. One Jebel Sahaba skeleton could be successfully radiocarbon dated to 13 740±600 BP. The inhabitants of both sites were hunter-gatherer-fishers for whom grinding stones were apparently already important tools (e.g. Anderson 1968; Lange, M., 2008: 10-11; Wendorf 1968; Wendorf *et al*. 1989).

II.B.1.b. A-Group

These comparative data were gathered in the *Antropologisk Laboratorium* at the *Panum Instituttet* at the *Københavns Universitet* in Copenhagen. 21 individuals from seven A-Group sites were inspected from the 24th of September until the 3rd of October 2008 (see Appendix I.A.2.).

The A-Group is a prehistoric culture of the Nubian Nile Valley (see I.D.1.a.3.). It has been dated to ca. 3700 to 2800 BCE. A-Group sites have been recorded between Kubbaniya, just north of Aswan, and Semna, south of the 2nd cataract. In many ways, the A-Group's material culture was a blend of Sudanese and Egyptian influences. Its bearers seem to have been semi-nomadic. Their economy was primarily based on raising cattle. Nonetheless, they did also grow some crops and engaged in fishing, hunting and gathering (e.g. Nielsen 1970; Nordström 1972).

II.B.1.c. Malian Sahara

The remains which formed this comparative sample are curated by the *Service d'Anthropologie Biologique* at the *Université de la Méditerrannée* in Marseille. They were studied from the 8th until the 19th of September 2008. 23 data sets were collected. Twelve of the 23 specimens were from seven sites in the Hassi el Abiod area, five from Kobadi KBD89, four from Erg Ine Sakane AZ56, one from Tagnout Chaggeret MK42 and one from Kesert el Gani MT32 (see Appendix I.A.3.).

The Hassi el Abiod, Erg Ine Sakane, Kesert el Gani and Tagnout Chaggeret sites are located in the southwestern, eastern, northern and eastern part of the Malian Sahara respectively. Hassi el Abiod AR7 could be dated to 6970±130 BP, Tagnout Chaggeret MK42/H1 to 4710±120 BP and Erg Ine Sakane AZ56/H8 to 4520±110 BP. Kesert el Gani is a 5th millennium BP site. The inhabitants of these sites were pottery-using hunter-gatherer-fishers. Aquatic resources were especially intensively exploited in the Hassi el Abiod area. The artefacts recovered from these sites show affinities with many trans-Saharan and regional Saharan traditions (e.g. Chevaux/Puech 1998; Dutour 1984, 1988, 1989; Dutour *et al*. 1994; Petit-Maire/Dutour 1987; Petit-Maire/Riser 1983; Raimbault 1994). Kobadi is a Neolithic midden in the Malian Sahel. Four ^{14}C dates (3450±80 BP, 3335±100 BP, 3320±100 BP and 3305±80 BP) indicate that KBD89 was occupied between 1955 and 1415 calBCE. The inhabitants of the Hassi el Abiod sites are widely believed to have been ancestral to the Neolithic population of Kobadi. Like their probable Saharan predecessors, Kobadi's inhabitants were hunter-gatherer-fishers. However, they appear to have relied more heavily on fishing. Furthermore, the zooarchaeological assemblage contained a small number of cattle bones (e.g. Dutour *et al*. 1994; Georgeon *et al*. 1992, 1993; Jousse/Chenal-Velarde 2001-2002; Jousse *et al*. 2008; Raimbault/Commelin 2001-2002; Raimbault/Dutour 1989; Urbain 2001-2002).

II.B.1.d. "Sudanese Hotchpotch"

These comparative data were compiled in order to gain at least some additional insight into the biological relationship between "Khartoum Meso-" and "Neolithic" populations from Central Sudan and the prehistoric inhabitants of the Wadi Howar. The sample consisted of a diverse mix of material. It contained nine individuals from the Jebel Shaqadud, eleven from El Kadada and four from Saggai. The data of the altogether 24 individuals were conflated to create a data set comprising 18 combined individuals. Since the data set contained such conflated individuals and part of its data was not gathered by the author, the set was not used in the regular discriminant function analyses. The alternative discriminant function analyses in which this sample was included were only performed to broaden the basis for discussion.

II.B.1.d.1. Jebel Shaqadud

The remains of seven Jebel Shaqadud individuals were studied from the 5th until the 8th of August 2008 (see Appendix I.A.4.a.1.). This material is housed in the *Seminar für Archäologie und Kulturgeschichte Nordostafrikas* at the *Humboldt-Universität zu Berlin*. Most of it is believed to date to the "Khartoum Neolithic" (e.g. Grimm/Hildebrandt 1972; Grimm/Zuhrt 1967; Otto 1964; Zuhrt 1967). Two further individuals of the same series could unfortunately not be inspected. Nevertheless, they were also incorporated into this sub-sample (see Appendix I.A.4.a.2.). Additional non-metric data were generated by analysing photographs of these remains (Grimm/Zuhrt 1967; Lange, M., 2008: written communication). Lastly, relevant cranial measurements published by Grimm/Zuhrt (1967) were added to the Jebel Shaqadud matrix.

The Jebel Shaqadud site complex lies approximately 50 km east of the Central Sudanese Nile Valley in the savannah of the Western Butana. The area was almost continually occupied from 7500 BP to 3500 BP. The material culture retained similarities with that of the Nile Valley until about 4000 BP. The artefacts from later strata, especially the ceramics, had more in common with traditions from areas further east. The inhabitants of the Jebel Shaqadud sites were foragers who had adapted to their grassland environment. Unlike their contemporaries in the Nile Valley, they did not adopt animal husbandry during the "Khartoum Neolithic" period. Even after 4000 BP, by when domesticated plants and animals had appeared at the Jebel Shaqadud, hunting and gathering remained important (e.g. Edwards 2004: 48, 62; Grimm/Hildebrandt 1972; Grimm/Zuhrt 1967; Keding 1997(a): 177-178, 185; Marks *et al*. 1985; Marks/Mohammed-Ali 1991; Otto 1964; Zuhrt 1967).

II.B.1.d.2. El Kadada

In 2005/2006 the *Section Française de la Direction des Antiquités du Soudan* (*SFDAS*) had temporarily stored human remains from El Kadada at the National Corporation for Antiquities and Museums (NCAM) in Khartoum. Some of these remains could be superficially inspected and photographed in February 2006. The photographs of the *Crania* of five individuals were later used to gather non-metric data (see Appendix I.A.4.b.1.). Furthermore, various dental measurements of another six individuals were taken from Bouville (1982) (see Appendix I.A.4.b.2.).

El Kadada is situated in the Shendi area north of the 5th cataract. It is one of the latest riverine 4th millennium BCE sites in Central Sudan. El Kadada's "Khartoum Neolithic" cemetery has been dated to ca. 3650 to 3350 BCE. The people interred at the site were pastoralists who also exploited aquatic resources. Their burials were often richly furnished. The ceramic and lithic artefacts often resemble finds from A-Group, C-Group and Kerma sites in the Nubian Nile Valley (e.g. Bouville 1982; Edwards 2004: 60-62; Geus 1984, 1986; Keding 1997(a): 176; Reinold 1982).

II.B.1.d.3. Saggai

A sub-sample consisting of four individuals was created on the basis of Coppa/Macchiarelli's (1983) article on the human remains from Saggai (see Appendix I.A.4.c.). The photographs in this publication were used to evaluate a number of non-metric traits. The data set also contained metric and non-metric information provided by Coppa/Macchiarelli (1983).

Saggai is an Early Khartoum site in the Khartoum region. Four ^{14}C dates place it in the 6th millennium BCE, at around 5700 calBCE (7410±100 to 7230±100 BP). The inhabitants of the site gathered, fished and hunted. Their material culture included Wavy Line pottery, bone harpoons and segments (e.g. Caneva 1983(a), 1983(b), 2004; Caneva/Zarattini 1984; Coppa/Macchiarelli 1983).

II.B.1.e. Kadruka

The Kadruka series is curated in the *Département d'Anthropologie et d'Écologie* at the *Université de Genève* in Geneva. Sixteen individuals could be processed from the 27th until the 31st of October 2008. Unfortunately, the collected data were lost. The author's private accommodation in Geneva was burgled on the 1st of November 2008. The computer on which the data were stored was stolen during this incident. As a consequence, it was logistically impossible to continue gathering data in Geneva.
The Kadruka sites were discovered south of the 3rd cataract. Many of them date to the "Khartoum Neolithic". Kadruka's large 5th and 4th millennium BCE cemeteries yielded many rich burials. The culture of the associated pastoralists appears to have anticipated many phenomena typically encountered at later Nubian sites (e.g. Edwards 2004: 55, 61; Reinold 2004; Simon 1987, 1997).

II.B.2. Modern samples

The modern comparative samples were chosen in accordance with previously formulated anthropological and linguistic hypotheses (see I.C.4.a. and I.D.2.a.). In view of the undoubtedly biologically sub-Saharan morphology of the Wadi Howar remains, it was not considered necessary to look for biologically North African comparative material (see I.C.4.a.). On the other hand, it would have been desirable to gather additional data from members of certain other groups of biologically sub-Saharan and "mixed" biologically sub-Saharan/North African ancestry. However, the collection of further data was prevented by various logistical constraints. The Southern Sudan, Chad and Mandinka data were collected from the 7th of July until the 1st of August 2008. The material which was inspected in order to compile these data sets is part of the collection of the *Département Hommes, Natures et Sociétés* at the *Musée de l'Homme* in Paris. The Somali and Haya remains which were employed in this study are housed in the Duckworth Laboratory at the University of Cambridge. The material in question was processed from the 10th of November until the 5th of December 2008.

Table 3: Modern comparative samples.

	Ethnic group/Area of origin	**Sex**	**Age**	**Institution**
24 Southern Sudan	2 Banda, 3 Mandari, 1 Dinka, 2 Masalit, 2 Kordofan, 14 Darfur	2 female, 21 male, 1 indeterminate	21 adult or older, 3 sub-adult	*Musée de l'Homme*, Paris
22 Chad	7 Tubu, 3 Kanembu, 1 Kanuri, 4 Buduma, 2 Kuri, 1 Sara, 4 Mundang	4 female, 15 male, 3 indeterminate	19 adult or older, 3 sub-adult	*Musée de l'Homme*, Paris
22 Mandinka	19 Senegal, 3 Guinea	2 female, 20 male	21 adult or older, 1 sub-adult	*Musée de l'Homme*, Paris
20 Somalis	20 Somalia	4 female, 16 male	20 adult or older	University of Cambridge, Cambridge
20 Haya	20 Tanzania	11 female, 9 male	20 adult or older	University of Cambridge, Cambridge

II.B.2.a. Southern Sudan

The sample comprised skeletal remains of two Banda, three Mandari, one Dinka, two Masalit, two individuals from Kordofan and fourteen people from Darfur (see Appendix I.B.1.). The altogether 24 specimens were collected in the 19th and early 20th century. Banda is an Adamawa-Ubangi language of the Niger-Congo phylum. It is predominantly spoken in the Central African Republic. Small communities of Banda speakers may also be encountered in Southwestern Sudan and the Democratic Republic of the Congo. The Banda are agriculturalists for whom hunting and gathering remains important. The Mandari and Dinka speak Nilotic languages. Both tribes may be described as Southern Sudanese mixed economy pastoralists. The Nilo-Saharan-speaking Masalit are agropastoralists who have tribal territories in Sudan and Chad. The Kordofanians were most likely Nuba. The diverse tribes collectively referred to as Nuba live as agropastoralists. Most Nuba speak Kordofanian languages. Kordofanian is a grouping within the Niger-Congo phylum. Some Nuba, on the other hand, speak Nilo-Saharan languages. The Fur are Darfur's most numerous inhabitants. It was therefore assumed that the individuals from Darfur were probably members of this tribe. They may, however, have also belonged to groups like the Daju, Masalit, Midob, Berti and Zaghawa. The Fur are mainly subsistence farmers, although some own fairly large herds of livestock as well. Their language, Fur, is part of the Nilo-Saharan phylum (see I.D.2.a.1., I.D.2.d. and for example: Barbour 1954; Beck 2003; Greenberg 1963; Haaland 1995; Holý 1974; Lewis 2009; Lienhardt 1970; MacMichael 1922; Nachtigal 1879, 1881, 1889; Nadel 1947; O'Fahey 2006; O'Fahey/Spaulding 1974; Ruhlen 1987; Sarsfield-Hall 1922; Seligman/Seligman 1932; Spaulding 2006).

II.B.2.b. Chad

Twenty-two individuals formed this sample (see Appendix I.B.2.). The seven Tubu, three Kanembu, one Kanuri, four Buduma, two Kuri, one Sara and four Mundang specimens were acquired in the early 20th century. The pastoralists who traditionally occupy the Ennedi and Tibesti are called Tubu. Like their respective sub-groups, their Saharan languages are known as Teda and Daza. Animal husbandry, long-distance trade and foraging constitute the basis of their economic life. The Kanembu and Kanuri are closely related groups. Their territories lie east and west of Lake Chad respectively. Both groups farm, fish and trade. Kanembu and Kanuri are dialects of the same Saharan language. Like the Kanembu and Kanuri, the Buduma and Kuri are closely related groups who speak different dialects of the same language. They live on the islands and shores of Lake Chad. The Buduma and Kuri are mixed economy pastoralists who heavily rely on lacusterine resources. Buduma is a Chadic language. It belongs to the Afro-Asiatic phylum. Chad's southwest is farmed by the Sara. Sara is a Nilo-Saharan language of the Bongo-Bagirmi group. The Mundang also live in Southwestern Chad. They are subsistence agriculturalists. Mundang is a member of the Niger-Congo phylum's Adamawa-Ubangi family (see I.D.2.a.1., I.D.2.c.3., I.D.2.d. and for example: Baroin 1997; Barth 1857-1858; Cohen 1967; Crognier 1973; Fuchs 1961, 1978, 1983, 1989; Greenberg 1963; Heiß 2006; Lewis 2009; MacMichael 1922; Nachtigal 1879, 1881, 1889; Ruhlen 1987; Talbot 1911).

II.B.2.c. Mandinka

Twenty-two Mandinka data sets were gathered (see Appendix I.B.3.). Nineteen of the processed individuals were from Senegal, the remaining three from Guinea. The material was accumulated in the 19th century. The history of the Mandinka is inextricably linked with the rise and fall of West Africa's medieval empires. Today, most Mandinka are farmers. Mandinka is a language of the Mande branch of Niger-Congo (see I.D.2.a.1., I.D.2.c.3. and for example: Condé 1974; Greenberg 1963; Lewis 2009; Quinn 1972; Ruhlen 1987).

II.B.2.d. Somalis

The remains of 20 Somalis were studied to collect the data for this sample (see Appendix I.B.4.). All individuals died or were retrieved from modern graves during the first half of the 20th century. Most of these Somalis were members of Darod or Hawiya clans encountered in British Somaliland at that time. The majority of Somalis live as nomadic pastoralists. Somali is a Cushitic language. It is thus part of the Afro-Asiatic phylum (see I.D.2.a.1. and for example: Aidid/Ruhela 1994; Greenberg 1963; Lewis 1980, 2008; Lewis 2009; Ruhlen 1987).

II.B.2.e. Haya

The Haya sample was made up of 20 data sets. Sixteen data sets represented single specimens. Each of the remaining four sets combined data of the *Calvarium* of one and the mandible (*Mandibula*) of another individual (see Appendix I.B.5.). The material was recovered from 18th and 19th century burials in the Bukoba District in Northwestern Tanzania. Traditionally, the Haya are agropastoralists. They speak a Bantu language which belongs to the Niger-Congo phylum (see I.D.2.a.1. and for example: Greenberg 1963; Lanning 1964; Lewis 2009; Nikita 2007; Ruhlen 1987; Weiß 1910; Werner 1910).

III. Methods

Chapter synopsis

The individual osteological analyses were carried out systematically (see III.A.). In situ *positions were photographed and described (see III.A.1.). The individuals' bones and teeth were painstakingly reconstructed. Their state of preservation was documented, quantified with preservation indices and verbally classified (see III.A.2.). Sex was primarily diagnosed morphologically (see III.A.3.). Systematic comparisons of expressions of sexually dimorphic traits and informative measurements within the sample played a key role in this context. The seven securely sexed skeletons served as important points of reference in these comparisons. Age at death estimates were mainly based on assessments of the individuals' dental development and abrasion (see III.A.4.). Again, internal comparisons were of utmost importance, especially when dentitions were assigned "abrasion ages". Whenever possible, Allbrook's (1961) formulae for male "Nilotes" were employed to reconstruct an individual's living height (see III.A.5.). Alternatively, living heights were calculated with equations published by Raxter* et al. *(2008) and Trotter/Gleser (1952, 1977). Female living heights which were reconstructed on the basis of Allbrook's (1961) formulae and alternative stature estimates were adjusted with specifically computed correction values. The stature of sub-adult individuals was reconstructed using the formulae presented by Ruff (2007), Smith (2007), Telkkä* et al. *(1962) and Visser (1998). The averages of the overall results were reported as the assumed sub-adult living heights. McHenry (1992) and Hartwig-Scherer (1993) provided the equations with which living weights were estimated (see III.A.6.). When both sets of formulae could be applied a weighted mean of both results was regarded as the most likely living weight. Otherwise, if possible, McHenry's (1992) method was given preference. Sub-adult living weights were calculated with Visser's (1998) formulae. Its height-weight and robusticity index values, its classification relying on Ullrich's (1966) summary of Schneider's (1944) technique and the result of its visual assessment were taken into account when a skeleton's physique was diagnosed (III.A.7.). Biological ancestry was estimated by evaluating the expressions of all assessable, relevant traits (see III.A.8.). The diagnoses mainly relied on those craniofacial traits whose usefulness in identifying an individual's biologically sub-Saharan ancestry has been repeatedly demonstrated. Traits typically only encountered in certain biologically sub-Saharan populations also received due attention. Since cranial, dental and postcranial epigenetic traits were systematically scored as well, only particularly noteworthy expressions were highlighted (see III.A.9.). Similarly, only occupational stress markers which were either not on the data collection list or very striking were separately evaluated (see III.A.10.). Changes which were considered to be pathological were described (see III.A.11.). Possible diagnoses were, however, merely tentatively suggested.*

A vast amount of data was systematically collected (see III.B.1.). Compiling the results of the individual osteological analyses constituted the first stage of this process (see III.B.1.a.), gathering the required additional data the second (see III.B.1.b.). The data collection lists were drawn up with specific objectives in mind. The additional Wadi Howar data were not only intended to serve descriptive purposes but also to be used in the various intra- and inter-sample comparisons. The relatively small comparative data sets, on the other hand, only had to fulfil one function. They were supposed to provide the basis upon which the Wadi Howar sample's metric and non-metric affinities were going to be determined. Major parts of the finished data collection lists consisted of large numbers of standardised and newly defined cranial, dental and postcranial measurements and indices (see III.B.1.b.1.). The lists also contained sizeable catalogues of non-metric traits (see III.B.1.b.2.). These catalogues comprised cranial morphological and cranial, dental and postcranial epigenetic as well as cranial, dental and *postcranial robusticity, occupational stress and health traits. The expressions of these traits were scored according to unmodified and modified previously published and specially devised classificatory schemata (see III.B.1.b.2.a.). To ensure that the variability within the Wadi Howar sample was adequately represented, most expressions, especially those of continuous traits, were only assigned their final scores after they had been seriated in the laboratory and subjected to an additional later photographic comparison.*

The sample was described by verbally summarising the results of both the individual osteological analyses and the inspection of the additionally collected data (see III.B.2.a.). Several osteological results and all additional data were also summarised statistically. Sets of suitable descriptive statistics were calculated for males, females and the sample as a whole.

The collected data were tested for intra-observer error (see III.B.2.b.). Nine months after the original data had been gathered, eight Wadi Howar individuals were re-measured and re-scored using a modified data collection list. The resulting data were compiled and, when it made sense to do so, further variables were created by fusing single variables. Variable by variable and individual by individual, the resulting data sets were statistically described and examined. Firstly, an overview matrix was constructed. It contained the absolute differences between the original and control values as well as the descriptive statistics calculated to sum up these differences. Secondly, χ^2*, McNemar's, Mann-Whitney U, Wilcoxon, Student's t- and paired t-tests were performed. These tests were carried out to detect, firstly, significant differences between the original and control data and, secondly, significant differences between the differences between these data and zero.*

The search for diachronic differences between the pre-Leiterband and the Leiterband sub-sample involved 178 single and combined variables (see III.B.2.c.). All selected variables were considered to be potentially informative as far as differences in robusticity, occupational stress and health were concerned. They were analysed with Mann-Whitney U and χ^2 *tests. Moreover, sub-sample-specific sets of appropriate descriptive statistics were presented for each variable.*

The metric and non-metric affinities of the Wadi Howar material were determined individual by individual, sub-sample set by sub-sample set and for the sample as a whole (see III.B.2.d.1.). Every Wadi Howar individual was entered into multiple, separate, individualised discriminant function analyses as the only ungrouped case. This way, every Wadi Howar skeleton could be assigned to the prehistoric and the modern comparative sample it was most similar to. The individualisation of each skeleton's set of discriminant function analyses was a crucial step. Only those variables for which values could be collected from a Wadi Howar specimen formed the basis of the discriminant function analyses into which it was entered. Site- and occupation phase-specific mean individuals were created. These mean individuals were classified in the same fashion as the normal Wadi Howar individuals. Like their site-specific counterparts, the occupation phase-specific sub-samples were processed together as separate groups with predefined members in further sets of discriminant function analyses. The Wadi Howar sample as a whole was also subjected to multiple discriminant function analyses as a group with predefined members. Before the discriminant function analyses could be performed the required matrices had to be modified (see III.B.2.d.2.). Only the means and mean scores of measurements and traits with left and right values were left in the matrices. Gaps in the comparative data and the Wadi Howar data sets which were compiled for the group analyses were filled. A sub-matrix which consisted exclusively of scaled measurements was generated. Non-metric variables were dichotomised. Metric variables which were not normally distributed were removed. The subsequent discriminant function analyses were carried out following a strict protocol (see III.B.2.d.3.). After all discriminant function analyses had been performed, the resulting classification patterns were examined and interpreted (see III.B.2.d.4.). This final procedure made it possible to draw reliable conclusions about the sample's *affinities and about possible population contacts or replacements. The examination of the results of the discriminant function analyses also relied on χ^2 tests. These tests were used to look for significant differences between the occupation phase-specific classification frequencies.*

III.A. Individual osteological analyses

The individual osteological analyses involved several steps. The *in situ* position of each of the 23 as yet unpublished individuals was documented (see III.A.1.). The remains of each of these individuals were cleaned, preserved parts of their bones and teeth were reconstructed and their preservation was documented (see III.A.2.). Analysing each of the reconstructed skeletons individually, established and modified standardised observational and metric techniques were used to estimate sex, age at death, living height, physique and biological ancestry, to make palaeopathological diagnoses, to evaluate occupational stress markers and to document non-metric traits as well as the overall morphology (see III.A.3.-11.). Unfortunately, the choice of relevant methods was limited by the types and quantity of diagnostic elements present. The material's extraordinarily poor state of preservation thus dictated much of the osteological protocol.

III.A.1. *In situ* position

Each skeleton was photographed *in situ*. The position of its head, limbs and body as a whole was thus documented. The initial intention was to establish if the deceased was lying or sitting in the grave, if the body as a whole was flexed or extended, if the corpse was arranged in a supine, prone or lateral position and if the limbs were flexed, extended, adducted, abducted or rotated. The result of this evaluation could then be discussed in the context of *in situ* positions encountered at other relevant sites, post-depositional movements brought about by taphonomic processes and *post mortem* damage (e.g. Bass 1987: 300-309; Grupe 2007; Herrmann *et al*. 1990: 21-45; Kunter 1988; Littleton 2000; Nelson 1998; Prokop 1976; Roksandic 2002: 101-107; White 2000: 284, 407-416; Zeitoun *et al*. 2004).

III.A.2. Preservation

The remains of each individual were carefully cleaned. If possible, any foreign substances covering the material were removed with paintbrushes, toothbrushes and dental probes. If necessary, small surfaces of special diagnostic value were cleansed with wet brushes. Otherwise, water was not used. No attempts were made to consolidate the remains in the laboratory. Whenever their fragmentary and incomplete nature did not make any such attempts obsolete, preserved parts of cleaned bones and teeth were painstakingly reconstructed. Only fragments which undoubtedly fitted together were reassembled. Missing fragments were not replaced with plaster or resin. The adhesive used was *Ponal Express* (Henkel AG & Co. KGaA), a wood glue (e.g. Adams/Byrd 2006; Bass 1987: 300-309; Herrmann *et al*. 1990: 48-51; Kunter 1988: 563-568; L'Abbé 2005; Ubelaker 2009; White 2000: 281, 290-296).

The overall state of each individual was described as "very poor", "poor", "fair", "good" or "very good". Each skeleton's condition *in situ* was recorded photographically (see III.A.1.). The reconstructed Wadi Howar remains were also photographed. 5379 digital photographs were taken in this context (see III.B.1.b.2.a.1.). Furthermore, the state of the material after its reconstruction was documented with preservation indices and descriptions. The preservation indices quantified how many of the data which were originally intended to be collected could actually be gathered. They thus acted as a relative measure of how much biologically relevant information had been erased by *post mortem* damage. Preservation indices were calculated for each Wadi Howar individual (see Figure 26). First, the number of the measurements/traits which could be taken/scored was recorded. Then, this number was expressed as a percentage of the number of the measurements/traits which were intended to be taken/scored. This procedure was applied to sub-sets of data and whole data collection lists (e.g. Bello *et al*. 2006; Boddington *et al*. 1987; Buikstra/Ubelaker 1994: 6-8; Dutour 1989; Gordon/Buikstra 1981; Judd 2002(a), 2008(a): 83, 86; Lovejoy/Heiple 1981; Nawrocki 1995; Stojanowski *et al*. 2002; Ullrich 1996; Walker *et al*. 1988).

	CM	DM	CN	CE	DE	Total
Abu Tabari 02/1-7	9.26% (5:54)	4.69% (3:64)	14.29% (2:14)	0.00% (0:11)	11.11% (7:63)	8.25% (17:206)
Abu Tabari 02/28-21	68.52% (37:54)	64.06% (41:64)	35.71% (5:14)	27.27% (3:11)	50.79% (32:63)	57.28% (118:206)

Figure 26: Examples of preservation indices based on the shortened preservation data list (CM = cranial measurements, DM = dental measurements, CN = cranial morphological traits, CE = cranial epigenetic traits, DE = dental epigenetic traits).

Three different preservation data lists were used (see Figure 27). One was based on the full data collection list, the two others on its shortened versions (see III.B.1.). The full and shortened versions of the data collection lists were slightly modified. Variables relating to structures already covered by other variables were removed from the lists during this process. The full preservation data list was only applied to the Wadi Howar individuals. Its shortened version, on the other hand, was employed to document the state of preservation of the Wadi Howar series and all comparative samples. The Wadi Howar material as well as 15 Jebel Sahaba individuals were also analysed on the basis of the additional shortened preservation data list (see II.B.1.a. and Appendix I.A.1.).

Cranial measurements	167
Dental measurements	64
Postcranial measurements	136
Cranial morphological traits	32
Cranial epigenetic traits	74
Dental epigenetic traits	81
Postcranial epigenetic traits	62
Cranial robusticity traits	12
Postcranial robusticity traits	20
Cranial musculoskeletal stress traits	13
Postcranial musculoskeletal stress traits	16
Enamel hypoplasia	32
Dental abrasion	32
Dental caries	32
Cribra orbitalia	2
Total	775
(a)	
Cranial measurements	54
Dental measurements	64
Cranial morphological traits	14
Cranial epigenetic traits	11
Dental epigenetic traits	63
Total	206
(b)	

Postcranial measurements	55
Cranial robusticity traits	6
Postcranial robusticity traits	8
Cranial musculoskeletal stress traits	2
Postcranial musculoskeletal stress traits	10
Enamel hypoplasia	32
Total	113

(c)

Figure 27: Overview of preservation data lists. Full preservation data list (a), shortened preservation data list (b) and additional shortened preservation data list (c).

Other issues relating to the material's state of preservation were duly recorded and contextualised. However, no further taphonomic data were systematically gathered from each individual. The *post mortem* damage suffered by the sample as a whole was highlighted. Fragment sizes and numbers, lesions caused by plants and animal, deformations due to soil pressure, cases of bleaching and sandblasting as well as observed stages of superficial and general bone decomposition were summarised and discussed (e.g. Aufderheide/Rodríguez-Martín 1998: 15-17; Behrensmeyer 1978; Bell *et al*. 1996; Boddington *et al*. 1987; Breitmeier *et al*. 2005; Brothwell 1981: 48, 173; Buikstra/Ubelaker 1994: 94-106; Cáceres *et al*. 2007: 915-916; Calce/Rogers 2007; Domínguez-Rodrigo/Piqueras 2003; Domínguez-Solera/Domínguez-Rodrigo 2009; Galloway 1997; Galloway *et al*. 1989; Großkopf 2004; Grupe 2007; Guy *et al*. 1997; Haglund/Sorg 1997; Herrmann 1988; Herrmann *et al*. 1990: 5-8, 12, 126; Hughes/White 2009; İşcan/McCabe 2000; Janaway 1996; Janjua/Rogers 2008; Judd 2008(a): 83; Kjorlien *et al*. 2009; Klippel/Synstelien 2007; Littleton 2000; Munson 2000; Nielsen-Marsh *et al*. 2007; Pittoni 2009; Quatrehomme/İşcan 1997; Reeves 2009; Smith *et al*. 2007; Thompson 2004; Ubelaker 2009; Wells 1967; Wheatley 2008; White 2000: 407-416; Wieberg/Wescott 2008; Willey *et al*. 1997; Wilson *et al*. 2007).

III.A.3. Sex

Estimating the sex of the Wadi Howar individuals was a particularly challenging task. The material's appalling state of preservation repeatedly made satisfactory determinations impossible. Ideally, the sex diagnoses should have taken the variability of the entire Wadi Howar population into account. The small size of the heterogeneous sample was therefore a further complicating factor. Moreover, effects certain activities may have had on relevant traits and various peculiarities of the sample had to be borne in mind as well (e.g. Bass 1987: 200-206; Ferembach *et al*. 1979: 1-2; İşcan *et al*. 2000: 234; White 2000: 366-369).

Preference was given to non-metric methods. Any sexually dimorphic pelvic and cranial trait present was assessed. Nevertheless, since some relevant skeletal elements were more frequently preserved than others, some traits were only rarely used. The results of these morphological assessments were summarised and evaluated. Factoring in the relative weight different diagnostic features should be given was an important part of this evaluation. The conclusion reached at the end of this process constituted the preliminary sex diagnosis (e.g. Acsádi/Nemeskéri 1970; Balci *et al*. 2005; Bass 2000: 197; Buikstra/Ubelaker 1994: 15-21; Bruzek 2002; Đurića *et al.* 2005; Ferembach *et al*. 1979; Herrmann *et al*. 1990: 75-85; İşcan/Miller-Shaivitz 1984(b); Kemkes-Grottenthaler *et al*. 2002; Kjellström 2004; Listi/Bassett 2006; Loth/Henneberg 1996; Loth/İşcan 2000(b): 253-257; Maat *et al*.

1997; Meindl/Russel 1998: 378-379; Novotný *et al.* 1993: 81-86; Oettlé *et al*. 2009; Patriquin *et al*. 2003; Rösing *et al*. 2007; Schiwy-Bochat 2001; Sjøvold 1988; Walker 2005, 2008; Walrath *et al*. 2004; White 2000: 338, 363-371; Williams/Rogers 2006).

Trait	**Diagnostic value**
Preauricular groove (*Sulcus praeauricularis*)	high
Greater sciatic notch (*Incisura ischiadica major*)	high
Composite arch (*Arc composé*)	high
Iliac ala (*Ala ossis ilii*)	moderate to high
Iliac crest (*Crista iliaca*)	low

(a)

Trait	**Diagnostic value**
Glabella	high
Superciliary arch (*Arcus superciliaris*)	moderate to high
Frontal and parietal tuberosities (*Tubera frontalia et parietalia*)	moderate
Forehead (*Inclinatio frontale*)	low to moderate
Mastoid process (*Processus mastoideus*)	moderate
Nuchal plane (*Planum nuchale*)	moderate
External occipital protuberance (*Protuberantia occipitalis externa*)	moderate
Supraorbital margin (*Margo supraorbitalis*)	low to moderate
Bony chin (*Mentum osseum*)	moderate
Mandibular angle (*Angulus mandibulae*)	moderate
Mandibular body (*Corpus mandibulae*)	low
Mandibular ramus flexure (*Ramus mandibulae*)	low

(b)

Trait	**Diagnostic value**
Size	high
Robusticity	high
Proportions	moderate

(c)

Figure 28: Most frequently used traits and their assumed diagnostic values. *Pelvis* (a), *Cranium* (b) and whole skeleton (c).

Published pictorial schemata were used as an external framework (e.g. Acsádi/Nemeskéri 1970; Buikstra/Ubelaker 1994: 17-20; Ferembach *et al*. 1979; Herrmann *et al*. 1990; Novotný *et al.* 1993: 82; Sjøvold 1988; Walker 2005, 2008; Williams/Rogers 2006). However, the actual assessments were primarily based on the variability within the Wadi Howar sample. Expressions of traits were seriated. Specimens were directly and photographically compared with each other. The expression of a trait could then be interpreted as male or female according to its position in such a series. The few reasonably securely sexed Wadi Howar skeletons played a key role in this context. The expressions of their traits served as de facto "morphological sectioning points". A trait whose expression was judged to be more female than the expressions observed in the confidently sexed female skeletons was considered female. A trait whose expression was judged to be more male than the expressions observed in the confidently sexed male skeletons was considered male. A trait whose expression was judged to be intermediate was considered either comparatively more female or comparatively more male. Seven individuals provided these "morphological sectioning points". The sex of Abu Tabari 02/1-2 and 02/28-11 could be confidently estimated on the basis of their pelvic morphology. They were diagnosed as female and male respectively. To a certain degree, the same can be said for the female Abu Tabari 02/28-22. The expressions of their relevant cranial traits strongly suggested that Abu Tabari 02/1-3 and 02/28-23 were females and that Conical Hill 95/4 and 02/3-4 were males (see IV.A. and V.B.2.b.1.).

(a) (b)

Figure 29: Abu Tabari 02/28-11’s left (a) and Abu Tabari 02/1-2’s right (b) greater sciatic notch (*Incisura ischiadica major*).

Although they were considered to be generally less powerful diagnostic tools, metric comparisons constituted an additional means of sexing individuals. These comparisons mainly focused on measurements of sexually dimorphic cranial structures, dental measurements and those measurements of long bones which reflect overall skeletal robusticity. The means, minima and maxima of the whole sample as well as the values of the seven confidently sexed individuals provided the necessary reference values. Again, the results of the comparisons were summarised and evaluated (e.g. Acharya/Mainali 2008; Aitchison 1964; Asala 2001; Asala *et al*. 2004; Barrier/L’Abbé 2008; Birkby 1966; Dayal *et al*. 2008; DiBennardo/Taylor 1983; Ferembach *et al*. 1979: 10; Franklin *et al*. 2008; Franklin *et al*. 2009; Giles 1964; Giles/Elliot 1963; Goose 1963: 126; Herrmann *et al*. 1990: 87-89; Hillson 1996: 80-82; Kemkes/Göbel 2006; Langenscheidt 1983; Mays/Cox 2000: 123-124; Molleson/Cruse 1998: 724-726; Patriquin *et al*. 2005; Pettenati-Soubayroux *et al*. 2002; Robinson/Bidmos 2009; Rösing *et al*. 2007; Schrantz/Bartha 1963; Seidemann *et al*. 1998; Sjøvold 1988; Steyn/İşcan 1999; Tague 2007).

Since only seven individuals could be confidently sexed, no attempts were made to develop sample-specific discriminant functions. The formulae which have been published for African-American, West and South African populations were largely unusable. Firstly, the required measurements could rarely be taken. Secondly, the bones of the members of these groups were normally substantially larger than those of the skeletons from the Wadi Howar. As a result, the functions usually classified Wadi Howar individuals as females and could only be used to reinforce the diagnosis “*probably male*” or “*male*” (e.g. Asala 2001; Asala *et al*. 2004; Barrier/L’Abbé 2008; Birkby 1966; Dayal *et al*. 2008; DiBennardo/Taylor 1983; Ferembach *et al*. 1979; Franklin *et al*. 2005(a); Franklin *et al*. 2008; Franklin *et al*. 2009; Giles 1964; Giles/Elliot 1963; Kemkes/Göbel 2006; Patriquin *et al*. 2005; Robinson/Bidmos 2009; Rösing *et al*. 2007; Seidemann *et al*. 1998; Sjøvold 1988; Steyn/İşcan 1999; Tague 2007). Only Langenscheidt’s (1983) discriminant functions for mesiodistal and buccolingual measurements of the lower incisors and canines (*Dentes incisivi et canini inferiores*) appeared to produce more reliable results (e.g. Herrmann *et al*. 1990: 89; Langenscheidt 1983; Teschler-Nicola/Prossinger 1998: 483-484). Two of these formulae were therefore systematically applied. The results they produced were treated with the necessary caution.

Young sub-adult individuals were mainly sexed on the basis of the dimensions of their permanent teeth (*Dentes permanentes*). Accordingly, as far as their dentitions were concerned, these skeletons were treated like adult specimens. Additionally, morphological methods designed to estimate the sex of sub-adult skeletons were applied (e.g. Acharya/Mainali 2008; Aitchison 1964; Cardoso/Saunders

2008; Ferembach *et al*. 1979: 10; Herrmann *et al*. 1990: 87-89; Langenscheidt 1983; Loth/Henneberg 2001; Loth/İşcan 2000(b): 253-257; Mays/Cox 2000: 121-124; Mittler/Sheridan 1992; Molleson/Cruse 1998; Pettenati-Soubayroux *et al*. 2002; Rösing *et al*. 2007; Scheuer 2002; Schrantz/Bartha 1963; Schutkowski 1990, 1993; Sjøvold 1988: 454-455; Teschler-Nicola/Prossinger 1998: 483-484; Vlak *et al*. 2008; Żądzińska *et al*. 2008).

Any final sex diagnosis was always based on all available data. It integrated the results of all possible morphological and metric analyses, *in situ* estimations and evaluations of the individual's overall size and robusticity. The result of an overall sex determination was reported as "female", "probably female", "indeterminate", "probably male" or "male".

Measurement	**Diagnostic value**
CM083 - 69. Height of the mandibular symphysis	moderate to high
CM085 - *69c. Thickness of the mandibular symphysis	moderate
CM088/89 - 69(2). 2nd molar mandibular body height (m)	moderate to high
CM102/103 - 69b. 2nd molar mandibular body thickness (m)	moderate

(a)

Measurement	**Diagnostic value**
DM005/6 - 81. Crown length UC (m)	low to moderate
DM013/14 - 81. Crown length UM2 (m)	low
DM021/22 - 81. Crown length LC (m)	moderate to high
DM029/30 - 81. Crown length LM2 (m)	low
DM037/38 - 81(1). Crown width UC (m)	moderate
DM045/46 - 81(1). Crown width UM2 (m)	low
DM053/54 - 81(1). Crown width LC (m)	high
DM061/62 - 81(1). Crown width LM2 (m)	low

(b)

Measurement	**Diagnostic value**
PM007/8 - C6. Circumference of the mid-shaft (m)	low to moderate
PM035 - *Humerus* - Cortical thickness (max.)	low
PM097/98 - F8. Mid-shaft circumference (m)	moderate
PM126 - *Femur* - Cortical thickness (max.)	moderate
PM146/147 - T10. Mid-shaft circumference (m)	moderate to high
PM162 - *Tibia* - Cortical thickness (max.)	moderate

(c)

Figure 30: Most frequently compared measurements and their assumed diagnostic values. *Cranium* (a), teeth (b) and postcranium (c) (see III.B.1.b.1.).

III.A.4. Age

Teeth were the most commonly and often only preserved age markers. As a result, age at death was primarily estimated using dental methods. Most diagnoses relied heavily or entirely on the assessment of the abrasion of the individuals' teeth. The diagrams published by Brothwell (1963(a)) and Lovejoy (1985) formed the basis of the age estimates. The dentitions of the Wadi Howar individuals were compared with the published figures and with each other. The ages suggested by Brothwell's (1963(a)) system were regarded as more reliable. The results produced by the application of Lovejoy's (1985) method were, however, also taken into consideration when the overall "abrasion ages" were estimated (see V.B.2.b.2.). A procedure which involved an internal comparison of seriated specimens was chosen to ensure that each assigned "abrasion age" was compatible with both the external standards and the skeletons' positions within the sample-specific ordered abrasion series (e.g. Brothwell 1963(a), 1981; Hillson 1996: 239-242; Kim *et al*. 2000; Loth/İşcan 2000(a): 250; Lovejoy 1985; Mays 2002; Meindl/Russel 1998: 386; Miles 1963, 2001; Novotný *et al*. 1993: 73; Oliveira *et al*.

2006; Rösing *et al*. 2007: 83-85; Szilvássy 1988: 422-424; White 2000: 338, 343-346; Yun *et al*. 2007). Whenever appropriate and possible, the charts compiled by Ubelaker (1978) in order to illustrate the phases of dental development were consulted. The ages of the individuals in the "*Infans I*", "*Infans II*" and "*Iuvenis*" category were mainly estimated in this fashion. In order to refine these dental age diagnoses, the individuals' stages of dental development were also seriated (e.g. Ferembach *et al*. 1979: 13-14, 1980: 528-529; Herrmann *et al*. 1990: 54; Meindl/Russel 1998: 382-389; Szilvássy 1988: 422-423; Ubelaker 1978, 1987; White 2000: 338, 342-343).

Provided any other diagnostic structures were present, all additional age markers were assessed as well. The results of these evaluations were used to support, calibrate and, occasionally, modify the dental age estimates (e.g. Acsádi/Nemeskéri 1970; Buikstra/Ubelaker 1994: 21-44; Ferembach *et al*. 1979; Herrmann *et al*. 1990; Kemkes-Grottenthaler 1996, 2002; Loth/İşcan 2000(a); Nemeskéri *et al*. 1960; Rösing *et al*. 2007; Szilvássy 1988; Ubelaker 1987; White 2000; Wittwer-Backofen *et al*. 2008). Rösing's (1977) version of Vallois's (1937) method was used to deduce probably ages at death from the condition of cranial sutures (*Suturae cranii*) (e.g. Dorandeu *et al*. 2008; Ferembach *et al*. 1979: 20-21; Herrmann *et al*. 1990: 67; Krogman/İşcan 1986: 117-123, 129; Martin 1928: 692; Meindl/Lovejoy 1985; Perizonius 1984: 204; Rösing 1977: 60; Rösing *et al*. 2007: 83-85; Sahni *et al*. 2005; Szilvássy 1988: 430, 433; Vallois 1937; White 2000: 345-348). In a few cases, it was possible to judge the state of the spheno-occipital synchondrosis (*Synchondrosis spheno-occipitalis*) and various postcranial metaphyses (e.g. Cardoso 2008(a), 2008(b), 2008(c); Coqueugniot/Weaver 2007; Ferembach *et al*. 1979: 15; Herrmann *et al*. 1990: 52, 56, 58-59, 386-389; Knußmann 1996: 169; Rösing *et al*. 2007: 82-83; Schaefer 2008; Szilvássy 1988: 424-426; Ubelaker 1987; White 2000: 349-351). The system developed by Lovejoy *et al*. (1985) and its later variants provided the tools necessary to classify the age-progressive changes of the auricular surface (*Facies auricularis*) (e.g. Buckberry/Chamberlain 2002; Falys *et al*. 2006; Hens *et al*. 2008; Igarashi *et al.* 2005; Lovejoy *et al*. 1985; Martrille *et al*. 2007; Meindl/Russel 1998: 382-389; Mulhern/Jones 2005; Passalacqua 2009; Rougé-Maillart *et al*. 2007; Schmitt 2004; Storey 2007; Wheatley 2005; White 2000: 338, 355, 358-359; Wittwer-Backofen *et al*. 2008). The degree of the ossification of preserved sternal ends of ribs (*Extremitates sternales*) was cautiously compared with figures illustrating the metamorphosis of the costochondral junction (*Articulatio costochondralis*) of the 1st and 4th rib (*Costa prima et quarta*) (e.g. Bass 1987: 134-141; Cho *et al*. 2006; DiGangi *et al*. 2009; Kunos *et al*. 1999; Kurki 2005; Loth/İşcan 2000(a): 242-247; Rösing *et al*. 2007: 83-85; Wheatley 2005). Observed age-related alterations of large joints were also analysed. For example, the relevant characteristics of the lunate surface (*Facies lunata*) of the *Acetabulum* and the sternal articular surface (*Facies articularis sternalis*) of the clavicle (*Clavicula*) were interpreted following the published recommendations (e.g. Aufderheide/Rodríguez-Martín 1998: 93; Black/Scheuer 1996; Ferembach *et al*. 1979: 21; Hildebrandt 1998: 126-127; Jurmain 1991; Kölbl 1996: 42; Kreitner *et al.* 1998; Miles 1999(a); Rissech *et al.* 2006, 2007; Rösing *et al*. 2007: 83-85; Rougé-Maillart *et al*. 2007; Rougé-Maillart *et al*. 2009; Schultz 1988: 481-487; Stevens/Viðarsdóttir 2008; Szilvássy 1977, 1988: 426-428).

The reported age determinations always drew on all relevant information. Moreover, distorting factors, such as population-specific ontogenetic tempos and abrasion rates, were always given due attention during the decision-making process (for population-specific ontogenetic tempos see for example:

Bénéfice *et al*. 2001; Cameron 2007; Cardoso 2007, 2008(a); Chagula 1960; Ericksen 1979; Ferembach *et al*. 1979: 12; Folayan *et al*. 2007; Garn 1972; Garn *et al*. 1972; Garn/Clark 1976; Gray *et al*. 2004; Gray *et al*. 2008, 2009; Harvey 1976: 38; Hassanali 1985; Heberer *et al.* 1959: 338-339; Herrmann *et al*. 1990: 54; Heuzé/Cardoso 2008; Hoppa 2000; İşcan *et al*. 2000: 234; Krogman/İşcan 1986: 92; Littleton 2005: 298; Loth/İşcan 2000(a): 242-243; Martin-de las Heras *et al*. 2008; Martrille *et al*. 2007; Mitchell *et al*. 2009; Monyeki *et al*. 2000; Novotný *et al.* 1993: 72; Olivieri *et al*. 2008; Olze *et al*. 2006; Otuyemi *et al* 1997; Pawloski 2002; Pendergast Moore *et al*. 1986: 324; Reid/Dean 2000 136; Schmeling *et al*. 2003; Sellen 1999; Semproli/Gualdi-Russo 2007; Tanner 1992: 105; Tompkins 1996; Walker *et al*. 2006: 300; White 2000: 342-343; for population-specific abrasion rates see for example: Alt/Pichler 1998: 398; Bass 1987: 17, 286-287; Bernal *et al*. 2007; Deter 2009; Eshed *et al*. 2006; Hinton 1981; Houghton 1978, 1996; Langsjoen 1998: 398-399; Larsen 2002: 131-133; Leek 1972, 1984; Lev-Tov Chattah/Smith 2006; Molleson/Jones 1991; Ruffer 1920; Smith 1984; Walker *et al*. 1991: 176; Watson 2008). Ultimately, each individual was classified as an "*Infans I*" (ca. 0-6 years), "*Infans II*" (ca. 7-12 years), "*Iuvenis*" (ca. 13-20 years), "*Adultus*" (ca. 20-40 years), "*Maturus*" (ca. 40-60 years) or "*Senilis*" (ca. 60-x years) (e.g. Grupe *et al*. 2005: 90; Herrmann *et al*. 1990: 52; Knußmann 1996: 169; Martin 1928; Szilvássy 1988: 421). Additionally, an approximate age in years was given. In the cases in which it was not possible to produce more precise estimates the categories "sub-adult", "adult or older" and "indeterminate" were employed.

III.A.5. Height

All long bone lengths which formed the basis of the stature reconstructions were taken or estimated *in situ* or in the laboratory (see III.B.1.b.1.c.). All values entered into the employed functions represented means of left and right measurements or, if only one side could be measured, measurements of whichever side was available. Unfortunately, published methods for reconstructing long bone lengths proved unusable (e.g. Bidmos 2008; Chibba/Bidmos 2007; Giroux/Wescott 2008; Simmons *et al*. 1990; Steele 1970; Steele/McKern 1969; Wright/Vásquez 2003). Living height was calculated with formulae published by Allbrook (1961), Raxter *et al*. (2008), Trotter/Gleser (1952, 1977) and Didia *et al*. (2009). Allbrook's (1961) functions were developed for *Ulnae* and *Tibiae* of male "Nilotes", Raxter *et al*.'s (2008) for *Humeri*, *Radii*, *Femura* and *Tibiae* of male and female Predynastic through Coptic period Egyptians, Trotter/Gleser's (1952, 1977) for *Humeri*, *Radii*, *Ulnae*, *Femura* and *Tibiae* of male and female African Americans, and Didia *et al*.'s (2009) for *Tibiae* of male and female Nigerians (e.g. Allbrook 1961; Bass 1987: 25-27; Didia *et al*. 2009; Krogman/İşcan 1986: 322; Raxter *et al.* 2007; Raxter *et al*. 2008; Rösing 1988: 589; 596; Sjøvold 2000: 283; Trotter/Gleser 1952, 1977; White 2000: 372-373).

Allbrook's (1961) equations for "Nilotes" were expected to produce the most reliable results (e.g. Didia *et al*. 2009; Krogman/İşcan 1986: 302-349; Raxter *et al*. 2008; Robins/Shute 1986; Rösing 1988; Sjøvold 2000; White 2000: 371). These functions' specificity did, however, necessitate certain additional procedures. Estimates for females had to be modified. Moreover, the stature of those individuals for whom neither the necessary tibial nor ulnar data were available had to be reconstructed by alternative means. Estimates based on Allbrook's (1961) tibial formula were accepted as probable living heights (see Figure 31(a)). When this function was inapplicable Allbrook's (1961) ulnar formula was employed (see Figure 31(b)). Estimates for females based on Allbrook's (1961) tibial or ulnar equation were adjusted by subtracting 3.70 cm (see Figure 31(c)).

Abu Tabari 95/2-3 (male):	Allbrook (*Tibia*):	167.66 cm
	Allbrook (*Tibia*) minus 2.00 cm (cadaver length correction):	**165.66 cm**
(a)		
Abu Tabari 02/1-5 (male):	Allbrook (*Tibia*):	-
	Allbrook (*Ulna*):	161.90 cm
	Allbrook (*Ulna*) minus 2.00 cm (cadaver length correction):	**159.90 cm**
(b)		
Abu Tabari 02/28-5 (female):	Allbrook (*Tibia*):	154.92 cm
	Allbrook (*Tibia*) minus 3.70 cm (mean sex difference between Raxter *et al*. and Trotter/Gleser estimates):	151.22 cm
	Modified Allbrook (*Tibia*) minus 2.00 cm (cadaver length correction):	**149.22 cm**
(c)		

Figure 31: Examples of adult living height estimates. Height estimate based on Allbrook's (1961) tibial formula (a), height estimate based on Allbrook's (1961) ulnar formula (b) and adjusted female height based on Allbrook's (1961) tibial formula (c).

These 3.70 cm were the mean difference between the male and female stature estimates for all Wadi Howar individuals based on Raxter *et al*.'s (2008) and Trotter/Gleser's (1952, 1977) functions. The determination of this value involved a few simple steps (see Figure 32). Raxter *et al*.'s (2008) male and female formulae were applied to every individual. Next, each skeleton's female mean value was subtracted from its mean male value. Then, the average of all individual male-female differences was calculated. Subsequently, the same protocol was followed using Trotter/Gleser's (1952, 1977) equations. Finally, the mean of Raxter *et al*.'s (2008) and Trotter/Gleser's (1952, 1977) formulae's average male-female difference was determined.

Abu Tabari 95/2-3 (male):	Raxter *et al*. male height:	169.54 cm
	Raxter *et al*. female height:	166.29 cm
	Raxter *et al*. sex-specific height difference:	**3.25 cm**
	Trotter/Gleser male height:	170.12 cm
	Trotter/Gleser female height:	166.62 cm
	Trotter/Gleser sex-specific height difference:	**3.50 cm**
(a)		
Raxter *et al*. sex-specific height difference - mean (all individuals):		4.44 cm
Trotter/Gleser sex-specific height difference - mean (all individuals):		2.96 cm
Mean sex-specific height difference:		**3.70 cm**
(b)		

Figure 32: Calculation of sex-specific height differences. Raxter *et al*. (2008) and Trotter/Gleser (1952, 1977) sex-specific stature difference for Abu Tabari 95/2-3 (a) and mean sex-specific height difference for all individuals (b).

When neither of Allbrook's (1961) functions could be employed to calculate an individual's living height, Raxter *et al*.'s (2008) and Trotter/Gleser's (1952, 1977) appropriate sex-specific equations were used (see Figure 33). First, all usable formulae published by Raxter *et al*. (2008) and Trotter/Gleser (1952, 1977) were applied. The results were then averaged. This was done for each set of equations and for the two resulting set-specific means. Lastly, the overall mean height was adjusted to the living heights calculated with Allbrook's (1961) functions (see Figure 34). This was achieved by subtracting the sex-specific mean difference between the height estimates based on Allbrook's (1961) method and the corresponding mean height estimates based on Raxter *et al*.'s (2008) and Trotter/Gleser's (1952, 1977) functions. Didia *et al*.'s (2009) functions appeared to produce inconsistent results. These results were therefore not incorporated into the reconstructions.

Abu Tabari 02/28-7 (female):	Raxter *et al*. (female; *Humerus*):	152.92 cm
	Raxter *et al*. (female; *Radius*):	-
	Raxter *et al*. (female; *Humerus* + *Radius*):	-
	Raxter *et al*. (female; *Femur*):	-
	Raxter *et al*. (female; *Tibia*):	-
	Raxter *et al*. (female; *Femur* + *Tibia*):	-
	Raxter *et al*. (female) mean:	**152.92 cm**
	Trotter/Gleser (female; *Humerus*):	154.02 cm
	Trotter/Gleser (female; *Radius*):	-
	Trotter/Gleser (female; *Ulna*):	-
	Trotter/Gleser (female; *Femur*):	-
	Trotter/Gleser (female; *Tibia*):	-
	Trotter/Gleser (female) mean:	**154.02 cm**
	Raxter *et al*. mean:	152.92 cm
	Trotter/Gleser mean:	154.02 cm
	Raxter *et al*.-Trotter/Gleser mean:	**153.47 cm**
	Raxter *et al*.-Trotter/Gleser mean minus 0.89 cm (mean difference between Allbrook and Raxter *et al*.-Trotter/Gleser female estimates):	152.58 cm
	Modified Raxter *et al*.-Trotter/Gleser minus 2.00 cm (cadaver length correction):	**150.58 cm**

Figure 33: Reconstruction of Abu Tabari 02/28-7's stature.

The adjustment values for females and males were 0.89 and 3.78 cm respectively. To calculate them, first, each skeleton's "Allbrook estimate" was subtracted from its "Raxter *et al*.-Trotter/Gleser estimate" (see Figure 34). The differences were then averaged for all male and female individuals.

Abu Tabari 95/2-3 (male):	Allbrook (*Tibia*):	167.66 cm
	Raxter *et al*.-Trotter/Gleser mean:	169.83 cm
	Difference between estimates:	**2.17 cm**
Abu Tabari 02/28-5 (female):	Allbrook (*Tibia*) minus 3.70 cm (mean sex difference between Raxter *et al*. and Trotter/Gleser estimates):	151.22 cm
	Raxter *et al*.-Trotter/Gleser mean:	151.49 cm
	Difference between estimates:	**0.27 cm**

Figure 34: Examples of differences between stature estimates.

All adjustment values were calculated after the removal of the sub-adult individuals from the relevant matrices. 2.00 cm were subtracted from each individual's living height estimate (see Figure 31 and 33). This measure was taken to counterbalance distortions which can be expected to be created by methods which were developed using lying or hanging cadavers. The stature reconstructions were, however, not age-adjusted (e.g. Bass 1987: 25-27; Behnke 1959; Cardoso 2009; Dupertuis/Hadden 1951; Ingalls 1927; Krogman/İşcan 1986: 302-349; Raxter *et al.* 2007; Robins/Shute 1986; Rösing 1988: 589, 593, 596; Sjøvold 2000: 277-278; Visser 1998: 415). Additionally, all formulae Allbrook (1961) presented for male "Nilotes", "Nilohamites" and "Bantus", Raxter *et al*. (2008) published for male and female Ancient Egyptians, Trotter/Gleser (1952, 1977) developed for male and female African Americans and Didia *et al*. (2009) suggested for male and female Nigerians were applied whenever possible, regardless of sex and age. This approach was adopted to generate additional comparative data.

The living height of sub-adult individuals was estimated using equations developed by Feldesman (1992), Feldesman *et al*. (1990), Ruff (2007), Smith (2007), Telkkä *et al*. (1962) and Visser (1998). The Feldesman (1992) and Feldesman *et al*. (1990) functions provided estimates which deviated widely from all others. Consequently, these values were excluded from the stature reconstructions (e.g. Anderson *et al*. 1963; Bortel/Pritchett 1993; Cardoso 2009; Feldesman 1992; Feldesman *et al*. 1990; Herrmann *et al*. 1990: 94-96; Pritchett 1988; Ruff 2007; Sciulli/Blatt 2008; Smith 2007; Telkkä *et al*. 1962; Visser 1998). Each sub-adult skeleton was processed using all other applicable age- and sex-appropriate formulae (see Figure 35). An average height was then calculated for each set of equations and the set means. The average of the set means was reported as the most likely living height. This value was left uncorrected.

Abu Tabari 02/28-2 (male, ca. 7 years):	Ruff (7; *Humerus*):	116.42 cm
	Ruff (7; *Radius*):	-
	Ruff (7; *Humerus* + *Radius*):	-
	Ruff (7; *Femur*):	114.66 cm
	Ruff (7; *Tibia*):	118.95 cm
	Ruff (7; *Femur* + *Tibia*):	116.20 cm
	Ruff mean:	**116.56 cm**
	Smith (male; 3-10; *Humerus*):	113.99 cm
	Smith (male; 3-10; *Radius*):	-
	Smith (male; 3-10; *Ulna*):	110.78 cm
	Smith (male; 3-10; *Femur*):	112.04 cm
	Smith (male; 3-10; *Tibia*):	116.71 cm
	Smith (male; 3-10; *Fibula*):	113.19 cm
	Smith (male; 3-10; *Femur* + *Tibia*):	114.03 cm
	Smith mean:	**113.46 cm**
	Telkkä *et al*. (male; 1-9; *Humerus*):	110.47 cm
	Telkkä *et al*. (male; 1-9; *Radius*):	-
	Telkkä *et al*. (male; 1-9; *Femur*):	107.52 cm
	Telkkä *et al*. (male; 1-9; *Tibia*):	114.25 cm
	Telkkä *et al*. mean:	**110.75 cm**
	Visser (3-13; *Humerus*):	114.77 cm
	Visser (3-13; *Femur*):	112.84 cm
	Visser (3-13; *Tibia*):	117.33 cm
	Visser mean:	**114.98 cm**
	Ruff mean:	116.56 cm
	Smith mean:	113.46 cm
	Telkkä *et al*. mean:	110.75 cm
	Visser mean:	114.98 cm
	Overall mean:	**113.93 cm**

Figure 35: Reconstruction of Abu Tabari 02/28-2's stature.

III.A.6. Weight

McHenry (1992) and Hartwig-Scherer (1993) developed the formulae with which the likely body weights of the prehistoric inhabitants of the Wadi Howar could be calculated. Other published methods either required data which could not be collected, were unsuitable for the series or produced erratic results (e.g. Auerbach/Ruff 2004; Behnke 1959; El-Meligy *et al*. 2006; Grine *et al*. 1995; Hemmer 2007; Holliday 2002; Porter 1999, 2002: 26-30; Ruff 2000(a); Ruff *et al*. 2005; Wheatley 2005).

The means of left and right measurements or, if only one side could be measured, the measurements of whichever side was available were entered into the functions used to estimate adult and sub-adult body weights. An adult individual's body mass was estimated as follows (see Figure 36). Firstly, two equations published by McHenry (1992) were applied. They relied on the product of the subtrochanteric transverse (F9.) and subtrochanteric sagittal diameter (F10.) of the *Femur*. Then, the mean of the two results was computed. Secondly, alternative body weights were estimated on the basis of formulae presented by Hartwig-Scherer (1993). These functions either required the mid-shaft circumference of the *Humerus* (H7a.), the maximum circumference of the *Radius* (*R5(7).), the mid-shaft circumference of the *Femur* (F8.), the subtrochanteric circumference of the *Femur* (*F10(1).), the product of the subtrochanteric transverse (F9.) and sagittal diameter of the *Femur* (F10.) or the mid-shaft circumference of the *Tibia* (T10.). Subsequently, the resulting body mass estimates were averaged. Thirdly, the final body weight estimate was determined. If both McHenry's (1992) and Hartwig-Scherer's (1993) equations could be used, a "weighted" mean estimate was reported as the reconstructed body weight. Since McHenry's (1992) formulae were developed using a larger sample which also included individuals of partly or wholly biologically sub-Saharan ancestry, the "mean McHenry estimate" was considered more reliable. Consequently, the "mean McHenry estimate" was given more "weight". This was accomplished by multiplying the "mean McHenry estimate" by three, adding the product to the "mean Hartwig-Scherer estimate" and dividing the sum by four. If McHenry's (1992) functions were inapplicable, the "mean Hartwig-Scherer estimate" was reported as the most likely body mass.

Abu Tabari 95/2-3:	McHenry FS1 (F9 · F10):	-
	McHenry FS2 (F9 · F10):	-
	McHenry mean:	-
	Hartwig-Scherer (H7a):	47.161 kg
	Hartwig-Scherer (*R5(7)):	47.726 kg
	Hartwig-Scherer (F8):	48.174 kg
	Hartwig-Scherer (T10):	48.112 kg
	Hartwig-Scherer FA (F9 · F10):	-
	Hartwig-Scherer (*F10(1)):	-
	Hartwig-Scherer mean:	**47.793 kg**
	McHenry/Hartwig-Scherer weighted mean:	-
	Weight:	**47.8 kg**
Abu Tabari 02/1-2:	McHenry FS1 (F9 · F10):	48.847 kg
	McHenry FS2 (F9 · F10):	48.873 kg
	McHenry mean:	**48.860 kg**
	Hartwig-Scherer (H7a):	46.367 kg
	Hartwig-Scherer (*R5(7)):	46.494 kg
	Hartwig-Scherer (F8):	47.249 kg
	Hartwig-Scherer (T10):	46.807 kg
	Hartwig-Scherer FA (F9 · F10):	45.322 kg
	Hartwig-Scherer (*F10(1)):	45.332 kg
	Hartwig-Scherer mean:	**46.262 kg**
	McHenry/Hartwig-Scherer "weighted" mean:	48.2 kg
	Weight:	**48.2 kg**

Figure 36: Examples of body weight reconstructions.

The body weights of sub-adult individuals were also estimated as explained above. Additionally, sub-adult individuals were processed using equations for three- to thirteen-year-old children developed by Visser (1998). The data they required or their lack of specificity made other comparable methods unusable (e.g. Auerbach/Ruff 2004; Hemmer 2007; Ruff 2007; Sciulli/Blatt 2008; Visser 1998). If possible, five of Visser's (1998) functions were applied. These formulae required the anterior-posterior mid-shaft diameter of either the *Humerus* (H5.), the *Femur* (F6.) or the *Tibia* (T8.). The average of the estimates calculated for a sub-adult skeleton was regarded as its probable body mass (see Figure 37).

Abu Tabari 02/28-2 (ca. 7 years):	Visser (Tanner *et al*. data; *Humerus*):	20.682 kg
	Visser (Tanner *et al*. data; *Tibia*):	19.113 kg
	Visser (Maresh data; *Humerus*):	19.680 kg
	Visser (Maresh data; *Tibia*):	26.599 kg
	Visser (Maresh data; *Femur*):	22.855 kg
	Visser mean:	**21.8 kg**

Figure 37: Reconstruction of Abu Tabari 02/28-2's body weight.

III.A.7. Physique

A combination of methods was used to estimate body build. Height-weight, proportion and robusticity indices were calculated, a method for diagnosing physique from the skeleton was applied and general postcranial robusticity was visually assessed. Different indices served different purposes. The body mass, Quetelet, Rohrer and Ponderal index (*Index ponderalis*) expressed the relationship between body height and weight. The radio-humeral, tibio-femoral and intermembral index measured limb proportions. Pearson's (2000) formulae for *Humeri* ((H5. + H6.) / H1.), *Radii* ((R4. + R5.) / R1.), *Ulnae* ((U11. + U12.) / U1.), *Femora* ((F6. + F7.) / F1.) and *Tibiae* ((T8. + T9.) / T1) quantified long bone robusticity. Index values could be categorised according to well-established classification schemes. They could also be compared with averages published for other relevant samples (e.g. Barkey *et al*. 2001; Bräuer 1988: 229-230; Carlson *et al*. 2007; Cole 1991; Derry 1914: 101; Dettwyler 1992; Ferro-Luzzi *et al*. 1992; Grupe *et al*. 2005: 290; Henry 1994; Holliday 1997; Jenike 2001; Knußmann 1988(c): 277-282; Krogman/İşcan 1986: 294-295, 524-530; McGee 2005; Muller *et al*. 2009; Pearson 2000: 575-576; Porter 1999: 107; Raxter *et al*. 2008: 151; Roberts 1953; Roberts/Bainbridge 1963; Robins/Shute 1986; Sellen 2000; Sherry/Marlowe 2007; Stini 1994; Zakrzewski 2003). Relying on Ullrich's (1966) summary of Schneider's (1944) technique, Wadi Howar individuals were classified as "pyknic-hypoplastic", "pyknic", "pyknic-athletic", "athletic", "leptosome-athletic", "leptosome" or "leptosome-hypoplastic". Using this technique, a skeleton was diagnosed by evaluating both its robusticity index of the *Humerus* (H7. / H1.) and the condition of its muscle attachment sites (e.g. Bass 1987: 148; Bräuer 1988: 201; Conrad 1963; Heath/Carter 1967; Himes 1988; Knußmann 1988(c): 280-282, 1996: 235-241; Kretschmer 1921, 1977; Lindegård 1953; Porter 1999, 2002: 31-33; Roberts 1953; Roberts/Bainbridge 1963; Schneider 1944; Sheldon 1940; Tanner 1992: 104-105; Ullrich 1966).

The general robusticity of the postcranial skeleton was visually assessed. The size and shape of the remains, the size of the joints and the state of muscle markings were evaluated. This procedure mainly involved comparisons within the Wadi Howar series. The final overall body build estimates were based on all available information. The results produced by all applicable methods, the sample-specific variability and possible distortions caused by specific activity patterns were all taken into consideration. Sub-adult individuals were processed following the same protocol. Their diagnoses were, however, appropriately contextualised by consulting BMI-for-age charts and growth studies of relevant populations (e.g. Cole *et al*. 2007; Gray *et al*. 2004; Gray *et al*. 2009; Kromeyer-Hauschild *et al*. 2001; National Center for Health Statistics 2002; Özenera/Duyarb 2008; Semproli/Gualdi-Russo 2007).

III.A.8. Biological ancestry

Using discriminant function analyses to reveal the biological affinities of the Wadi Howar series individual by individual was one of the most important aims of the study (see III.B.1.b. and III.B.2.d.). The additional individual osteological estimations of biological ancestry mainly focused on the morphological differential diagnosis between "biologically sub-Saharan" and "biologically North African" (e.g. Angel/Kelley 1990; Bass 1987: 83-87; Bidmos 2006; Brace *et al*. 1991: 38-39; Bräuer 1983: 35-38; Brooks *et al*. 1990; Brues 1990; Byers 2002: 151-168; Derry 1914: 100-105, 1949: 32-33; Finnegan/McGuire 1979; Gaherty 1971; Gill 1998; Gill/Gilbert 1990; Hanihara/Ishida 2005; Harvey 1976: 38-39; Heberer *et al*. 1959: 338-339; Hefner 2003, 2007, 2009; Irish 1997, 2000, 2005; İşcan *et al*. 2000: 228-234; Keita 2004; Knußmann 1996: 409-410, 415, 429; Lease/Sciulli 2005; Limson 1932; Martin 1928: 688-689, 772, 939-940, 949, 967; Novotný *et al.* 1993: 76-78; Ousley *et al*. 2009: 71-72; Patriquin *et al*. 2002; Relethford 2009; Rhine 1990; Roberts/Bainbridge 1963; Rooyen 2010; Schultz 1926; Weinberg *et al*. 2005; Wescott 2006(b); Wescott/Srikanta 2008; White 2000: 375-376; Winkler/Wilfing 1991: 19). Findings suggestive of more specific diagnoses were, however, noted as well. No relevant information which could be extracted from any preserved cranial, dental or postcranial structure was ignored. Accordingly, each final determination was the result of a contextualised evaluation of all relevant findings. Nevertheless, most estimations were primarily based on the assessment of the expressions of cranial morphological traits (see Figure 38).

Trait	Diagnostic value
Mastoid tubercle (*Tuberculum mastoideum*)	low
Relative interorbital breadth	moderate
Shape of the nasal saddle (*Sella nasi*)	high
Orientation of the frontal processes of the *Maxillae* (*Processus frontales maxillae*)	moderate
Relative nasal breadth	high
Shape of the inferior nasal margin (*Margo infranasalis*)	high
Shape of the bony palate (*Palatum osseum*)	low
Alveolar prognathism	high
Height of the mandibular symphysis (*Symphysis mandibulae*)	low to moderate
Shape of the chin (*Protuberantia mentalis*)	low to moderate
Shape of the ascending ramus (*Ramus mandibulae*)	low
Ramus inversion	moderate
Depth of the mandibular notch (*Incisura mandibulae*)	low to moderate

Figure 38: Most frequently used traits and their assumed diagnostic values.

III.A.9. Epigenetic traits

246 cranial, dental and postcranial epigenetic traits were systematically scored (see III.B.1.b.2.c.). Epigenetic traits were therefore not exhaustively treated in the context of the individual osteological analyses. All the same, remarkable epigenetic traits and morphological peculiarities were reported and evaluated. Particularly, their occurrence in other populations was given attention (e.g. Alt/Türp 1998; Berry/Berry 1967, 1972; Brothwell 1981: 90-100; Buikstra/Ubelaker 1994: 85-94; Česnys/Pavilonis 1982; Czarnetzki 1971; Donlon 2000; Finnegan 1978; Finnegan/McGuire 1979; Gaherty 1971; Hauser/De Stefano 1989; Herrmann *et al*. 1990: 109-115; Hillson 1996: 85-103; Irish 1997; Mysorekar 1967; Oxenham/Whitworth 2006; Riesenfeld 1956; Rightmire 1972; Rösing 1982; Shulman 1959; Turner *et al*. 1991; Tyrrell 2000).

III.A.10. Occupational stress

Bone shapes, preserved muscle attachment sites, joints and teeth were carefully examined. The aim was to find non-pathological changes suggestive of elevated habitual stress levels. Discovered stress markers were described, interpreted and discussed. Descriptions consisted of verbal and photographic parts. The interpretations involved two steps. Firstly, the movements which could have induced the observed changes were identified. Secondly, the identified movements were matched to archaeologically, ethnographically or osteologically documented activities. The discussions fulfilled two functions. They contextualised the findings and examined the reliability of the interpretations (e.g. Arrighetti *et al*. 2002; Binder *et al*. 2005; Bonfiglioli *et al*. 2004; Boyle *et al*. 1997; Brock/Ruff 1988; Carlson *et al*. 2007; Churchill/Morris 1998; Davis/Kotowski 2007; Deter 2009; Dlamini/Morris 2005; Domett 1998; Dutour 1986; Erdal 2008; Eshed *et al*. 2004(a); Evans-Pritchard 1940; Galtés *et al*. 2009; Hadler *et al*. 1978; Hales/Bernard 1996; Hawkey 1998; Hawkey/Merbs 1995; Henke *et al*. 2002; Hinton 1981; Holý 1974; Jäger *et al*. 1997; Jurmain 1991; Kennedy 1989; Kucera *et al*. 2008(b); Lai/Lovell 1992; Larsen 1985; Levy 1968; Lieverse *et al*. 2007(b); Lipscomb *et al*. 2004; Lozano *et al*. 2008; Marchi 2008; Minozzi *et al*. 2003; Molleson 1989; Molnar 1971; Nadel 1947; Peterson 1998; Punnett/Wegman 2004; Schulz 1977; Seligman/Seligman 1932; Simon *et al*. 2002; Tobert 1988; Weiss 2007; Wilczak/Kennedy 1998). The data collection list according to which each individual was processed also contained 59 cranial, dental and postcranial stress and robusticity entries (see III.B.1.b.2.b.). As a result, these 59 markers were only revisited in the course of the individual osteological assessments if their expressions were particularly noteworthy.

III.A.11. Health

Any observation which was deemed to fall outside the normal range of variability and could not be explained as the result of *post mortem* damage was treated as a pathology. Pathologies were examined macroscopically. They were described and photographed. Most probable and alternative preliminary diagnoses were offered and discussed. The discussions explained the rationale behind the differential diagnoses and put them into a wider context. The suggested diagnoses were based on the information which could be extracted from the pertinent literature. It was not attempted to make precise medical diagnoses. This would have been beyond the scope of an anthropological thesis (e.g. Aufderheide/Rodríguez-Martín 1998; Barkey *et al*. 2001; Blystad/Rekdal 2004; Boyle *et al*. 1997; Brothwell/Sandison 1967; Calce/Rogers 2007; Conrad 1994; Crognier 1973: 57-61; Czarnetzki 1996; Davies 1961; Davis/Kotowski 2007; Durrheim/Leggat 1999; Gray *et al*. 2003; Herrmann *et al*. 1990: 116-171; Hershkovitz *et al*. 2008; Hildebrandt 1998; Hill *et al*. 2007; Kaufmann *et al*. 1984; Klümper 1982; Kouimintzis *et al*. 2007; Langsjoen 1998; Lefort/Bennike 2007; Lovell 1997(b); Marlowe 2004; Marshall *et al*. 2004; Mays 2007: 115; Miller *et al*. 1996; Muchomba/Sharp 2006; Nadel 1947: 517-520; Newman 1970: 102-104; O’Brien *et al*. 2009; Ortner/Putschar 1981; Pickles 1987; Pratt *et al*. 1992; Roberts/Ingham 2008; Rothschild 2005; Schultz 1988, 2001; Steinbock 1976; Sugiyama 2004; Tyson/Dyer Alcauskas 1980; Ubelaker/Pap 2009; Wapler *et al*. 2004; Wells 1967; Wheatley 2008; Woodburn 1968).

All skeletons were examined for signs of enamel hypoplasia, *Cribra orbitalia*, *ante mortem* tooth loss and dental caries (see III.B.1.b.2.b.). Periostitis, periodontal disease, degenerative joint disease and other macroscopic indicators of general health were not systematically scored. Strong expressions of these conditions were also individually discussed, regardless of whether or not they were included in the intra-sample comparisons (e.g. Beckett/Lovell 1994; Buzon 2006(b); Buzon/Judd 2008; Facchini *et al*. 2004; Hillson/Bond 1997; Keita/Boyce 2001; King *et al*. 2005; Lewis/Roberts 1997; Manzi *et al*. 1999; Mosothwane/Steyn 2009; Ortner/Frohlich 2007; Šlaus 2008; Starling/Stock 2007; Ubelaker/Pap 2009; Wapler *et al*. 2004).

III.B. Group analyses

The group analyses comprised a number of different procedures. A large body of metric and non-metric data was compiled (see III.B.1.). Data relevant to the detection of diachronic differences in robusticity, occupational stress levels and health were collected from the Wadi Howar material only. Data relevant to the estimation of biological ancestry were also gathered from prehistoric and modern African comparative series. Descriptive statistics were employed to summarise all the Wadi Howar data variable by variable (see III.B.2.a.). Intra-observer error was quantified and statistically assessed after a subset of Wadi Howar individuals had been reprocessed (see III.B.2.b.). The intra-sample comparisons between the pre-Leiterband and Leiterband sub-sample focused on selected robusticity, stress and health variables (see III.B.2.c.). They were carried out using Mann-Whitney U and χ^2 tests. The inter-sample comparisons were designed to reveal which prehistoric and which modern comparative series the Wadi Howar sample, its different parts and each of its members were morphologically closest to (see III.B.2.d.). For this purpose, multiple, separate, individualised discriminant function analyses were performed for each Wadi Howar individual. The resulting classification patterns were interpreted. Differences between the occupation phase-specific classification frequencies were analysed with χ^2 tests.

III.B.1. Data collection

III.B.1.a. Results of the individual osteological analyses

The individual osteological analyses produced the first collectable data. All final results were entered into in an overview table (see III.A. and IV.A.). In addition, various partial and end results were systematically compiled (see III.A. and IV.A.). The preservation indices of the different sections of the full, shortened and additional shortened preservation data list were tabulated. Both the results of the height and weight reconstructions and the index values which were calculated in connection with the estimation of physique were gathered as well. One sub-set of the data had to be modified. Age at death estimates were reduced to single values for the statistical comparisons. Each individual’s assumed highest and lowest possible age at death were added and divided by two. “Adult or older” individuals were arbitrarily defined as 30.0 years old, “late *Iuvenis*/early *Adultus*” individuals as 20.0 years old and “40-x” individuals as 50.0 years old.

III.B.1.b. Additional data

Collecting additional data was part of the attempt to extract as much information from the Wadi Howar sample as possible. It was also a prerequisite for answering the research questions concerning diachronic changes and morphological affinities. Since the Wadi Howar series exclusively comprised skeletons which were both highly fragmented and incomplete, it was impossible to collect the same data set from each individual. However, virtually all standardised and modified cranial, dental and postcranial measurement/traits which could be taken/scored and fulfilled at least one of the following two criteria were taken/scored. Firstly, variables had to be informative. Those which were intended to be used in the intra-sample comparisons had to be generally accepted and reliable indicators of robusticity, occupational stress or health. Those which were intended to be used in the inter-sample comparisons had to be measurements or traits whose usefulness in estimating biological ancestry has been repeatedly demonstrated. Variables could also be introduced into either group because they represented particularly salient features of the sample (e.g. Brock/Ruff 1988; Buzon 2006(a); Gill/Rhine 1990; Hawkey/Merbs 1995; Irish 1997; İşcan *et al*. 2000; Lahr/Wright 1996; Larsen 1997; Lewis/Roberts 1997; Manzi *et al*. 1999; Mosothwane/Steyn 2009; Ortner/Frohlich 2007; Ousley *et al*. 2009; Šlaus 2008; Ubelaker/Pap 2009; Weinberg *et al*. 2005; Weiss 2007; Wilczak/Kennedy 1998; Wood *et al*. 1992). Secondly, measurements and traits had to be part of the canon of data customarily gathered from skeletal series. This criterion was introduced in order to increase the comparability with published material (e.g. Bass 1987; Bräuer 1988; Bräuer/Knußmann 1988; Brothwell 1981; Buikstra/Ubelaker 1994; Herrmann *et al*. 1990: 91-109; Howells 1973; İşcan 2000; Krogman/İşcan 1986; Martin 1928; Saller 1959). The full data collection list constituted a compilation of all such variables. It contained every entry in each individual data set of the 23 as yet unpublished Wadi Howar skeletons. This full data collection list consisted of 984 variables (see Appendix III.A.). Each one of the 32 Wadi Howar individuals was processed on the basis of this list.

Entries in **Abu Tabari 02/1-2**'s data collection list:	Entries in **Abu Tabari 02/28-5**'s data collection list:	Entries in **Conical Hill 95/4**'s data collection list:	Entries in the **full data collection list**:
		CM001	CM001 - 1. Maximum cranial length
	CM020	CM020	CM020 - 30. *Bregma-Lambda* chord
CM088		CM088	CM088 - 69(2). 2nd mol. mand. body hght. (l)
CM121			CM121 - 71. Minimum ramus breadth (r)
	DM010		DM010 - 81. Crown length UP2 (r)
DM017	DM017		DM017 - 81. Crown length LI1 (l)
	DM037	DM037	DM037 - 81(1). Crown width UC (l)
	CN007a	CN007a	CN007a - Sagittal keeling - degree
	CN017a		CN017a - Shape of the *Sella nasi* - main
		CN027	CN027 - *Sutura palatina transversa*
CN031	CN031	CN031	CN031 - Ramus inversion
	DE005	DE005	DE005 - Shovel UI1 (l)
		DE013	DE013 - Canine mesial ridge UC (l)
	DE024		DE024 - Distosagittal ridge UP1 (r)
DE050			DE050 - Premol. lingual cusps LP2 (r)

Figure 39: Hypothetical example of the construction of a full data collection list. If the Wadi Howar sample had only consisted of these three individuals and they had only yielded the respective data sets, the resulting full data collection list would have contained all of the altogether 15 variables of the three data sets.

The comparative data was gathered on the basis of a shortened version of the full data collection list. On the one hand, this decision constituted a concession to logistical constraints (see II.B.). On the other hand, it reflected the fact that the statistical inter-sample comparisons served a well-defined purpose (see I.B. and III.B.2.d.1.). Accordingly, the shortened data collection list only contained those sections of the full list which were dedicated to the detection of population affinities. Moreover, numerous variables within these sections were removed. Most variables which appeared in less than five individual Wadi Howar data sets were taken off the list. Many variables which were considered unlikely to be highly discriminating were deleted as well. The resulting shortened data collection list consisted of 212 entries (see Appendix III.B.). Fifteen Jebel Sahaba skeletons were processed using an alternative shortened version of the full data collection list. This alternative shortened list comprised the same 212 entries as the normal shortened list. It also contained an additional 115 robusticity, stress and health variables of the full list (see Appendix III.C.). These data were intended to be employed as external points of reference.

Table 4: Entries in the different sections of the full, shortened and alternative shortened data collection list.

	Full list	**Shortened list**	**Alternative shortened list**
Cranial measurements	171	54	54
Dental measurements	64	64	64
Postcranial measurements	179	-	55
Cranial morphological traits	39	20	20
Cranial epigenetic traits	85	11	11
Dental epigenetic traits	81	63	63
Postcranial epigenetic traits	80	-	-
Cranial robusticity traits	12	-	6
Postcranial robusticity traits	18	-	10
Cranial musculoskeletal stress markers	13	-	2
Postcranial musculoskeletal stress markers	16	-	10
Tooth loss	64	-	-
Dental abrasion	32	-	-
Enamel hypoplasia	64	-	32
Dental caries	64	-	-
Cribra orbitalia	2	-	-
Total	984	212	327

III.B.1.b.1. Measurements

Cranial, dental and postcranial measurements were taken in accordance with the descriptions provided in Bräuer's (1988) updated summary of the Martin-Saller catalogue (e.g. Bräuer 1988; Bräuer/Knußmann 1988; Martin 1928; Saller 1959). Indices were calculated following the instructions in the same publication. The ordinal numbers by which measurements and indices are identified were given after the dashes between the variable codes and the names of the measurements or indices. Asterisks accompanying such ordinal numbers were used to mark measurements or indices not included in Bräuer's (1988) article. Designations of measurements which could either be maxillary or mandibular were followed by an (mx) or (md) respectively. Left and right measurements were distinguished from each other by adding l's and r's in brackets to variable names. An (m) following a variable name was used to designate the arithmetic mean of a measurement's left and right value. A "C" was placed in front of an ordinal number if it belonged to a clavicular measurement, an "H" if it belonged to a humeral measurement, an "R" if it belonged to a radial measurement, a "U" if it belonged to an ulnar measurement, a "P" if it belonged to a measurement of the *Pelvis*, an "F" if it belonged to a femoral measurement, a "T" if it belonged to a tibial measurement and an "Fi" if it belonged to a fibular measurement. Additional "I"s were employed to denote indices.

Cranial and postcranial measurements were taken to the nearest 0.5 mm. Teeth were measured to the nearest 0.01 mm. Dental measurements were subsequently rounded to the nearest 0.1 mm. Each single measurement of every Wadi Howar individual was repeated as often as deemed necessary by the author to ensure that its right value had been determined. This was often an extremely lengthy process. Even in unambiguous cases, measurements were taken at least three times. The members of the comparative samples were measured in a slightly less compulsive manner. Nonetheless, each measurement of every comparative individual was taken at least three times as well. When a measurement could be taken without difficulties but the state of the measured structure had a distorting effect, the result of the measurement was reported in round brackets. For instance, dimensions of cracked teeth were given in round brackets. When a value represented a partial estimate or was probably severely influenced by distorting factors, the result of the measurement was reported in round and square brackets. The anterior palate breadth (63(2).) of a mandible (*Mandibula*) with an alveolar process (*Processus alveolaris*) whose edges had partly broken off or the crown length (81.) of a tooth with substantial wear, for example, were given in round and square brackets. The information conveyed by round or round and square brackets also extended to arithmetic means partially or wholly based on bracketed values (see Appendix XII). Whenever the state of a structure would have obviously introduced an intolerably large distortion or the size of a missing portion would have clearly made an estimate too unreliable no measurement was taken.

III.B.1.b.1.a. *Cranium*

Most of the entries on the list of cranial measurements were intended to be used in the inter-group comparisons. Numerous viscerocranial measurements, or the structures whose dimensions they quantify, have been successfully used in the estimation of biological ancestry (e.g. Birkby *et al*. 2008; Brace *et al*. 2006; Bruner/Manzi 2004; Buzon 2006(a); Cramon-Taubadel 2009(a), 2009(b); Gill 1998; Gill/Rhine 1990; Hefner 2003, 2007, 2009; İşcan *et al*. 2000; Morris/Ribot 2006; Ousley *et al*. 2009; Relethford 2009; Rooyen 2010; Roseman/Weaver 2004; Weinberg *et al*. 2005). Viscerocranial measurements were therefore given preference. Conversely, neurocranial measurements were largely neglected. The results of several studies were taken as evidence that many of them tend to reflect size and robusticity rather than geographic variation (e.g. Dutour 1984; Grine *et al*. 2007; Harvati/Weaver 2006; Jaeger *et al*. 1998(b); Jantz/Meadows Jantz 2000; Sereno *et al*. 2008; Stynder *et al*. 2007; Zellner *et al*. 1998).

93 of the 171 measurements were non-standard measurements (see Appendix IV.A.). The majority of the non-standard measurements were introduced with the aim to take full advantage of the most frequently preserved cranial structures. 56 were dedicated to the description of dental arches (*Arcus dentales*), a further 20 to the description of mandibular bodies (*Corpora mandibularum*). Almost all of the remaining non-standard measurements were musculoskeletal stress- or robusticity-related. Ten of these were cranial thickness measurements (e.g. Hatipoglu *et al*. 2008; Henke/Rothe 1994; Lieberman 1996; Lynnerup 2001; Wolpoff 1980).

Since it would have been impossible to follow the pertinent instructions given in Bräuer (1988), all angles were determined photogrammetrically (e.g. Bräuer 1988; Bräuer/Knußmann 1988; Buikstra/Ubelaker 1994: 10-12; Jacobshagen *et al*. 1988; Knußmann 1996: 12). First, the cranial remains were photographed in lateral view (*Norma lateralis*). Then, the approximate location of the Frankfurt plane and the necessary points were drawn onto the standardised photographs. Finally, the resulting angles were measured with a protractor. The angles were primarily estimated so that individual values could be classified according to the relevant schemes (see III.B.1.b.2.c.1. and for example: Bräuer 1988; Martin 1928). The likely loss of precision was therefore considered acceptable.

Locating *Bregma*, *Lambda* or both was crucial to nine measurements. When a *Lambda* bone (*Os lambdae*) was present, the position of *Lambda* was redefined. In order to increase the reproducibility of the measurements in question, this was, however, not done by applying the conventional technique. When the bone was located in the sagittal suture (*Sutura sagittalis*), *Lambda* was placed immediately occipital to the bone. When the *Lambda* bone (*Os lambdae*) was better interpreted as a part of the occipital bone (*Os occipitale*), the landmark was placed immediately frontal to it. The result of the measurement was marked with an (o) or an (f) respectively when it was necessary to move *Lambda*. *Bregma* was moved in the same fashion, when a bregmatic bone (*Os bregmaticum*) was present (e.g. Berry/Berry 1967; Bräuer 1988; Hauser/De Stefano 1989; Martin 1928).

III.B.1.b.1.b. Teeth

The metric dental data's main purpose was to serve as an additional basis for the inter-sample comparisons (e.g. Hanihara/Ishida 2005; Harris/Lease 2005; Irish 2008; Lease/Sciulli 2005). Only standard dental measurements were taken. If possible, the length (81.) and width (81(1).) of each tooth's crown (*Corona dentis*) was determined (e.g. Bräuer 1988). Many teeth were measured even though they showed substantial wear. Particularly in premolars (*Dentes praemolares*) and molars (*Dentes molares*), maximum diameters were usually located fairly close to the neck of the tooth (*Collumn dentis*). Consequently, even severe abrasion did often not cause any problems. Teeth whose dimensions had obviously been reduced by wear were judged case by case. Moderately abraded teeth were measured. Maximum diameters of more severely worn teeth were partly estimated. Whenever the degree of abrasion would have made estimates too unreliable no measurements were taken. The measurement of teeth with cracks or chips and incomplete teeth was handled analogously (e.g. Bräuer 1988: 186; Goose 1963: 126; Hillson 1996: 71-72; Hillson *et al*. 2005: 423-424; Kieser 1990: 9-14; Kieser/Groeneveld 1988: 1200; Lease/Sciulli 2005: 57-58; Pinhasi 1998: 3-4; Teschler-Nicola/Prossinger 1998: 484; Wood/Abbott 1983: 199-202).

UI1 = upper first incisor (*Dens incisivus superior I*)
UI2 = upper second incisor (*Dens incisivus superior II*)
UC = upper canine (*Dens caninus superior*)
UP1 = upper first premolar (*Dens praemolaris superior I*)
UP2 = upper second premolar (*Dens praemolaris superior II*)
UM1 = upper first molar (*Dens molaris superior I*)
UM2 = upper second molar (*Dens molaris superior II*)
UM3 = upper third molar (*Dens molaris superior III*)

LI1 = lower first incisor (*Dens incisivus inferior I*)
LI2 = lower second incisor (*Dens incisivus inferior II*)
LC = lower canine (*Dens caninus inferior*)
LP1 = lower first premolar (*Dens praemolaris inferior I*)
LP2 = lower second premolar (*Dens praemolaris inferior II*)
LM1 = first lower molar (*Dens molaris inferior I*)
LM2 = lower second molar (*Dens molaris inferior II*)
LM3 = lower third molar (*Dens molaris inferior III*)

Figure 40: Abbreviations used to identify teeth.

III.B.1.b.1.c. Postcranium

This section of the full data collection list contained 179 measurements. All selected postcranial measurements were considered potentially useful in exposing diachronic robusticity, stress and health differences (e.g. Bridges *et al*. 2000; Carlson *et al*. 2007; Hawkey/Merbs 1995; Holt 2003; Lanyon *et al*. 1982; Larsen 2002; Marchi 2008; Martin *et al*. 1985; Pearson 2000; Pfeiffer/Lazenby 1994; Ruff *et al*. 1984; Shackelford 2007; Stock 2006; Stock/Shaw 2007; Wanner *et al*. 2007; Wescott/Srikanta 2008; Zumwalt 2005). 71 of the 179 postcranial measurements were non-standard measurements (see Appendix IV.B.). They were all developed to generate additional and more specific stress and robusticity data for the intra-sample comparisons. 22 documented the size of muscle attachment sites. Six quantified additional circumferences. 43 constituted cortical thickness measurements.

Due to the Wadi Howar material's state of preservation, cortical thickness could usually be measured. The data was gathered from left and right bones. Sides were chosen according to where cortical thickness could be more reliably determined. The intention was to measure any long bone's cortical thickness as close to the middle of its shaft (*Corpus*) as possible. Unfortunately, that was not always possible. However, if possible, the approximate locations along the shafts (*Corpora*) were recorded. The femoral cortical thickness of the 15 Jebel Sahaba skeletons which were processed according to the alternative shortened protocol was measured whenever this could be done (e.g. Brock/Ruff 1988; Holt 2003; Lanyon *et al*. 1982; Marchi 2008; Ruff *et al*. 1984; Ruff *et al*. 1994; Shackelford 2007; Stock/Shaw 2007; Suby/Guichón 2009; Trinkaus 1997: 13371-13372).

Various long bone lengths were measured or estimated *in situ*. Unless a bone was preserved well enough to be measured precisely in the laboratory, the results of its *in situ* examination were treated as the more reliable data (e.g. Bass 1987; Bräuer 1988; Herrmann *et al*. 1990: 36-42; Kunter 1988: 561-562; White 2000).

III.B.1.b.1.d. Indices

The data collected from each Wadi Howar individual was processed according to a list of 121 indices. 47 of these were non-standard indices. The list contained 13 cranial, 80 dental and 28 postcranial indices (see Appendix V.). Except for most of the cranial indices, they were calculated with the intra-sample comparisons in mind. They provided measures of relative size relevant to the investigation of robusticity, stress and health (e.g. Brace *et al*. 1991; Bridges *et al*. 2000; Brown 2006; Carlson *et al*. 2007; Harris *et al*. 2001; Hawkey/Merbs 1995; Hoover *et al*. 2005; Kieser *et al*. 1997; Kieser/Groeneveld 1988; Krogman/İşcan 1986: 518-530; Pearson 2000; Pinhasi *et al*. 2008; Stock/Shaw 2007; Wanner *et al*. 2007). Six of the postcranial indices had already been used in the course of the individual analyses (see III.A.7.). An additional seven height-weight and limb proportion indices were also employed in this context (see III.A.7.). Furthermore, each measurement, or the mean of its left and right value, was scaled (see III.B.2.d.2.c.). Means were used to calculate indices whenever cranial or postcranial measurements had left and right values. The crown index (I74.) and area (I75.) were computed for every tooth. The asymmetry index was calculated for each pair of antimeres (IDM033-48).

III.B.1.b.2. Non-metric traits

Not least the conscientiousness with which the osteo- and odontoscopic assessment of the Wadi Howar material was carried out made scoring non-metric traits very time-consuming. It also introduced an additional element of subjectivity into the study. Nevertheless this assessment did make it possible to extract a large amount of extra information from this poorly preserved sample. Even badly damaged or only partly preserved structures could often be scored with reasonable confidence (e.g. Berry/Berry 1967; Bräuer 1988; Donlon 2000; Finnegan 1978; Finnegan/McGuire 1979: 552; Gaherty 1971; Galtés *et al*. 2009; Gill/Rhine 1990; Hauser/De Stefano 1989; Hawkey/Merbs 1995; Lahr 1996; Larsen 1997; Martin 1928; Ortner/Frohlich 2007; Rhine 1990; Turner *et al*. 1991; Ubelaker/Pap 2009; Walker 2008; Weinberg *et al*. 2005; Wilczak/Kennedy 1998).

With few exceptions, the non-metric traits on the data collection list were selected because of their likely significance for the intra- and inter-sample analyses. Both traits which had been successfully used in previous studies and traits which could be considered prominent features of the Wadi Howar series were assumed to be informative. Certain traits were put on the data collection list although they were deemed largely uninformative. These traits were primarily scored for descriptive purposes (e.g. Bräuer 1988; Buikstra/Ubelaker 1994; Finnegan 1978; Gill/Rhine 1990; Hauser/De Stefano 1989; Hawkey/Merbs 1995; Irish 1997; Larsen 1997; Tyrrell 2000; Weiss 2007).

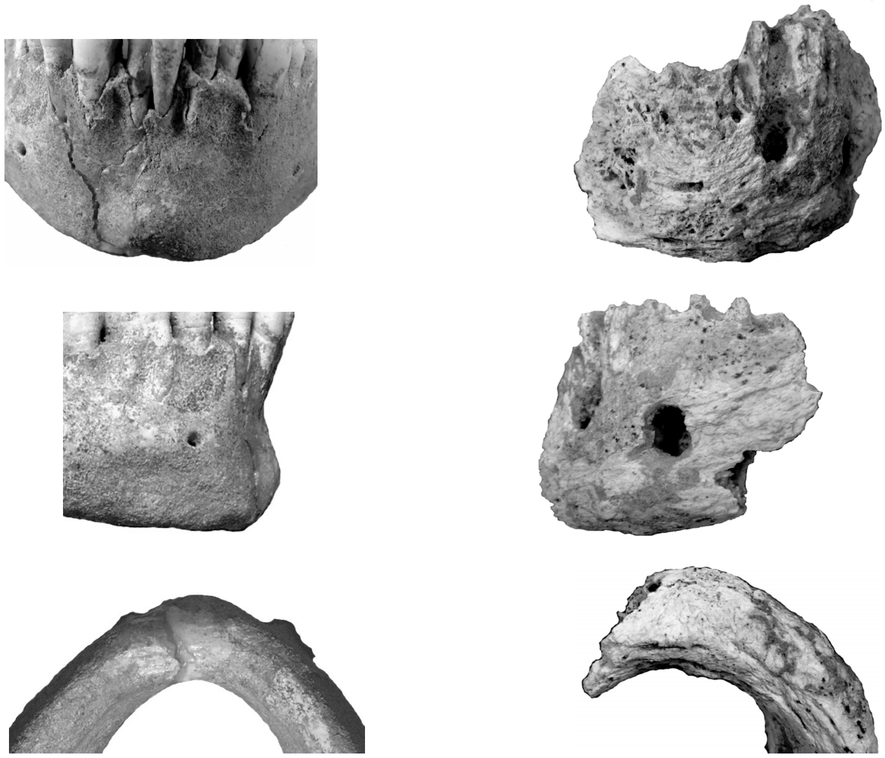
III.B.1.b.2.a. Basic scoring procedures

Published grading and classification systems formed the basis of the evaluations. Whereas various methods could be applied more or less unchanged, most techniques were modified. Modifications were made for several reasons. Ensuring that the scales according to which trait expressions were graded reflected the encountered variation appropriately was one major concern. Simplifying some complex methods was another. Changes were occasionally also introduced with the intention of extracting additional information from specific sets of traits (e.g. Acsádi/Nemeskéri 1970; Bass 1987; Berry/Berry 1967; Blau 2001: 179; Bräuer 1988; Brothwell 1963(a), 1981; Cope *et al*. 2005: 393; Derevenski 2000: 340; Ferembach *et al*. 1979; Finnegan 1978; Gill 1998; Gill/Rhine 1990; Hawkey 1998: 329-332; Hawkey/Merbs 1995: 327-329; Lahr 1996; Martin 1928; Miles 1963; Molnar 2006: 15; Peterson 1998: 382; Robb 1998: 365; Schultz 1988; Smith 1984; Stirland 1998: 355-356; Stuart-Macadam 1991; Szilvássy 1988: 423; Turner *et al*. 1991; Van Der Merwe *et al*. 2006: 460-461; Walker 2008; White 2000).

New code	Description
1	very gracile (-2)
2	very gracile to gracile
3	gracile (-1)
4	gracile to indifferent
5	indifferent (0)
6	indifferent to robust
7	robust (+1)
8	robust to very robust
9	very robust (+2)

Figure 41: Recoding of the Acsádi/Nemeskéri (1970) scores. Original Acsádi/Nemeskéri (1970) codes in brackets.

The basic scoring procedure was the same for most non-metric traits. Its details did, however, differ depending on whether the trait was continuous or discontinuous. “CR010 - *Mentum osseum*” may be used as an example of a continuous trait. Firstly, the Acsádi/Nemeskéri (1970) grading system for this cranial robusticity trait was modified. Their system comprised five categories. They defined a hyper-feminine (-2) bony chin (*Mentum osseum*) as small and rounded, a feminine (-1) one as small, an indifferent (0) one as medium-sized, a masculine (+1) one as prominent and a hyper-masculine (+2) one as very prominent with bilateral protrusions. Four intermediate categories were added to this original schema. Thereafter, the reorganised scale was recoded (see Figure 41).



(a) (b)

Figure 42: Opposite expressions of the *Mentum osseum* trait (CR010). The shape of Abu Tabari 02/1-2’s bony chin (*Mentum osseum*) was classified as “very gracile to gracile” (2) (a). The shape of Conical Hill 02/3-4’s bony chin (*Mentum osseum*) was classified as “robust to very robust” (8) (b).

Secondly, the continuous variation in the *Mentum osseum* trait was scored directly on the basis of this modified scale. The descriptions and illustrations provided by Acsádi/Nemeskéri (1970), Ferembach *et al*. (1979, 1980: 523), Walker (2008) and White (2000: 364-365) served as external yardsticks. Reports of population-specific frequencies of particular shapes of the bony chin (*Mentum osseum*) were also taken into account. A blunt, medial and retreating appearance, for instance, is sometimes considered typical of biologically sub-Saharan individuals in general (e.g. Bass 1987: 83-88; Bräuer 1983: 36-37; De Villiers 1968; Oettlé *et al*. 2009: 30, 38; Walker 2008: 48; White 2000: 376). The 23 as yet unpublished Wadi Howar individuals were scored accordingly in the laboratory. Comparing their mandibles (*Mandibulae*) with each other was an integral part of directly scoring the expressions of the trait. This comparison revealed that the thickness of the mandibular symphysis (*Symphysis mandibulae*) was an important aspect of the robusticity of the bony chin (*Mentum osseum*) in this series. Consequently, relative thickness of the mandibular symphysis (*Symphysis mandibulae*) was employed as an additional diagnostic criterion. Thirdly, immediately after this stage of the scoring process had been completed, each expression of the trait was photographed. The aim was to produce accurate photographic representations of the expressions. This normally involved photographs in frontal, lateral, vertical and basilar view (*Norma frontalis, lateralis, verticalis et basilaris*). If deemed necessary, additional non-standardised photographs were taken (see III.B.1.b.2.a.1.). The eight already published Wadi Howar individuals were scored and photographed in the same fashion (Henke *et al*. 2002). Their mandibles (*Mandibulae*) were, however, not seriated. The 15 Jebel Sahaba skeletons which were processed on the basis of the alternative shortened data collection list were treated like the eight already published Wadi Howar individuals (see II.B.1.a.). Fourthly, the photographs of the expressions of all Wadi Howar and Jebel Sahaba individuals were systematically compared with each other. Photographs of expressions of the *Mentum osseum* trait which were considered especially representative of a particular score played a central role in this context. They were used as main points of reference. Expressions whose evaluations were found to be inaccurate in the course of these comparisons were re-scored. This last stage of the scoring process was introduced for two reasons. It was intended as a measure to ensure that the assigned scores were correct relative to each other and that they reflected the observed range of trait expressions.

"DE053/54 - Groove pattern LM2" may serve as an example of a discontinuous trait. The Arizona State University Dental Anthropology System (ASUDAS) was used to score it. The system describes three character states for this trait of the lower second molar (*Dens molaris inferior II*) (Turner *et al*. 1991: 22-23). Its grooves (*Fissurae*) can form a Y-, +- or X-pattern. A Y-pattern (1) is defined by contact between the metaconid (*Cuspis mesiolingualis*) and the hypoconid (*Cuspis distovestibularis*), a +-pattern (2) by contact between the protoconid (*Cuspis mesiovestibularis*), the metaconid (*Cuspis mesiolingualis*), the hypoconid (*Cuspis distovestibularis*) and the entoconid (*Cuspis distolingualis*), and an X-pattern (3) by contact between the protoconid (*Cuspis mesiovestibularis*) and the entoconid (*Cuspis distolingualis*). Firstly, each individual's left and right lower second molar (*Dens molaris inferior II*) were scored following the instructions given in Turner *et al*. (1991). Secondly, after a skeleton had been fully processed, photographs of its dentition were taken (see III.B.1.b.2.a.1.). Thirdly, the relevant photographs of all individuals were examined to determine if the type of groove pattern had been correctly diagnosed. This procedure was applied to Wadi Howar and comparative individuals alike.

The evaluation of continuous traits always involved the main procedures outlined in the "CR010 - *Trigonum mandibulae/Mentum osseum*" example. Scores were assigned on the basis of a classification scheme. Special characteristics of biologically sub-Saharan populations in general or the Wadi Howar sample in particular were taken into consideration when expressions were scored. Seriating the specimens in the laboratory was part of scoring the 23 as yet unpublished Wadi Howar individuals directly. The eight previously published Wadi Howar individuals and the members of the comparative samples, on the other hand, were directly scored without seriating the specimens. The individual expressions of a trait were photographed. The photographs of the expressions of all processed individuals were systematically compared with each other to make sure that the scoring was consistent and appropriate. If this photographic comparison revealed inconsistencies, the expressions in question were re-scored.

The assessment of discontinuous traits always consisted of the three principal steps described in the "DE053/54 - Groove pattern LM2" example. The types of expressions were determined. The expressions were documented photographically. Later, the photographs were used to check the diagnoses (e.g. Acsádi/Nemeskéri 1970; Benazzi *et al*. 2008; Benazzi *et al*. 2009; Berbesque/Doran 2008; Berg 2008: 574-577; Berry/Berry 1967; Bräuer 1988; Brothwell 1981; Buikstra/Ubelaker 1994: 10-12; Ferembach *et al*. 1979; Finnegan 1978; Galtés *et al*. 2009: 287-289; Gill 1998; Gill/Rhine 1990; Hawkey 1998: 329-332; Hawkey/Merbs 1995: 327-329; Hillson 1996: 85-103, 305-306; Jacobshagen *et al*. 1988; Kimmerle *et al*. 2008(a): 566-568; Lahr 1996; Martin 1928; Meindl/Russel 1998: 382-389; Molleson/Cruse 1998: 721-722; Rissech *et al.* 2006: 215-224; Schultz 1988; Smith 1984; Storey 2007; Turner *et al*. 1991; Walker 2008; White 2000: 338, 343-346).
Scores which could not be determined with full confidence were reported in round brackets. Scores in round and square brackets were assigned with an even greater degree of uncertainty. Expressions of traits whose condition would have made their assessment too unreliable were not scored. Left-right means partially or wholly based on bracketed values were intended to be viewed with the same degree of caution (see Appendix XVII.-XXI.). Moreover, although not bracketed themselves either, values which were created by splitting up bracketed double-figure scores into single-figure scores were also meant to be treated as if they were given in brackets (see below). L's and r's in brackets were combined with variable names to distinguish left from right scores. The mean of the left and right score of a trait was marked with an (m) behind the variable name. The mean score of a continuous antimeric trait was determined by calculating the arithmetic mean of its left and right score. The mean of the left and right score of a discontinuous trait with countable expressions was reported in the same manner. If a discontinuous trait which could either be present or absent was only expressed on one side, its mean score was "present". If the left and right score of a discontinuous trait with several types of possible expressions differed from each other, the score of the more complex expression or a double score was given as the mean score. In some cases, two aspects of the expression of the same trait were assessed. The results of the grading of both aspects were usually reported separately in single-figure scores and together in a combined double-figure score. A combined score was created by adding the subsidiary single-figure to the main double-figure score. For example, a *Cranium* whose shape was judged to be "pentagonoid" (60) "with a rhomboid tendency" (7) in vertical view (*Norma verticalis*) was assigned a combined score of 67 (see Appendix VI.B.1.: "CN002 - Cranial shape (*Norma verticalis*)").

III.B.1.b.2.a.1. Basis of the photographic comparisons

The comparisons of the photographs taken during the data collection stage of the project were carried out between the 8th of December 2008 and the 13th of February 2009. All photographs were taken with a *FinePix S6500fd* digital camera (Fuji Photo Film Co., Ltd.) with a 10.7-times optical zoom lens and 6.3 million effective pixels. The reconstructed remains of all 32 Wadi Howar individuals were documented with a total of 5379 photographs. Although the Wadi Howar remains were also photographed to document their state of preservation, diagnostically relevant structures, pathologies and remarkable features (see III.A.1.-11.), the majority of the photographs served a different purpose. Most digital images were needed for the photographic comparisons of the expressions of the systematically scored non-metric traits. 13 866 photographs were taken of the members of the comparative series for the same reason (e.g. Behrensmeyer 1978; Benazzi *et al*. 2009; Berbesque/Doran 2008; Cardoso/Saunders 2008; Galtés *et al*. 2009: 287; Hillson 1996: 305-306; Jacobshagen *et al*. 1988; Kimmerle *et al*. 2008(a); Knußmann 1996: 12; Molleson/Cruse 1998; Rissech *et al.* 2006; Rougé-Maillart *et al*. 2007; Wilson *et al*. 2008).

Number of photographs	**Samples**
	<u>Prehistoric samples</u>
3007	Jebel Sahaba/Tushka
1495	A-Group
1744	Malian Sahara
782	Jebel Shaqadud
83	El Kadada
7111	**Total (with Jebel Shaqadud and El Kadada)**
6246	Total (without Jebel Shaqadud and El Kadada)
	<u>Modern samples</u>
1541	Southern Sudan
1350	Chad
1596	Mandinka
1591	Somalis
1542	Haya
7620	**Total**
	<u>All comparative samples</u>
14731	**Total (with Jebel Shaqadud and El Kadada)**
13866	Total (without Jebel Shaqadud and El Kadada)

Figure 43: Overview of the photographs taken of the comparative material.

The expressions of the cranial and dental non-metric traits on the shortened data collection list were documented with standardised photographs (see III.B.1.b.). The list of these comparative photographs comprised 44 entries. All Wadi Howar individuals and every member of each comparative sample were processed using this photographic protocol. Whenever a structure was not accurately represented by the one or more standardised photographs dedicated to it, additional non-standard photographs were taken. Any relevant observation not covered by the list was also documented photographically. An additional second list contained 38 standardised photographs of a selection of the stress and robusticity traits on the alternative shortened data collection list (see III.B.1.b.). The 15 Jebel Sahaba individuals from whom the data on the alternative shortened data collection list was collected and the Wadi Howar remains were photographed on the basis of this list. Again, additional photographs were taken, if necessary. The expressions of the traits of the Wadi Howar individuals which only appeared on the full data collection list were photographed in the same manner (see III.B.1.b.).

Minimum number of photographs	**Description of photographs**
1	*Cranium* (*Norma frontalis*)
1	*Cranium* (*Norma occipitalis*)
1	*Cranium* (*Norma lateralis sinistra*)
1	*Cranium* (*Norma lateralis dextra*)
1	*Cranium* (*Norma verticalis*)
1	*Cranium* (*Norma basilaris*)
1	Cranial length (vertical)
1	Cranial shape (vertical)

1	Cranial height (occipital)
1	Cranial shape (occipital)
1	Interorbital breadth (frontal)
6	*Sella nasi* shape (half basilar, quarter basilar, lateral left/right, half lateral left/right)
4	*Processus frontales maxillae* orientation (frontal, frontal and half vertical, half lateral and quarter vertical left/right)
3	*Margo infranasalis* (frontal, half lateral and quarter vertical left/right)
1	*Apertura piriformis* (frontal)
2	Prognathism (lateral left/right)
2	Mental angle (lateral left/right)
2	Symphyseal height (frontal, occipital)
1	*Mandibula* (basilar)
2	Mandibular ramus angle (lateral left/right)
4	Ramus inversion (occipital left/right, quarter basilar and quarter lateral left/right)
3	*Dentes superiores* (left/right half arch occlusal, whole arch occlusal)
3	*Dentes inferiores* (left/right half arch occlusal, whole arch occlusal)
44	**Total**
(a)	

2	*Planum nuchale* (half basilar, lateral)
2	*Processus mastoideus* (left/right)
3	*Arcus superciliaris* (frontal, lateral, half basilar)
3	*Mentum osseum* (frontal, half lateral and half vertical, basilar)
2	*Corpus mandibulae* (M2) (basilar left/right)
2	*Angulus mandibulae* (left/right)
2	Ulnar shaft bowing (left/right)
2	*Margo interosseus* size (*Ulna*) (left/right)
2	Femoral shaft bowing (left/right)
2	Pilaster (left/right)
2	*M. sternocleidomastoideus* (*Cranium*) (left/right)
2	*M. pectoralis major* (*Humerus*) (left/right)
2	*M. deltoideus* (*Humerus*) (left/right)
2	*M. brachialis* (*Ulna*) (left/right)
2	*Membrana interossea* (*Ulna*) (left/right)
2	*Musculus gluteus maximus* (*Femur*) (left/right)
2	*Linea aspera* (*Femur*) (left/right)
2	*Musculus soleus* (*Tibia*) (left/right)
38	**Total**
(b)	

Figure 44: List of comparative photographs of cranial and dental non-metric traits (a) and additional list of comparative photographs of stress and robusticity traits (b).

III.B.1.b.2.b. Robusticity, occupational stress and health

III.B.1.b.2.b.1. Cranial robusticity traits

This section of the full data collection list comprised a selection of traits which have been found equally useful in estimating sex and describing cranial robusticity (e.g. Acsádi/Nemeskéri 1970; Anderson 1968: 1011, 1014, 1016; Buikstra/Ubelaker 1994; Clark 1989: 395; Coppa/Macchiarelli 1983: 124; Coppens/Chamla 1978: 176; Derry 1949: 32-33; Ferembach *et al*. 1979; Greene/Armelagos 1972: 11, 20-24, 27-28, 33; Herrmann *et al*. 1990: 77-81; Lahr 1996: 343-351; Lahr/Arensburg 1995: 89; Lahr/Wright 1996; Novotný *et al*. 1993: 82; Petit-Maire/Dutour 1987: 261, 263, 267, 269, 272, 277; Sjøvold 1988: 449-451; Walker 2008: 41; White 2000: 364-365; Williams/Rogers 2006: 731). All twelve cranial robusticity traits were graded using the same scale. The scale was a modified version of Acsádi/Nemeskéri's (1970) classification scheme (see Figure 41). The illustrations and descriptions of the expressions of the chosen traits in various publications could be utilised as external points of reference (e.g. Acsádi/Nemeskéri 1970; Buikstra/Ubelaker 1994; Ferembach *et al*. 1979, 1980; Herrmann *et al*. 1990: 77-81; Lahr 1996: 344-351; Novotný *et al*. 1993: 82; Sjøvold 1988: 449-451; Walker 2008: 41; White 2000: 364-365; Williams/Rogers 2006: 731).

III.B.1.b.2.b.2. Postcranial robusticity traits

The postcranial robusticity variables were chosen because some of the Wadi Howar individuals displayed remarkable expressions of these traits. With the exception of "PR001/2 - Humeral shaft bowing", all traits in this section of the data collection list have received varying degrees of attention in previous studies. Whereas not all of these traits have been unanimously considered robusticity markers as such, they have all been remarked upon in connection with samples characterised by elevated levels of postcranial robusticity (e.g. Aiello/Dean 1990: 364, 466; Anderson 1968: 1024; Birkby *et al*. 2008: 31; Boulle 2001; Bräuer 1983: 54, 62; Bruns *et al*. 2002; Dalou 2007; Galtés *et al*. 2009; Georgeon *et al*. 1993: 38; Greene/Armelagos 1972: 38, 42-43; Henke/Rothe 1994: 489, 496; Holt 2003; İşcan *et al*. 2000: 229; Kennedy 1989: 149-150; Krogman/İşcan 1986: 293, 297; Martin 1928; Shackelford/Trinkaus 2002; Wang *et al*. 2008: 48; Weaver 2003; Wilczak/Kennedy 1998: 481). The scoring techniques were specially developed for the traits in this part of the data collection list (see Appendix VI.A.1. for scoring protocols, scales, descriptions and illustrations).

III.B.1.b.2.b.3. Musculoskeletal stress traits

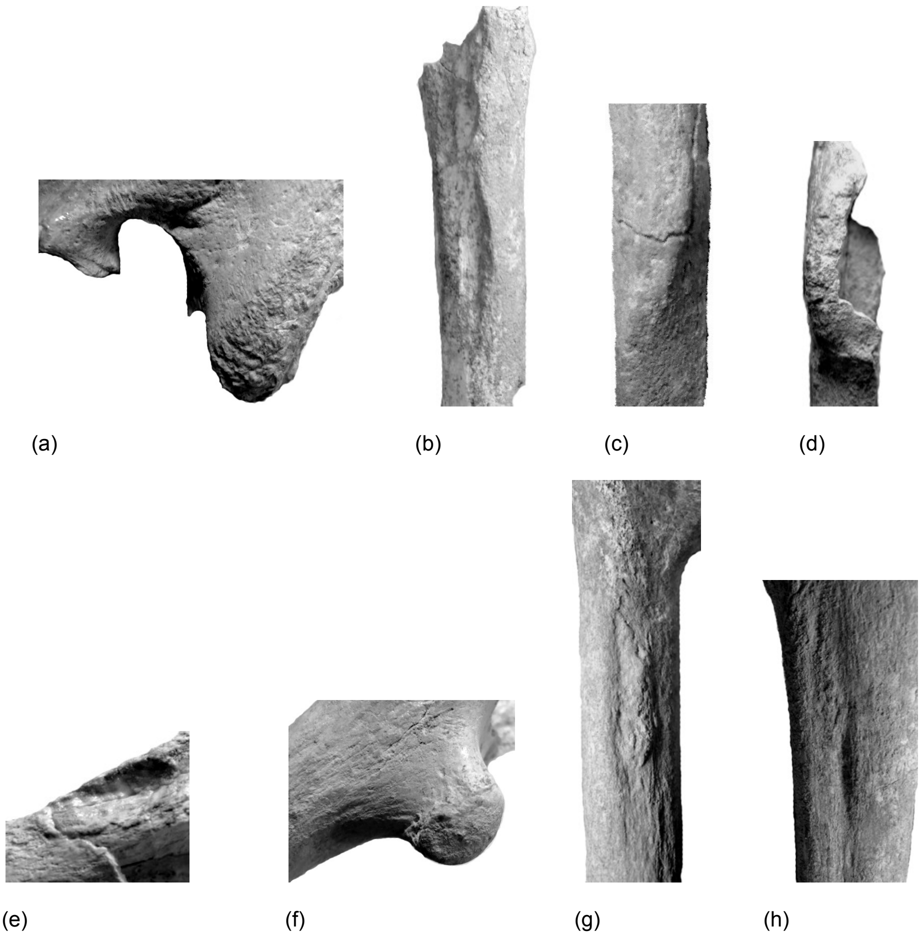
Analyses of muscle attachment sites enabled numerous researchers to reconstruct and compare activity patterns. The resulting publications include both individual analyses and systematic studies of skeletal series. There have been attempts to quantify the size and complexity of the surfaces of entheses with the help of modern imaging techniques. Nevertheless, the vast majority of researchers did and continue to rely on osteoscopic methods. Most larger-scale studies opted for the Hawkey/Merbs (1995) system or modified versions of it (e.g. Arrighetti *et al*. 2002; Churchill/Morris 1998; Dutour 1986; Eshed *et al*. 2004(a); Foster 2009; Galtés *et al*. 2009; Hawkey 1998; Hawkey/Merbs 1995; Kennedy 1983, 1989; Lai/Lovell 1992; Lieverse *et al*. 2009; Lovell/Dublenko 1999; Molnar 2006; Munson Chapman 1997; Oumaoui *et al*. 2004; Peterson 1998; Robb 1998; Steen/Lane 1998; Stirland 1998; Weiss 2003, 2004, 2005, 2007; Zumwalt 2005, 2006).

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 45: Musculoskeletal stress marker scale.

The approach adopted for this study was also inspired by the Hawkey/Merbs (1995) system. It was, however, much simpler. The observed expressions of each attachment site were seriated separately.

This was done directly and photographically. The score assigned to a particular expression of a specific attachment site reflected its place within the series of all expressions observed at that site. Enthesis size, prominence/depth and rugosity were chosen as the seriation criteria. Although the same ordinal scale was used to code all expressions, grades were variable-specific. Scores assigned to expressions of different attachment sites were therefore not directly comparable. Illustrations and descriptions provided by various authors served as external standards with which the scales of all but one postcranial variable could be calibrated (e.g. Churchill/Morris 1998: 399-400; Galtés *et al*. 2009: 288-289; Hawkey 1998: 329-331; Hawkey/Merbs 1995: 327-328; Lieverse *et al*. 2009: 469; Lovell/Dublenko 1999: 252; Molnar 2006: 15; Oumaoui *et al*. 2004: 347-350; Peterson 1998: 382; Robb 1998: 365; Stirland 1998: 356). Like “PS011/12 - *Femur*; *Musculus gluteus maximus* (*Insertio*)”, the variables dedicated to cranial muscle markings were almost entirely internally calibrated. Nonetheless, even for these scales, the published examples could be partly used as points of reference. In closing, it needs to be pointed out that all applied techniques did neither require exact definitions of grades nor distinctions between enthesis types. Furthermore, it has to be stressed that an optimal representation of the limited range of the expressions in the Wadi Howar sample could only be achieved through the use of such relative and individually adapted scoring procedures.



(a) (b) (c) (d) (e) (f) (g) (h)

Figure 46: Musculoskeletal stress traits. “CS004/5 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*)” score 9 (a), “PS001/2 - *Humerus*; *Musculus pectoralis major* (*Insertio*)” score 8 (b), “PS003/4 - *Humerus*; *Musculus deltoideus* (*Insertio*)” score 9 (c), “PS005/6 - *Radius*; *Musculus biceps brachii* (*Insertio*)” score 7 (d), “PS007/8 - *Ulna; Musculus brachialis* (*Insertio*)” score 9 (e), “PS009/10 - *Femur*; *Musculus iliopsoas* (*Insertio*)” score 9 (f), “PS011/12 - *Femur*; *Musculus gluteus maximus* (*Insertio*)” score 9 (g) and “PS015/16 - *Tibia*; *Musculus soleus* (*Origo*)” score 8 (h).

III.B.1.b.2.b.4. Tooth loss

Tooth loss is routinely documented on recording forms (e.g. Brues 1990: 4; Buikstra/Ubelaker 1994: 47-49; Herrmann *et al*. 1990: 421; Schultz 1988: 491-492). The coding system adopted for this variable integrated elements of different commonly used recording forms (see Figure 47). Presence, partial presence, likely type of loss and condition of socket(s) (*Alveolus dentalis/Alveoli dentales*) were recorded with combined scores. The combined score 34 denoted "not present", which could also mean "congenitally absent". A 4 could be assigned to a closed socket (*Alveolus dentalis*) and a socket which was not preserved. The main combined score 50 was only used for sub-adult individuals. It referred to teeth which could not be assessed because they had not yet erupted. Additional single-figure scores only coded presence and likely type of loss.

Combined score (main)	**Description**
10	present
20	lost *post mortem*
30	not present (*ante* or *post mortem* loss)
40	lost *intra vitam*
50	not observable (not yet developed)

Combined score (additional)	**Description**
1	remnants of root(s) present
2	no remnants of root(s) present
3	remnants of *Alveolus*/*Alveoli* without root(s) present
4	no remnants of *Alveolus*/*Alveoli* present
5	isolated

(a)

Additional score (presence)	**Description**
1	present
2	lost *post mortem*
3	not present (*ante* or *post mortem* loss)
4	lost *intra vitam*
5	not assessable (not yet developed)

(b)

Figure 47: Tooth loss coding system. Combined double-figure scores (a) and additional singe-figure scores (b).

Ante mortem tooth loss can have several causes and its specific reasons can often be identified in individual osteological analyses. Moreover, *ante mortem* tooth loss has frequently been included in sets of traits considered indicators of oral and overall health. Studies examining *ante mortem* tooth loss as part of such a set of traits or on its own have sought to reveal diachronic changes, social inequalities and different dietary practices. Traumatic *ante mortem* tooth loss, especially in the context of ritual extraction, tribal sports and interpersonal violence, has also been examined by numerous researchers (for aetiology and individual case studies see for example: Czarnetzki *et al*. 1985: 83-85; Herrmann *et al*. 1990: 155-156; Hildebrandt 1998: 576, 1204; Langsjoen 1998: 401-402; Orschiedt 1996: 112-113; Tyson/Dyer Alcauskas 1980: 8-9, 28-29, 50-51, 66-67, 76-77, 104-105, 120-121; for *ante mortem* tooth loss as a health indicator see for example: Beckett/Lovell 1994; Belcastro *et al*.

2007; Bernal *et al*. 2007; Cucina *et al*. 1999; Cucina/Tiesler 2003; Keenleyside 2008; L'Abbé *et al*. 2008(b); Larsen 1995: 187-189; Lieverse *et al*. 2007(a); Littleton/Fröhlich 1993; Manji *et al*. 1988; Manzi *et al*. 1999; Nelson *et al*. 1999; Pechenkina *et al*. 2002; Poitrat-Targowla 1977; Polo-Cerdá *et al*. 2007; Prowse *et al*. 2008; Ruffer 1920; Sanya *et al*. 2004; Sciulli 1997; Ubelaker/Pap 1998, 2009; Watson 2008; for traumatic *ante mortem* tooth loss see for example: Clark 1989: 395; Coppa/Macchiarelli 1983: 119, 122; Cote *et al*. 2004: 739; Crognier 1973: 13; Derry 1914: 105-106, 1949: 32; Eshed *et al*. 2006: 156; Ferembach *et al.* 1962: 60; Finucane *et al*. 2008(a): 632-633; Georgeon *et al*. 1993: 38; Hadjouis 2002: 352-356, 365-366; Hassanali/Amwayi 1993; Humphrey/Bocaege 2008; Humphreys 1954: 313-314; Jones 1992; L'Abbé *et al*. 2008(b); Lubell 2001: 132; Lukacs 2007; Manji *et al*. 1988; Morris 1998; Pindborg 1969; Poitrat-Targowla 1977; Reichart *et al*. 2007; Santoni *et al*. 2006; Sanya *et al*. 2004; Seligman/Seligman 1932: 296-304; Simon *et al*. 2002: 269-271; Tayles 1996(b); Turner 1979: 620-621).

III.B.1.b.2.b.5. Dental abrasion

Brothwell's (1963(a), 1981) system was employed to grade the abrasion of molars (*Dentes molares*). The assessment was carried out following Brothwell's (1963(a), 1981) instructions. His method was only modified by recoding his scores. Since Smith's (1984: 44-46) method was devised for the whole dentition, the remaining teeth were graded using her system. Smith's (1984) codes were, however, translated into Brothwell's (1963(a), 1981) equivalents by synchronising both systems' molar scores. This procedure made it possible to use the same scale for all teeth. The decision in favour of Brothwell's (1963(a), 1981) scores was mainly taken because his system offered a slightly higher resolution. As a consequence of the synchronisation of the two scales, certain scores of Smith's (1984) system had to be divided. Which one of Brothwell's (1963(a), 1981) equivalent codes was assigned in a case affected by such a split depended on how advanced the wear was. Like the scores of most other non-metric variables, wear was assessed directly in the laboratory and, later, reassessed photographically (e.g. Hillson 1996: 305-306; Jacobshagen *et al*. 1988).

Score	**Description (Brothwell system score)**	**Brothwell system score**	**Smith system score**
10	1	1	1
20	2	2/2+	2
25	2+	3-	3
28	3-	3/3+	4
30	3	4	5
35	3+	4+/5	6
40	4	5+	7
45	4+	5++	8
50	5		
55	5+		
58	5++		
60	6		
70	7		
(a)		(b)	

Figure 48: Dental abrasion scale. Recoded Brothwell scores (a) and synchronisation of Brothwell and Smith scores (b).

Macroscopic analyses of dental wear can have a number of objectives. The studies which did not attempt to develop methods to estimate age at death usually tried to draw conclusions about food preparation techniques, types of food consumed, paramasticatory tooth use and subsistence strategies. Recording the degree and type of abrasion is often a routine part of processing skeletons as well. Different systems to score abrasion are in use in either context (for studies aiming to answer specific research questions see for example: Alt/Pichler 1998: 395-399; Beckett/Lovell 1994; Belcastro *et al*. 2007; Bernal *et al*. 2007; Clarke/Hirsch 1991; Deter 2009; Eshed *et al*. 2006; Hillson 1996: 231-242; Hinton 1981; Houghton 1978, 1996; Kaifu 1999; Kennedy 1989: 152, 2000: 214; Kieser *et al*. 2001(a); Langsjoen 1998: 398-399; Larsen 2002: 131-133; Leek 1972, 1984; Lev-Tov Chattah/Smith 2006; Littleton/Fröhlich 1993; Lozano *et al*. 2008; Mays 2002; Minozzi *et al*. 2003; Molleson 1994; Molleson/Jones 1991; Molnar 1971; Molnar 2008; Oliveira *et al*. 2006; Polo-Cerdá *et al*. 2007; Prowse *et al*. 2008: 300; Ruffer 1920; Schulz 1977; Sciulli 1997; Smith 1984; Spencer/Ungar 2000; Walker *et al*. 1991: 176; Watson 2008; White 2000: 346; for recording abrasion as a routine part of processing skeletons see for example: Anderson 1968: 1021-1022, 1035; Brothwell/Shaw 1971: 224; Brues 1990: 4; Buikstra/Ubelaker 1994: 49-53; Clark 1989: 395; Coppa/Macchiarelli 1983: 125; Greene *et al*. 1967: 47-52; Greene/Armelagos 1972: 52; Henke *et al*. 2002: 298-301; Hillson 1996: 231-242; Judd 2008(a): 98-99, 103-104; Schultz 1988: 494; for different scoring systems see for example: Brothwell 1963(a), 1981; Herrmann *et al*. 1990: 67; Molnar 1971; Scott 1979; Smith 1984: 45-46; Szilvássy 1988: 423).

III.B.1.b.2.b.6. Enamel hypoplasia

Hypoplastic lesions of the dental enamel (*Enamelum*) are generally regarded as indicators of physiological stress. It is therefore not surprising that their evaluation has featured prominently in a large number of studies. Enamel hypoplasia has, for example, been extensively used to investigate diachronic and inter-group differences in overall physiological stress. Lesion frequencies and formation ages are the variables which have been most frequently analysed in such studies. The majority of researchers collected the necessary data from front teeth, especially canines (*Dentes canini*). There are several different scoring systems and the assessment of hypoplastic enamel lesions is an integral part of various standardised recording forms. Most scoring systems rely on the macroscopic examination of teeth. Nonetheless, certain approaches do require comparatively expensive equipment (for general research on enamel hypoplasia see for example: Berten 1895; Berti/Mahaney 1995; Brothwell 1963(b); Goodman/Armelagos 1985; Goodman *et al*. 1991; Guatelli-Steinberg/Benderlioglu 2006; Herrmann *et al*. 1990: 151; Hillson 1979, 1996: 165-177; King *et al*. 2005; Langsjoen 1998: 405-407; Lukacs *et al*. 2001; May *et al*. 1993; Mellanby 1929; Schultz *et al*. 1998; Steyn/İşcan 2000: 226; Witzel *et al*. 2008; Zhou/Corruccini 1998; Zsigmondy 1893, 1913; for use of enamel hypoplasia as an indicator of physiological stress see for example: Belcastro *et al*. 2007; Blakey *et al*. 1990; Brothwell 1963(b): 273-280; Buzon 2006(b); Buzon/Judd 2008; Cunha *et al*. 2004; Facchini *et al*. 2004; Griffin/Donlon 2007; Hillson 1979; Hoover *et al*. 2005; Hoover/Matsumura 2008; Hubbard *et al*. 2009; Judd 2008(a): 98-100, 103; King *et al*. 2005; Klaus/Tam 2009; L'Abbé *et al*. 2008(b); Larsen 1995: 193-194, 2002: 126-127; Lewis 2002; Lewis/Roberts 1997; Littleton 2005; Lovell/Whyte 1999; Manzi *et al*. 1999; Mosothwane/Steyn 2009; Obertová 2005; Obertová/Thurzo 2008; Pechenkina/Delgado 2006; Pechenkina *et al*. 2002; Rose *et al*. 1993: 65; Saunders/Keenleyside 1999; Starling/Stock 2007; Temple 2007, 2008; Ubelaker/Pap 1998, 2009; Zhou/Corruccini 1998; for quantification of lesions see for example: Belcastro *et al*. 2007: 383; Berbesque/Doran 2008; Ensor/Irish 1995; Hubbard *et al*.

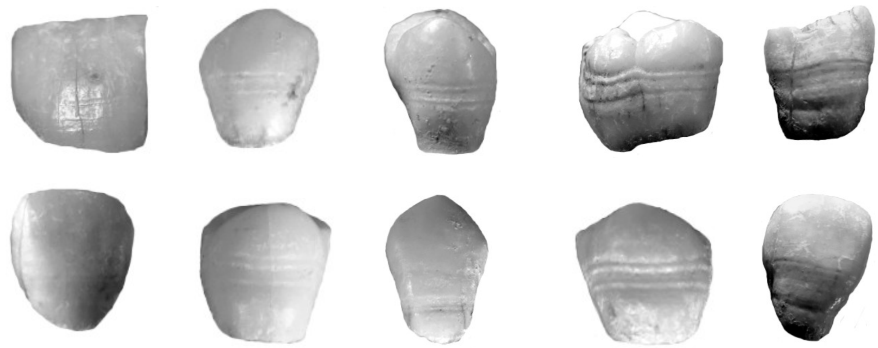
2009; King *et al*. 2005; Lovell/Whyte 1999: 72-73; Papathanasiou *et al*. 2000: 220; for estimation of formation ages and duration see for example: Blakey *et al*. 1990; Cunha *et al*. 2004: 223-225; Goodman/Rose 1990; Hillson 1979: 159-161, 1992; Hillson/Bond 1997; Hubbard *et al*. 2009; King *et al*. 2005; Littleton 2005: 299; Lovell/Whyte 1999: 79; Martin *et al*. 2008; Reid/Dean 2000; Ritzman *et al*. 2008; for selection of tooth types see for example: Berbesque/Doran 2008: 351-352; Berti/Mahaney 1995; Goodman/Armelagos 1985; Goodman/Rose 1990; Keita/Boyce 2001; King *et al*. 2005; Starling/Stock 2007: 522; for scoring and standardised recording systems see for example: Berbesque/Doran 2008; Buikstra/Ubelaker 1994: 56-58; Clarkson 1989; Cunha *et al*. 2004: 222-223; FDI 1982; Griffin/Donlon 2007; Hillson 1996: 172, 174-175, 2000; Hoover *et al*. 2005: 756; Schultz 1988: 494-495; Schultz *et al*. 1998; for methods requiring special equipment see for example: Berbesque/Doran 2008; Griffin/Donlon 2007; Hillson 1992; Hillson/Bond 1997; Hubbard *et al*. 2009; King *et al*. 2005; Witzel *et al*. 2008).

Score (intensity)	**Description**
10	absent (0)
20	very faint (I)
30	faint (II)
40	moderate (III)
50	pronounced (IV)
60	very pronounced (V)
Score (frequency/ type)	**Description**
0	absent
1	single horizontal
2	multiple horizontal
3	pitted

Figure 49: Enamel hypoplasia scale.

The method adopted for this study was a modified version of Schultz's (1988: 494-495) system. Firstly, since only weak forms of the scale's strongest expression were observed, his scale had to be slightly altered. Secondly, the designations of Schultz's categories were changed. Thirdly, sub-scores were introduced. These sub-scores recorded whether the defects were linear or pitted and distinguished between single and multiple horizontal grooves. The approach thus integrated elements of the FDI (1982) system into Schultz's (1988) classification scheme. Schultz's illustrations (1988: 494) were chosen as the primary basis of the evaluation because they offered a simple way to classify lesion severity. Since it increased the resolution of the assessment considerably, grading lesion severity was also considered superior to merely scoring lesion absence/presence. Furthermore, the severity of the lesions could often still be comparatively reliably scored, even if only tooth fragments were present.

Assigning the scores was a three step process. First, each tooth was inspected with the naked eye and a magnifying glass. Each tooth's initial score was assigned after this direct macroscopic examination. Then, each tooth was photographed with the aim of producing a representative image of its state (e.g. Berbesque/Doran 2008; Hillson 1996: 305-306; Jacobshagen *et al*. 1988). Finally, the photographs were compared with each other in order to check and, if necessary, adjust scores.



(a) (b) (c) (d) (e)

Figure 50: Enamel hypoplasia. Score 22 (a), score 32 (b), score 42 (c), score 52 (d) and score 62 (e).

III.B.1.b.2.b.7. Dental caries

Dental caries is a very common dental pathology of great antiquity. It regularly plays a prominent role in the pathology chapters of reports of osteological analyses and most standardised osteological recording forms contain caries sections. Systematic studies of dental caries have been able to shed light on the oral health and dietary habits of many past populations. Often, they have made significant contributions to the reconstruction of these populations' food preparation techniques and subsistence strategies as well. Additionally, many inter-sample comparisons of this nature have drawn attention to a number of recurring patterns of biocultural differences (for general publications see for example: Brothwell 1963(b): 273-280; Caselitz 1998; Czarnetzki *et al*. 1985: 14-15; Herrmann *et al*. 1990: 153-155; Hillson 1996: 269-284; Langsjoen 1998: 402-404; Lingström/Borrman 1999; Orschiedt 1996: 111-112; Powell 1985; Schmid *et al*. 1988; Schultz 1988: 494; for osteological analyses see for example: Anderson 1968: 1023; Clark 1989: 395; Derry 1914: 105; Greene *et al*. 1967: 52-53; Greene/Armelagos 1972: 51-52; Judd 2008(a): 98-100, 103; Poitrat-Targowla 1977; for scoring and standardised recording systems see for example: Brues 1990: 4; Buikstra/Ubelaker 1994: 54-55; Erdal/Duyar 1999; Hillson 1996: 279-281; Lukacs 1995; Pechenkina/Delgado 2006: 222; Prowse *et al*. 2008: 300; Schultz 1988: 492, 494; for systematic studies see for example: Beckett/Lovell 1994; Belcastro *et al*. 2007; Bernal *et al*. 2007; Brothwell 1963(b): 275; Cucina *et al*. 1999; Cucina/Tiesler 2003; Eggers *et al*. 2008; Hillson 1979; Keenleyside 2008; L'Abbé *et al*. 2008(b); Larsen 1995: 187-189, 2002: 123; Lieverse *et al*. 2007(a); Littleton/Fröhlich 1993; Manji *et al*. 1988; Manzi *et al*. 1999; Nelson *et al*. 1999; Papathanasiou *et al*. 2000; Pechenkina *et al*. 2002; Pechenkina/Delgado 2006; Polo-Cerdá *et al*. 2007; Prowse *et al*. 2008; Rose *et al*. 1993: 61-62; Ruffer 1920; Sanya *et al*. 2004; Sciulli 1997; Temple 2007; Temple/Larsen 2007; Turner 1979; Watson 2008; Zilhão 1998: 694).

Score (presence/ size)	**Description**	**Score (location)**	**Description**
10	no lesion	1	occlusal
20	needle point	2	mesial
30	poppy seed	3	distal
40	sesame seed	4	lingual
50	peppercorn	5	vestibular
60	rice grain		
70	half the crown		
80	whole crown		

Figure 51: Dental caries coding system.

Dental caries was recorded using combined scores. Lesion presence/size and location were coded. The presence/size score was also given as an additional separate single-figure score. The scoring system was loosely based on the protocol described by Schultz (1988: 492, 494). All teeth were examined with the naked eye, with a magnifying glass and photographically. Each lesion of a tooth with multiple lesions was reported.

III.B.1.b.2.b.8. Cribra orbitalia

Cribra orbitalia is commonly associated with anaemic conditions caused by various diseases, malnutrition and parasites. As a result, it is often used as an indicator of physiological stress in both individual and large-scale analyses (for general publications, aetiology and differential diagnosis see for example: Aufderheide/Rodríguez-Martín 1998: 348-351; Czarnetzki *et al*. 1985: 83-90; Facchini *et al*. 2004; Herrmann *et al*. 1990: 168-169; Hershkovitz *et al*. 1997; Lagia *et al*. 2007; Larsen 1995: 199; Schultz 2001: 131; Steinbock 1976: 239-248; Trellisó Carreño 1996: 94-95; Tayles 1996(a); Wander *et al*. 2009; Wapler *et al*. 2004; for *Cribra orbitalia* as a health indicator see for example: Belcastro *et al*. 2007; Blau 2001; Blom *et al*. 2005; Bräuer *et al*. 2003; Buzon 2006(b); Buzon/Judd 2008; Djuric *et al*. 2008; Fairgrieve/Molto 2000; Holt/Formicola 2008; Judd 2008(a): 100, 103; Keenleyside/Panayotova 2006; L'Abbé/Steyn 2007; Larsen 2002: 126-128; Lewis 2002; Lewis/Roberts 1997; Lovell 1997(a); Mosothwane/Steyn 2009; Obertová/Thurzo 2008; Ortner/Frohlich 2007; Paine *et al*. 2007; Papathanasiou *et al*. 2000; Pechenkina *et al*. 2002; Pechenkina/Delgado 2006; Schultz *et al*. 2007; Šlaus 2008; Ubelaker/Pap 2009).

Score	Description
1	absent
2	faint
3	moderate
4	pronounced

Figure 52: *Cribra orbitalia* scale.

The presence and severity of lesions was visually assessed and scored according to a simplified scale. The grades of the Stuart-Macadam (1991) scale as well as related illustrations and descriptions served as external points of reference in this context (e.g. Belcastro *et al*. 2007: 383; Buikstra/Ubelaker 1994: 151; Keenleyside/Panayotova 2006: 375-378; Stuart-Macadam 1991).

III.B.1.b.2.c. Geographic variation

III.B.1.b.2.c.1. Cranial morphological traits

The majority of the traits in this section were put on the data collection list because of the importance variously attached to them in publications on the estimation of biological ancestry. They were primarily selected from the group of traits generally considered useful in distinguishing between biologically European and biologically sub-Saharan ancestry. Distinctive frequencies of the different expressions of the remaining traits have been observed in various Sudanese, Saharan and East African populations (for estimation of biological ancestry see for example: Angel/Kelley 1990; Bass 1987: 83-88; Birkby *et al*. 2008; Brues 1990; Bruner/Manzi 2004; Byers 2002: 151-168; Carey/Steegmann 1981; Chunn 2008; Derry 1949: 32; Franciscus/Long 1991; Gill 1998; Gill/Gilbert 1990; Hauschild 1937; Heberer *et al*. 1959: 338-339; Hefner 2003, 2007, 2009; İşcan *et al*. 2000; Keita 2004; Knußmann 1996: 409-410; Limson 1932; Martin 1928; Novotný *et al.* 1993: 77-78; Ousley *et al*. 2009: 71; Rhine 1990; Rooyen 2010; Roseman 2004; Roseman/Weaver 2004; Schultz 1926; Schwidetzky 1982: 354; Strouhal 1975: 34-35, 1984: 297; Walker 2008: 48; Weinberg *et al*. 2005; Wheat 2009; White 2000: 375-376; Winkler/Wilfing 1991: 19; for distinctive characteristics of relevant African groups see for example: Anderson 1968: 1004, 1011-1012, 1015-1016; Angel/Kelley 1986: 56; Brace *et al*. 1993; Bräuer 1983: 35-38, 119; Bruner *et al*. 2002; Buzon 2006(a); Chamla 1967: 104-105, 1968; Charpin 1961; Clark 1989: 395; Coppa/Macchiarelli 1983; Coppens/Chamla 1978: 176; De Villiers 1968; Derry 1914: 102-105, 1949: 32-33; Dutour 1989; Dzierżykray-Rogalski 1977; Froment/Hiernaux 1984; Georgeon *et al*. 1993; Greene/Armelagos 1972: 11-12, 14, 22-25, 27-29; Hájek *et al*. 2008; Harvey 1976: 38; Henke *et al*. 2002; Henneberg *et al*. 1980; Herrmann/Gabriel 1972; Irish 2001; Keita 1990, 1993; Oettlé *et al*. 2009; Paris 1990: 72; Pinhasi/Semal 2000; Promińska 1989: 418-419; Reuer/Winkler 1980; Ricci *et al*. 2002; Rightmire 1984: 194-195, 198-199; Schild *et al*. 2002: 123; Seligman/Seligman 1932: 20-21, 370-371; Sereno *et al*. 2008: 4, 9-10, 12, 13-14, 16; Simon *et al*. 2002; Strouhal 1975, 1984: 297).

The scales and scoring procedures were as varied as the traits in this section of the data collection list. The diverse assortment of traits made it impossible to adopt a uniform approach in this regard (see Appendix VI.B.1. for scoring protocols, scales, descriptions and illustrations).

III.B.1.b.2.c.2. Cranial epigenetic traits

Except for "CE054 - *Foramina paranasalia*", the cranial epigenetic traits were selected from the pertinent literature (e.g. Bentley 1991; Berry/Berry 1967; Brothwell 1981: 90-97; Buikstra/Ubelaker 1994: 84-95; Carson 2006; Česnys/Pavilonis 1982; Czarnetzki 1971; Finnegan/McGuire 1979; Gaherty 1971; Hanihara *et al*. 2003; Hauser/De Stefano 1989; Herrmann *et al*. 1990: 109-115; Jidoi *et al*. 2000; Prowse/Lovell 1995, 1996; Rightmire 1972; Rösing 1982; Rubini 1996; Tyrrell 2000). All but nine of these anatomical variants were scored as either "present" (2) or "not present" (1) (see Appendix VI.B.2. for scoring protocols, scales and descriptions of the remaining traits). Traits whose expressions could not be assessed, for example because they had not been preserved or were damaged, were not scored.

III.B.1.b.2.c.3. Dental epigenetic traits

The entries in the dental epigenetic traits section of the full data collection list consisted of well-known and widely used traits (e.g. Alt/Türp 1998; Coppa *et al*. 2007; Cucina *et al*. 1999; Hanihara 2008; Higa *et al*. 2003; Hillson 1996: 85-103; Irish 1997, 2005; Kitagawa 2000; Lease/Sciulli 2005; Turner *et al*. 1991; Ullinger *et al*. 2005). Virtually all traits were scored following the instructions for the use of the Arizona State University Dental Anthropology System (ASUDAS) (Turner *et al*. 1991) (see Appendix VI.B.3. for scoring protocols, scales and descriptions of the remaining ten traits).

III.B.1.b.2.c.4. Postcranial epigenetic traits

The list of postcranial epigenetic traits was primarily compiled for documentation purposes. Only a few of these traits have also been described as habitual stress markers, pathologies or features relevant to the estimation of sex and ancestry. One trait in this section of the full data collection list, "PE021/21a/b/22/22a/b - *Foramen intertrochleare*", was not part of the corpus of classic postcranial epigenetic traits (for traits commonly included in catalogues of postcranial *Discreta* see for example: Brothwell 1981: 97-99; Buikstra/Ubelaker 1994: 85-94; Donlon 2000; Finnegan 1978; Finnegan/McGuire 1979; Judd 2008(a): 88, 91, 94, 95; Herrmann *et al*. 1990: 112-113; Mysorekar 1967; Shulman 1959; Tyrrell 2000; for traits also used in different contexts see for example: Aufderheide/Rodríguez-Martín 1998; Bass 1987: 148, 151; Bidmos 2006; Birkby *et al*. 2008: 31; Cox 2000: 132-133; Dlamini/Morris 2005; Herrmann *et al*. 1990: 111-114; Houghton 1974: 387-389; Krogman/İşcan 1986: 247-254, 256, 259; Martin 1928; Mays 2008; Miles 1996, 1999(b)). The majority of the traits were scored as "present" (2) or "not present" (1) (see Appendix VI.B.4. for scoring protocols, scales and descriptions of the remaining ten traits). Traits which could not be evaluated did not receive scores.

III.B.2. Data analysis

The data analyses intentionally relied on the simplest and most widely used valid statistical methods (see I.B.2.). The aim was to make the analyses as efficient, transparent, reproducible and falsifiable as possible.

The Wadi Howar series was described by summarising both the results of the individual osteological analyses and the additionally collected data with the help of descriptive statistics (see III.B.2.a.). Appropriate combinations of descriptive statistics were provided for each variable. These descriptive statistics comprised the number of values, the minimum and maximum value, the mode, the median, the mean, the standard deviation and the frequencies of values. This information was presented for each sex and the entire sample.

Intra-observer error was quantified and tested for significance (see III.B.2.b.). A sub-set of the Wadi Howar sample was reprocessed. The differences between the original and control values were calculated. The number of value pairs, minimum and maximum differences between the values of a pair, the mean difference and the number of differences were reported. Mann-Whitney U, Wilcoxon, t-, paired t-, χ^2 and McNemar's tests were used to identify statistically significant deviations. All procedures were applied variable by variable, individual by individual and data sub-set by data sub-set.

The Wadi Howar material was separated into pre-Leiterband and Leiterband individuals to detect diachronic differences (see III.B.2.c.). The selected variables were analysed separately. Whenever variables could be conflated, additional composite variables were created. Variable by variable, sets of descriptive statistics were calculated for the pre-Leiterband and Leiterband sub-sample. These sets contained different combinations of the number of values, the minimum and maximum value, the mode, the median, the mean, the standard deviation and the frequencies of values. The search for statistically significant differences between the two sub-samples was conducted with Mann-Whitney U and χ^2 tests.

To determine with which modern and prehistoric comparative samples the Wadi Howar individuals shared most affinities, each one was entered into multiple, individualised discriminant function analyses as an ungrouped case (see III.B.2.d.). The analyses were based on normally distributed cranial and dental metric data, normally distributed scaled cranial and dental metric data and dichotomised cranial and dental non-metric data. Sufficiently well-preserved individuals were subjected to six analyses, three with the prehistoric and three with the modern comparative samples. Only the variables for which values could be collected from a Wadi Howar skeleton were used in its analyses. Classification accuracies were increased by manually trying out different variable combinations and exhausting the recommended variables to cases ratios. χ^2 tests were performed to check for differences between the patterns in which individuals of different sub-samples were classified. The assignment frequencies of the pre-Leiterband, Leiterband and Handessi sub-sample were compared in this manner. Additionally, mean individuals were constructed for the three main sites, the three culturally defined sub-samples and the Wadi Howar sample as a whole. These mean individuals were then entered into multiple, individualised discriminant function analyses like a normal Wadi Howar skeleton. Furthermore, twelve discriminant function analyses were carried out into which the individuals from the three main sites and the three culturally defined sub-samples were entered as separate groups. Finally, six discriminant function analyses in which the Wadi Howar sample as a whole was defined as a group were performed.

III.B.2.a. Description of the sample

The results of the individual osteological analyses as well as the data gathered and generated on the basis of the full data collection list were summarised together (see III.B.1.a. and b.). Descriptive statistics were used to provide overviews of several osteological results and the additionally collected data. Variable by variable, suitable sets of descriptive statistics were presented for each sex and the sample as a whole (e.g. Knußmann 1988(d): 659-665; Madrigal 1998: 31-53; Zöfel 1992: 14-56). The number of values, the minimum and maximum value, the mode, the median, the mean and the standard deviation were reported for every cranial, dental and postcranial metric variable. Each morphological, epigenetic, musculoskeletal stress, robusticity, enamel hypoplasia, dental caries and *Cribra orbitalia* variable was summarised by providing the number of values, the minimum and maximum value, the mode, the median, the mean and the frequencies of values. Numbers of values, modes and frequencies of values were determined for the tooth loss variables. The description of the dental abrasion variables relied on numbers of values, minimum and maximum values, modes, medians and means. The number of values, the minimum and maximum value and the mean were used to characterise every age, weight, physique and index variable.

The left, right and mean or combined values of antimeric measurements and traits were processed as separate variables (see III.B.1.b.1. and 2.). The values of sub-adult individuals were usually removed before calculating descriptive statistics. Only when these individuals' age did not have a distorting effect were their values included. In cases in which it made sense, the descriptive statistics were computed twice, once with and once without sub-adult values. Unless a variable was dedicated to the quantification of a sub-pathological or pathological condition, values which were likely to mainly represent such changes were excluded as well. Except for frequencies, which were calculated by hand, all statistics were computed with *Microsoft Office Excel 2003* (Microsoft Corp.). No attempts were made to employ other methods to describe the series statistically (e.g. Bentley *et al*. 2001; Drenhaus 1988; Herrmann *et al.* 1990: 301-314, 329-334; Hoppa/Vaupel 2002; Kemkes-Grottenthaler/Henke 2001; Larsen 2002: 141-142; Nagaoka/Hirata 2007; Ortner/Frohlich 2007: 359, 364-365; Wood *et al*. 1992).

III.B.2.b. Intra-observer error

From the 16th to the 20th of February 2009, nine months after the last original measurements/scores were recorded, eight of the Wadi Howar individuals were re-measured and re-scored. Abu Tabari 02/1-2, -3, -5, -7, -8, 02/28-2, -3 and -5 were the eight skeletons in question. The control data were gathered using the shortened data collection list (see III.B.1.b.). Additionally, 36 postcranial measurements, six musculoskeletal stress markers, eleven robusticity traits and enamel hypoplasia intensity as well as presence were taken and scored again (see Figure 54). During the photograph-based part of their reassessment, the original photographs of the re-scored individuals were taken out of the comparative sets.

58	**Cranial measurements**		
	47	Single variables	
	3	Combined variables	
	8	Individuals	
43	**Dental measurements**		
	32	Single variables	
	3	Combined variables	
	8	Individuals	
58	**Postcranial measurements**		
	36	Single variables	
	6	Combined variables	
	16	Individuals	
48	**Cranial morphological traits**		
	19	Non-dichotomised	
		10	Single variables
		1	Combined variable
		8	Individuals
	29	Dichotomised	
		20	Single variables
		1	Combined variable
		8	Individuals
34	**Cranial epigenetic traits**		
	17	Non-dichotomised	
		8	Single variables
		1	Combined variable
		8	Individuals
	17	Dichotomised	
		8	Single variables
		1	Combined variable
		8	Individuals
84	**Dental epigenetic traits**		
	42	Non-dichotomised	
		30	Single variables
		1	Combined variable
		8	Individuals
		3	Discontinuous variables
	42	Dichotomised	
		33	Single variables
		1	Combined variable
		8	Individuals
38	**Cranial and postcranial robusticity traits**		
	10	Single variables	
	3	Combined variables	
	24	Individuals	
	1	Discontinuous variable	

15	**Cranial and postcranial musculoskeletal stress traits**		
	6	Single variables	
	1	Combined variable	
	8	Individuals	
50	**Enamel hypoplasia**		
	25	Intensity	
		16	Single variables
		1	Combined variable
		8	Individuals
	25	Presence	
		16	Single variables
		1	Combined variable
		8	Individuals
428	**Total**		

Figure 53: Overview of the intra-observer error variables.

After the re-examination of the eight skeletons, a matrix containing all absolute differences between the original and control values was constructed. Mean or overall values were used when measurements and traits had right and left values. Traits with scores which were dichotomised for the discriminant function analyses were processed in their binary states (see III.B.2.d.2.d.). Traits of this type which were originally scored on an ordinal scale were entered into the matrix in this form as well. The number of value pairs, the minimum and maximum difference between the values of pairs and the mean difference between value pairs were reported for each continuous and ordinal variable. The number of value pairs and the number of differences between value pairs were provided for every binary variable (e.g. Buikstra/Ubelaker 1994: 183-184; Cohen *et al*. 2003: 302-353; Irish 2008: 106; Kieser/Groeneveld 1988: 1200; Knußmann 1988(d): 659-663; Madrigal 1998: 31-40; Morris/Ribot 2006: 17).

Un-paired statistical tests were employed to identify significant differences between the original and the control values. Paired statistical tests were used to determine if the differences between value pairs differed significantly from zero. Continuous and ordinal variables were analysed with Mann-Whitney U and Wilcoxon tests (e.g. Knußmann 1988(d): 671-674; Madrigal 1998: 132-138, 144-147; Mann/Whitney 1947; Wilcoxon 1945; Zöfel 1992: 144-155). In addition, Student's and paired t-tests were performed whenever the values of metric variables were normally distributed (e.g. Irish 2008: 106; Kieser/Groeneveld 1988: 1200; Knußmann 1988(d): 668-671; Madrigal 1998: 96-109; Student 1908; Willems *et al*. 2002; Zabell 2008; Zöfel 1992: 109-116). To establish whether the values of a variable were normally distributed its skewness and kurtosis were computed. The results were compared with the standard error values of skewness and kurtosis. If a variable's absolute skewness and kurtosis value were lower than the standard error of skewness and kurtosis multiplied by two, the variable was considered to be normally distributed (e.g. Knußmann 1988(d): 663-666; Madrigal 1998: 31-53; Zöfel 1992: 14-56, 203-208). Binary and nominal variables were processed with Pearson's and Yates's χ^2 as well as McNemar's tests (e.g. Hoffman 1976; Knußmann 1988(d): 677-680; Madrigal 1998: 192-203; McNemar 1947; Pearson 1900, 1934; Plackett 1983; Yates 1934; Zöfel 1992: 181-202). Within the data sub-sets, the tests were carried out variable by variable and individual by individual. In cases in which it made sense to do so, single variables were fused to create additional, larger combined variables (see Figure 53 and 54).

PM015/16 - H1. *Humerus* - Maximum length (m)
PM019/20 - H5. Maximum diameter of the mid-shaft (m)
PM021/22 - H6. Minimum diameter of the mid-shaft (m)
PM025/26 - H7a. Mid-shaft circumference (m)
PM031 - Humeral cortical thickness (ant.)
PM032 - Humeral cortical thickness (post.)
PM033 - Humeral cortical thickness (med.)
PM034 - Humeral cortical thickness (lat.)
PM035 - Humeral cortical thickness (max.)
PM036 - Humeral cortical thickness (min.)
PM065/66 - U1. *Ulna* - Maximum length (m)
PM067/68 - U3. Least circumference (m)
PM071/72 - *U3c. Crest circumference (m)
PM073/74 - U11. Dorso-ventral shaft diameter (m)
PM075/76 - U12. Transverse shaft diameter (m)
PM077/78 - *U18. Longitudinal *Tub. ulnae* diameter (m)
PM079/80 - *U19. Transverse *Tub. ulnae* diameter (m)
PM093/94 - F6. Anterior-posterior mid-shaft diameter (m)
PM095/96 - F7. Medio-lateral mid-shaft diameter (m)
PM097/98 - F8. Mid-shaft circumference (m)
PM099/100 - F9. Subtrochanteric transverse diameter (m)
PM101/102 - F10. Subtrochanteric sagittal diameter (m)
PM103/104 - *F10(1). Subtrochanteric circumference (m)
PM117/118 - *F34. *Linea aspera* breadth (m)
PM121 - Fem. cort. thick. (ant.)
PM122 - Fem. cort. thick. (post.; *L. aspera*)
PM123 - Fem. cort. thick. (post.; med./lat. to *L. aspera*)
PM124 - Fem. cort. thick. (med.)
PM125 - Fem. cort. thick. (lat.)

PM126 - Fem. cort. thick. (max.)
PM127 - Fem. cort. thick. (min.)
PM130/131 - T1a. *Tibia* - Maximum length (m)
PM138/139 - T8. Sagittal mid-shaft diameter (m)
PM142/143 - T9. Transverse mid-shaft diameter (m)
PM146/147 - T10. Mid-shaft circumference (m)
PM150/151 - T10b. Minimum shaft circumference (m)

CR001 - Relief of the *Planum nuchale*
CR003 - *Processus mastoideus*
CR006 - *Arcus superciliaris*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)
PR007/8 - Ulnar shaft bowing (m)
PR009/10 - Ulnar *Margo interosseus* size (m)
PR011b/12b - Femoral shaft bowing (m) - degree
PR013/14 - Pilasterism (m)

CS004/5 - *M. sternocleidomastoideus* (*Insertio*) (m)
PS001/2 - *M. pectoralis major* (*Insertio*) (m)
PS003/4 - *M. deltoideus* (*Insertio*) (m)
PS007/8 - *M. brachialis* (*Insertio*) (m)
PS011/12 - *M. gluteus maximus* (*Insertio*) (m)
PS015/16 - *M. soleus* (*Origo*) (m)

DS001a/2a-31a/32a - Hypoplasia (m) - intensity
DS001b/2b-31b/32b - Hypoplasia (m) - presence

(a)

All cranial measurements
All neurocranial measurements
All viscerocranial measurements

All dental measurements
All crown lengths
All crown widths

All postcranial measurements
All postcranial measurements (without long bone lengths)
All long bone lengths
All postcranial measurements (without long bone lengths and cortical measurements)
All cortical thickness measurements
All circumferences

All cranial morphological scores
All dichotomised cranial morphological scores

All cranial epigenetic traits
All dichotomised cranial epigenetic scores

All dental epigenetic traits
All dichotomised dental epigenetic traits

All robusticity scores
All cranial robusticity scores
All postcranial robusticity scores

All musculoskeletal stress scores

Hypoplasia - intensity (all teeth)
Hypoplasia - presence (all teeth)

(b)

Figure 54: Additional single (a) and combined (b) intra-observer error variables.

χ^2 and McNemar's tests were performed by hand. Descriptive statistics were calculated with *Microsoft Office Excel 2003* (Microsoft Corp.). *SPSS 15.0.1* (SPSS Inc.) was used to compute all skewness and kurtosis values as well as all Mann-Whitney U, Wilcoxon, Student's t- and paired t-tests. No further steps were taken to determine intra-observer error. Since all data for the core analyses were collected by the author, inter-observer error did not need to be examined (see III.B.2.d.3. and for example: Buikstra/Ubelaker 1994: 183-184; Cohen 1960; Gapert *et al*. 2009: 386; Hillson *et al*. 2005: 423-424; Howitt/Cramer 2005; Kemkes-Grottenthaler *et al*. 2002: 103; Kinnear/Gray 2008; Knapp 1992; Mays 2002: 863; Ross/Williams 2008; Temple 2007: 1038-1039; Walker 2005: 388-389; Willems *et al*. 2002).

III.B.2.c. Diachronic differences

In order to be able to detect diachronic differences, the members of the Wadi Howar series were divided into two sub-samples according to their different cultural associations (see I.C.3.and 4.). The pre-Leiterband sub-sample comprised the eight older individuals from Abu Tabari 02/1 and Conical Hill 95/4. The 21 younger individuals from Abu Tabari 95/2, 02/28, 03/31, 03/34, Djabarona 96/1, 96/4 and Conical Hill 02/3 formed the Leiterband sub-sample. Due to its extremely poor state of preservation and its small size, the three individuals strong Handessi sub-sample from Djabarona 96/120 was excluded from the analyses.

Type of variables	Number of variables
Cranial and postcranial measurements	29
Cranial measurements	5
Postcranial measurements	24
Scaled cranial and postcranial measurements	25
Scaled cranial measurements	3
Scaled postcranial measurements	22
Cranial, dental and postcranial indices	46
Cranial indices	9
Dental indices	4
Postcranial indices	33
Cranial and postcranial robusticity traits	19
Cranial robusticity traits	9
Postcranial robusticity traits	10
Cranial and postcranial musculoskeletal stress traits	19
Cranial musculoskeletal stress traits	8
Postcranial musculoskeletal stress traits	11
Cranial morphological traits	6
Postcranial epigenetic traits	2
Tooth loss	2
Dental abrasion	5
Enamel hypoplasia	9
Dental caries	4
Age at death	6
Living height	1
Living weight	1
Height-weight indices	4
Total	**178**

Figure 55: Variables used to detect diachronic differences.

A catalogue containing a wide range of variables was compiled. All selected variables were considered potentially informative with respect to skeletal robusticity levels, workloads, activity patterns, amounts of physiological stress and overall quality of life (e.g. Boas 1912; Bridges *et al*. 2000; Brock/Ruff 1988; Bruns *et al*. 2002; Buretić-Tomljanović *et al*. 2006; Cardoso 2008(b); Carlson *et al*. 2007; Churchill/Morris 1998; Deter 2009; Formicola/Giannecchini 1999; Galtés *et al*. 2009; Goodman *et al*. 1991; Gustafsson *et al*. 2007; Hinton 1981; Holliday 2002; Jaeger *et al*. 1998(a); Jantz/Meadows Jantz 2000; Kaifu 1997; Kennedy 1989; Kieser/Groeneveld 1988; Klaus/Tam 2009; Lahr 1996: 248-263; Lahr/Wright 1996; Lanyon *et al*. 1982; Larsen 1995: 187-204, 2002: 120, 126-128, 134-138; Lieberman 1996; Lieberman *et al*. 2004; Lieverse *et al*. 2007(b); Lipscomb *et al*. 2004; Little *et al*. 2006; Maat 2005; Marchi 2008; May *et al*. 1993; Mosothwane/Steyn 2009; Paine *et al*. 2007; Pearson 2000; Pinhasi *et al*. 2008; Pucciarelli *et al*. 1990; Shackelford 2007; Stock 2006; Temple 2008; Ubelaker/Pap 2009; Wood *et al*. 1992; Young *et al*. 2008). Altogether 178 such

variables were tested for significant differences between the two sub-samples (see Appendix VII.). This total included 25 variables dedicated to scaled measurements and 46 dedicated to indices. Another 63 of these 178 variables were generated by merging variables. Eight were combined index variables. A further eleven were based on scaled metric variables (see III.B.2.d.2.c.).
Descriptive statistics were calculated separately for the pre-Leiterband and Leiterband values of each variable (e.g. Knußmann 1988(d): 659-665; Madrigal 1998: 31-53; Zöfel 1992: 14-56). Numbers of values, minimum and maximum values, modes, medians, means and standard deviations were reported for continuous variables. Each sub-sample's number of values, minimum and maximum value, mode, median and mean were computed for every ordinal variable. The values of nominal variables were summarised by providing numbers of values, modes, medians, means and frequencies of values. Values determined for sub-adult individuals were excluded whenever they distorted the statistical description or the analysis of a variable. Values reflecting sub-pathological or pathological conditions were treated in the same manner. Means and mean scores were used for antimeric measurements and traits, if so indicated. Whether differences between the pre-Leiterband and Leiterband sub-sample were statistically significant was determined variable by variable. Since the small sub-samples were unequal in size, Mann-Whitney U tests were employed to process both continuous and ordinal variables. Nominal variables were analysed with Pearson's and Yates's χ^2 tests (e.g. Knußmann 1988(d): 671-673, 677-680; Madrigal 1998: 132-138, 192-203; Mann/Whitney 1947; Pearson 1900, 1934; Plackett 1983; Yates 1934; Zöfel 1992: 144-151, 181-202).
Frequencies and χ^2 tests were calculated by hand. *Microsoft Office Excel 2003* (Microsoft Corp.) was used to compute the remaining descriptive statistics. All but 24 Mann-Whitney U tests were performed with *SPSS 15.0.1* (SPSS Inc.). The 24 Mann-Whitney U tests in question were carried out with *SPSS 19* (SPSS Inc.) at a later date. They were employed to analyse the cortical thickness variables which were generated by conflating different combinations of single cortical thickness variables. No further steps were taken to detect statistically significant differences between the pre-Leiterband and Leiterband sub-sample (e.g. Howitt/Cramer 2005; Kinnear/Gray 2008; Knußmann 1988(d); Madrigal 1998; Tabachnick/Fidell 2001; Zöfel 1992).

III.B.2.d. Metric and non-metric affinities

III.B.2.d.1. Basic approach

The inter-sample comparisons had three main aims (see I.B.1.b.3.). Firstly, they should reveal which prehistoric and modern comparative sample the Wadi Howar series and its different parts were morphologically closest to. Secondly, they should expose population discontinuities. Thirdly, they should identify traces of biologically relevant interactions with other groups. The intention was to achieve all three goals with one simple approach. Rather than analysing the whole series as one sample, each one of the analysed Wadi Howar individuals was treated as an isolated find. This was considered to be the most sensible approach for two reasons. The first reason was that one aim was to establish whether the Wadi Howar skeletons actually all belonged to the same population (see I.B.1.b.3.). That the material's state of preservation made it impossible to collect the same set of data from each individual was the second reason (see I.C.4. and III.B.1.b.).

To find out which one of the modern and prehistoric comparative samples the Wadi Howar individuals were most similar to, each one was entered into multiple, separate, individualised discriminant function analyses as an ungrouped case (see III.B.2.d.3.). The discriminant function analyses assigned each Wadi Howar specimen to the prehistoric and the modern comparative sample it was most similar to. Every discriminant function analysis also provided a measure of how accurately it classified the comparative individuals with regard to the samples to which they actually belonged. These percentages were used as proxy values for the accuracies with which the Wadi Howar individuals were assigned to the comparative samples they shared most affinities with. It was thus possible to immediately judge the success of an analysis. The comparisons with the prehistoric and modern comparative samples had to be carried out separately. The metric and non-metric data were not analysed together either. As a consequence, each sufficiently well-preserved Wadi Howar individual was subjected to six individualised discriminant function analyses (see Figure 56 and III.B.2.d.3.).

A. Prehistoric comparative samples:	A.1. Cranial and dental measurements
	A.2. Scaled cranial and dental measurements
	A.3. Cranial and dental non-metric traits
B. Modern comparative samples:	B.1. Cranial and dental measurements
	B.2. Scaled cranial and dental measurements
	B.3. Cranial and dental non-metric traits

Figure 56: Discriminant function analyses performed for each sufficiently well-preserved Wadi Howar individual.

Every Wadi Howar individual was assumed to be most similar to that comparative sample to which it was assigned in the majority of the relevant analyses (see III.B.2.d.4.). For example, if a Wadi Howar skeleton was classified as a member of the Malian Sahara sample on the basis of its metric data, as a member of the A-Group sample on the basis of its scaled metric data and as a member of the Malian Sahara sample on the basis of its non-metric data, it was deemed to be most similar to the Malian Sahara sample.

After all individual analyses had been carried out the results were examined as a whole (see III.B.2.d.4.). The objective of this procedure was to draw conclusions about the affinities of the Wadi Howar sample and its parts, about possible population discontinuities and possible population contacts. The affinities of the whole Wadi Howar sample and its parts could be established by simply determining to which prehistoric and which modern comparative sample the relevant Wadi Howar individuals were most frequently assigned. As far as the other two points were concerned, each one of the three imaginable basic outcomes would have provided support for a different scenario:

1. If all Wadi Howar individuals had been assigned to the same comparative sample, population continuity could have been assumed.
2. If the Wadi Howar individuals had been assigned to different samples in accordance with their cultural associations, the introduction of new cultural complexes by incoming populations could have been assumed.
3. If the Wadi Howar individuals had been assigned to different samples regardless of their cultural associations, a population of "mixed" groups could have been assumed.

To gain further insights and to see if the sub-samples could be separated from each other, three additional steps were taken. Firstly, the classification frequencies observed in the pre-Leiterband, Leiterband and Handessi sub-sample were tested for significant differences with χ^2 tests (see

III.B.2.d.4.). Secondly, mean individuals representing the three main sites, the three culturally defined sub-samples and the whole sample were generated and processed like normal Wadi Howar individuals, i.e. they were entered into separate sets of individualised discriminant function analyses as ungrouped cases (see III.B.2.d.2.a. and III.B.2.d.3.). Thirdly, predefined groups of Wadi Howar individuals were entered into separate sets of discriminant function analyses (see III.B.2.d.3.). Like the individuals belonging to the three culturally defined sub-samples, the individuals belonging to the three main sites were processed as separate groups in the same set of analyses. Finally, the whole Wadi Howar sample was processed as a predefined group in a set of discriminant function analyses (see III.B.2.d.3.).

Data which can be collected from **Abu Tabari 02/1-2**:	Data which can be collected from **Abu Tabari 02/28-5**:	Data which can be collected from **Conical Hill 95/4**:	Data which has to be collected from **each member of every comparative sample**:
		CM001	CM001 - 1. Maximum cranial length
CM121			CM121 - 71. Minimum ramus breadth (r)
	DM010		DM010 - 81. Crown length UP2 (r)
DM017	DM017		DM017 - 81. Crown length LI1 (l)
	DM037	DM037	DM037 - 81(1). Crown width UC (l)
	CN007a	CN007a	CN007a - Sagittal keeling - degree
	CN017a		CN017a - Shape of the *Sella nasi* - main
	DE005	DE005	DE005 - Shovel UI1 (l)
	DE024		DE024 - Distosagittal ridge UP1 (r)
DE050			DE050 - Premol. lingual cusps LP2 (r)

(a)

Data used in Abu Tabari 02/1-2's analyses

Abu Tabari 02/1-2:	**Comparative samples**:
CM121	CM121 - 71. Minimum ramus breadth (r)
DM017	DM017 - 81. Crown length LI1 (l)
DE050	DE050 - Premol. lingual cusps LP2 (r)

(b)

Data used in Abu Tabari 02/28-5's analyses

Abu Tabari 02/28-5:	**Comparative samples:**
DM010	DM010 - 81. Crown length UP2 (r)
DM017	DM017 - 81. Crown length LI1 (l)
DM037	DM037 - 81(1). Crown width UC (l)
CN007a	CN007a - Sagittal keeling - degree
CN017a	CN017a - Shape of the *Sella nasi* - main
DE005	DE005 - Shovel UI1 (l)
DE024	DE024 - Distosagittal ridge UP1 (r)

(c)

Data used in Conical Hill 95/4's analyses

Conical Hill 95/4:	**Comparative samples**:
CM001	CM001 - 1. Maximum cranial length
DM037	DM037 - 81(1). Crown width UC (l)
CN007a	CN007a - Sagittal keeling - degree
DE005	DE005 - Shovel UI1 (l)

(d)

Figure 57: Hypothetical example of the compilation of a master matrix and the subsequent construction of individualised matrices.

The data basis for the individualised discriminant function analyses had to meet an important criterion. It had to be possible for each skeleton to be compared with the selected comparative samples using only the variables for which data could actually be gathered from it (see III.B.2.d.2.e.). The list according to which data was collected from the comparative samples had to be compiled accordingly (see III.B.1.b.). The strategy adopted in this context, can be explained using the hypothetical example illustrated in Figure 57. In this example, the Wadi Howar sample only comprises Abu Tabari 02/1-2, Abu Tabari 02/28-5 and Conical Hill 95/4. Moreover, it is only possible to collect data for three variables from Abu Tabari 02/1-2, for seven from Abu Tabari 02/28-5 and for four from Conical Hill 95/4. The data collection list according to which each member of every comparative sample would have to be processed in this example is generated by combining all variables for which data can be collected from the three Wadi Howar individuals. Consequently, the comparative data has to be gathered according to this hypothetical list before each one of the three skeletons can be analysed using only the variables for which it provided values. The analysis of the example's Abu Tabari 02/1-2 skeleton then only relies on the three variables for which data could be collect from it. The procedure for the other two hypothetical individuals is analogous. The compilation of the full and the shortened data collection list as well as the individualisation of the discriminant function analyses were achieved in the manner described in this example (see III.B.1.b. and III.B.2.d.2.e.).

III.B.2.d.2. Data preparation

The shortened data collection list formed the basis of the altogether ten master matrices which were constructed for the discriminant function analyses (see III.B.1.b. and Table 5). Building these master matrices involved various preparatory procedures. Firstly, mean individuals had to be generated (see III.B.2.d.2.a.). Secondly, gaps in the comparative data sets had to be filled (see III.B.2.d.2.b.). Thirdly, additional scaled versions of the metric data sets were computed (see III.B.2.d.2.c.). Fourthly, ordinal and nominal variables had to be dichotomised (see III.B.2.d.2.d.). Fifthly, non-normally distributed continuous variables had to be removed (see III.B.2.d.2.e.).

Table 5: Discriminant function analysis master matrices.

Matrix	Samples in matrix	Modifications
Prehistoric comparative samples	Jebel Sahaba/Tushka, A-Group, Malian Sahara	filled, normalised, dichotomised
Alternative prehistoric comparative samples	Jebel Sahaba/Tushka, A-Group, Malian Sahara, "Sudanese Hotchpotch"	filled, normalised, dichotomised
Prehistoric comparative samples with Wadi Howar sample	Jebel Sahaba/Tushka, A-Group, Malian Sahara, Wadi Howar	filled, normalised, dichotomised
Alternative prehistoric comparative samples with Wadi Howar sample	Jebel Sahaba/Tushka, A-Group, Malian Sahara, "Sudanese Hotchpotch", Wadi Howar	filled, normalised, dichotomised
Untreated alternative prehistoric comparative samples	Jebel Sahaba/Tushka, A-Group, Malian Sahara, "Sudanese Hotchpotch"	filled
Untreated alternative prehistoric comparative samples with Wadi Howar sample	Jebel Sahaba/Tushka, A-Group, Malian Sahara, "Sudanese Hotchpotch", Wadi Howar	filled
Modern comparative samples	Southern Sudan, Chad, Mandinka, Somalis, Haya	filled, normalised, dichotomised
Modern comparative samples with Wadi Howar sample	Southern Sudan, Chad, Mandinka, Somalis, Haya, Wadi Howar	filled, normalised, dichotomised
Untreated modern comparative samples	Southern Sudan, Chad, Mandinka, Somalis, Haya	filled
Untreated modern comparative samples with Wadi Howar sample	Southern Sudan, Chad, Mandinka, Somalis, Haya, Wadi Howar	filled

III.B.2.d.2.a. Generation of mean individuals

Wadi Howar sample		Prehistoric comparative samples	
		Jebel Sahaba/Tushka:	
		- all individuals	
Wadi Howar sample		- males	
Total:		- females	
- Wadi Howar	all sites	*A-Group:*	
Occupation phases:		- all sites	
- pre-Leiterband	sites: 95/4, 02/1	*Malian Sahara:*	
- Leiterband	sites: 95/2, 96/1, 96/4, 02/3, 02/28, 03/31, 03/34	- all sites	
		- Erg Ine Sakane	
		- Hassi el Abiod	
- Leiterband/Handessi	sites: 95/2, 96/1, 96/4, 96/120, 02/3, 02/28, 03/31, 03/34	- Kobadi	
		"Sudanese Hotchpotch:	
		- all sites	
- Handessi	sites: 96/120	- El Kadada	
Sites:		- Saggai	
- Abu Tabari 02/1		- Jebel Shaqadud	
- Abu Tabari 02/28			
- Conical Hill 95/4		**Modern comparative samples**	
- Djabarona 96/1		- Southern Sudan	all individuals
- Djabarona 96/120		- Chad	all individuals
		- Mandinka	all individuals
		- Somalis	all individuals
		- Haya	all individuals

Figure 58: Generated mean individuals.

27 mean individuals were generated (see Figure 58). They fulfilled three functions. Firstly, they made quick variable by variable comparisons between samples and sub-sample possible (see V.C.1.). Secondly, they provided the values with which gaps in the data sets were filled (see III.B.2.d.2.b.). Thirdly, they offered the opportunity to subject a selected sample or sub-sample to a set of individualised discriminant function analyses as if it was a Wadi Howar individual (see III.B.2.d.3. and V.B.3.b.4.b.1.).

	CM010 - 19a. Mastoid height (l)	**CM083 - 69. Height of the mandibular symphysis**	**CR006 - *Arcus superciliaris***	**CR010 - *Trigonum mandibulae***	**DE010 - Interruption groove UI2 (r)**	**DE054 - Groove pattern LM2 (r)**
Abu Tabari 02/1-2	-	36.0	-	2	-	-
Abu Tabari 02/1-3	27.0	38.0	2	4	-	1
Abu Tabari 02/1-5	-	-	-	-	-	-
Abu Tabari 02/1-6	-	-	-	-	-	-
Abu Tabari 02/1-7	-	39.0		7	-	-
Abu Tabari 02/1-8	-	-	-	-	4	1
Mean individual - Abu Tabari 02/1	**27.0**	**37.7**	**2**	**4**	**4**	**1**

Figure 59: Example of the construction of a mean individual. Continuous variables (CM010, CM083), ordinal variables (CR006, CR010) and nominal variables (DE010, DE054).

The construction of the mean individuals proceeded variable by variable (see Figure 59). The mean of the values of the relevant cases was used as the mean individual's value for a continuous variable. Any mean individual's value for an ordinal variable was determined in the same way. The mode of the relevant values served as the mean individual's value for a nominal variable. Relying on the mean, not the median, for continuous and ordinal variables was a conscious decision (see V.B.3.b.4.b.1.). Whenever appropriate, values influenced by sub-adult age at death and sub-pathological or pathological conditions were removed before mean individuals were constructed (e.g. Knußmann 1988(d): 659-663; Madrigal 1998: 31-40; Zöfel 1992: 14-56).

III.B.2.d.2.b. Missing values

Since the large number of variables and cases involved in the discriminant function analyses would have made any attempts to employ more sophisticated methods to replace missing values logistically impossible, gaps were simply filled with values taken from mean individuals (e.g. Bortz 2005; Howitt/Cramer 2005; Kinnear/Gray 2008; Knußmann 1988(d); Tabachnick/Fidell 2001).

	CM004 - 9. Least frontal breadth	CM020 - 30. *Bregma-Lambda* chord	CM028 - 48(1). *Nasospinale-Prosthion* height
Abu Tabari 02/1-2	***92.4***	***123.0***	22.0
Abu Tabari 02/1-3	***92.4***	***123.0***	23.0
Abu Tabari 02/1-5	***92.4***	***123.0***	***22.5***
Abu Tabari 02/1-6	***92.4***	***123.0***	***22.5***
Abu Tabari 02/1-7	***92.4***	***123.0***	***22.5***
Abu Tabari 02/1-8	***92.4***	***123.0***	***22.5***
Mean individual - Abu Tabari 02/1	-	-	***22.5***
Mean individual - pre-Leiterband	-	***123.0***	25.7
Mean individual - Wadi Howar	***92.4***	112.3	22.4

Figure 60: Replacing missing values.

Only the mean values of antimeric measurements and traits were used in the matrices (see III.B.1.b.1. and III.B.1.b.2.a.). Missing values were not substituted until the matrices had been cropped accordingly and potentially distorting values, for instance those of sub-adult individuals, had been removed (see III.B.2.d.2.e.). Gaps in the Jebel Sahaba/Tushka data set were treated as follows. A female's missing value was replaced with the corresponding value of the mean female individual. When no corresponding mean female individual value was available, the corresponding value of the mean individual of the whole sample was entered instead. Missing male values were treated analogously. Similarly, whenever possible, missing values in the Malian Sahara data set were replaced with values of site-specific mean individuals. Gaps which could not be filled with site-specific mean values were filled with the values of the overall Malian Sahara sample mean individual. Missing

values in the "Sudanese Hotchpotch" data set were replaced in the same manner. Gaps in the other comparative data sets were filled with the values of the sample-specific mean individuals.
Although missing values in the Wadi Howar data did not need to be replaced for the individualised discriminant function analyses, a Wadi Howar data set without gaps had to be created for those analyses which involved Wadi Howar individuals as groups (see III.B.2.d.3.). This data set was generated using the same techniques which were employed to fill the gaps in the Malian Sahara data (see Figure 60). If possible, missing values were replaced with values of site-specific mean individuals. If site-specific mean individual values were not available, occupation phase-specific mean individual values were used instead. If both site- and occupation phase-specific replacement values were missing, gaps were filled with values of the mean individual of the Wadi Howar sample.

III.B.2.d.2.c. Scaling

The size correction methods which would have been applicable to the metric variables either scale an individual's measurements in relation to a sample mean or in relation to a value based on the individual's data in a set of variables (e.g. Darroch/Mosimann 1985; González-José *et al*. 2008: 179; Hanihara/Ishida 2005: 288; Howells 1973, 1989, 1995; Jungers *et al*. 1995; Konigsberg *et al*. 2009: 78; Marroig 2007: 21-23; Morris/Ribot 2006: 17; Rosas/Bastir 2002: 238; Williams-Blangero/Blangero 1989). Methods of the former type reduce the variability within and between samples. They were therefore not considered appropriate for discriminant function analysis data. Using a method of the latter type would have led to a considerable amount of extra work. Because only those variables were used in a Wadi Howar skeleton's discriminant function analyses for which values could be gathered from it, each Wadi Howar individual's matrices consisted of unique combinations of variables (see III.B.2.d.1. and III.B.2.d.2.e.). Consequently, any size correction technique based on a specific set of variables would have had to be specially modified for each Wadi Howar individual and applied separately to each Wadi Howar individual's set of matrices.
Instead, one additional, individually scaled version of the metric data sets was created. This scaled version of the metric data sets could then be integrated into the master matrices. The scaling was achieved by dividing all measurements of each skeleton by the mean width of its lower second molars (*Dentes molares inferiores II*). "DM061/62 - 81(1). Crown width LM2 (m)" was chosen as the scale because it was the metric variable on the shortened data collection list with the highest number of values (20) in the Wadi Howar data set. Moreover, it could usually be measured reliably. Before the scaled values were calculated "DM061/62 - 81(1). Crown width LM2 (m)" was removed from the data sets. Values which would have been distorted by sub-adult age at death and sub-pathological or pathological conditions were taken out of the data sets as well. Whenever a specimen lacked a "DM061/62 - 81(1). Crown width LM2 (m)" value the corresponding value of an appropriate mean individual was used to scale its measurements. As far as the Wadi Howar material was concerned, the sample's mean male value was considered most appropriate for the seven males without a "DM061/62 - 81(1). Crown width LM2 (m)" value, the sample's mean female value was seen as the best alternative for the three females of this type and the sample's overall mean was employed as the substitute for the two individuals of indeterminate sex lacking the relevant value. The five Jebel Sahaba/Tushka individuals without "DM061/62 - 81(1). Crown width LM2 (m)" values were also scaled

with sample-specific male and female means. Nine Malian Sahara and eight "Sudanese Hotchpotch" specimens had to be processed on the basis of site-specific rather than individual "DM061/62 - 81(1). Crown width LM2 (m)" values. Three A-Group, seven Southern Sudan, ten Chad, seven Mandinka, two Somali and two Haya individuals were lacking the required data as well. These specimens were scaled with sample-specific mean "DM061/62 - 81(1). Crown width LM2 (m)" values. All necessary calculations were performed with *Microsoft Office Excel 2003* (Microsoft Corp.).

III.B.2.d.2.d. Dichotomisation

Unlike the use of raw ordinal and nominal data, the use of binary data in discriminant function analyses is widely regarded as unproblematic (e.g. Cohen *et al*. 2003: 302-353; Cox/Snell 1999: 161-162; Gilbert 1968, 1969; Hand 1983; Henke 1997: 23; Krzanowski 1975, 1977: 193; Lachenbruch/Goldstein 1979: 78; Moore 1973; Moosbrugger/Richter 1999). Therefore, all ordinal and nominal variables in the discriminant function analysis matrices were dichotomised (see Appendix VIII.). The presence/absence thresholds were primarily intended to reflect the expressions of the traits in the Wadi Howar sample. Whether or not dichotomisations created variables with evenly distributed values was also taken into consideration. Because the modifications were carried out with these aims in mind, especially the dental dichotomisations did not necessarily correspond to those commonly employed (e.g. Berry/Berry 1972; Carson 2006; Edgar 2009: 62; Finnegan/McGuire 1979: 552; Gaherty 1971; Irish 1997: 461, 2008: 106; Prowse/Lovell 1995; Ullinger *et al*. 2005: 470; Willermet/Edgar 2009: 212-213).

III.B.2.d.2.e. Removal of cases and variables

Unless sub-adult age had no influence on the values in question, as was, for example, the case with measurements of permanent teeth (*Dentes permanentes*), values of sub-adult individuals were deleted. Values were also deleted if they were affected by sub-pathological or pathological conditions. Gaps created by values which were removed for either reason and needed to be replaced were filled as described above (see III.B.2.d.2.b.).

The distributions of all variables were examined (see III.B.2.b.). In this context, it was attempted to correct non-normally distributed continuous variables with commonly used normalising transformations (e.g. Bortz 2005; Howitt/Cramer 2005; Kinnear/Gray 2008; Knußmann 1988(d); Madrigal 1998: 31-40; Tabachnick/Fidell 2001; Zöfel 1992: 14-56). Logarithmic transformations (LOG10), square root transformations (SQRT), subtracting each value from the maximum value plus one and inverse transformations (INV), i.e. dividing one by each value, were applied alone or in various combinations. Variables whose distributions could not be normalised were removed from the matrices (see Appendix IX.). *SPSS 15.0.1* (SPSS Inc.) was used to compute all transformations. Binary variables characterised by a nine to one or more extreme distribution were also excluded (see Appendix IX.). The data sets of Wadi Howar and mean individuals were independently subjected to the same changes as the matrices into which they were going to be re-entered in the individualised discriminant function analyses.

Only mean values of antimeric measurements or traits, i.e. those designated with an (m) (see III.B.1.b.1. and III.B.1.b.2.a.), were left in the matrices. Similarly, only the split, single-figure score versions of the non-metric variables which could also occur as combined, double-figure scores were kept in the matrices (see III.B.1.b.2.a.). Variables dedicated to left, right or non-metric double-figure values were deleted. As explained above, each matrix of every individualised discriminant function analysis had to be specifically modified (see III.B.2.d.1. and Figure 57). Each individualised discriminant function analysis relied only on those variables for which a value could be collected from the Wadi Howar individual whose affinities it was meant to determine. As a result, all other variables had to be removed from the matrices of the Wadi Howar individuals.

III.B.2.d.3. Discriminant function analyses

Discriminant function analysis is a multivariate statistical method. Its primary purpose is to separate a priori defined groups on the basis of two or more variables. This statistical separation procedure can also be used to assign individuals whose group membership is unknown to such predefined groups. As a result, discriminant function analyses are routinely performed in anthropology. Estimating sex and biological ancestry are the method's most common applications (for discriminant function analysis in general see for example: Backhaus *et al*. 2003: 155-228; Barnard 1935; Bortz 2005: 605-625; Cox/Snell 1999; Fisher 1936; Henke 1997: 22-28; Klecka 1980; Knußmann 1988(d): 750-766, 768-769; Lachenbruch 1975; Mahalanobis 1936; Moosbrugger/Richter 1999; Ousley *et al*. 2009: 70-72; Tabachnick/Fidell 2001; for sex estimations relying on discriminant function analyses see for example: Asala *et al*. 2004; Barrier/L'Abbé 2008; Dayal *et al*. 2008; Giles 1964; Giles/Elliot 1963; Kranioti *et al*. 2008; Langenscheidt 1983; Patriquin *et al*. 2005; Rösing *et al*. 2007; Sjøvold 1988; Steyn/İşcan 1999; Żądzińska *et al*. 2008; for estimations of biological ancestry relying on discriminant function analyses see for example: Amadon 1949; Bernhard 1994; Bidmos 2006; Birkby 1966; DiBennardo/Taylor 1983; Hemphill 1999(b); İşcan *et al*. 2000; Ousley *et al*. 2009; Patriquin *et al*. 2002; Pietrusewsky 2008; Relethford 2009: 19; Schwidetzky 1971: 141; Varela *et al*. 2008; Zakrzewski 2007).

<u>1. 32 Wadi Howar individuals</u>

Sets of individualised discriminant function analyses (per Wadi Howar individual)

1.a. ***6 core analyses*** (*stepwise - Mahalanobis distance and manual simultaneous entry: strict protocol – selected normalised or dichotomised variables – matrices: Prehistoric comparative samples, Modern comparative samples*):

A. Prehistoric comparative samples:	A.1. Cranial and dental measurements
	A.2. Scaled cranial and dental measurements
	A.3. Cranial and dental non-metric traits
B. Modern comparative samples:	B.1. Cranial and dental measurements
	B.2. Scaled cranial and dental measurements
	B.3. Cranial and dental non-metric traits

1.b. ***2 additional core analyses***, if there was insufficient data for satisfactory separate metric and non-metric analyses (*stepwise - Mahalanobis distance and manual simultaneous entry: strict protocol – selected normalised or dichotomised variables – matrices: Prehistoric comparative samples, Modern comparative samples*):

A. Prehistoric comparative samples:	A.4. Measurements and non-metric traits
B. Modern comparative samples:	B.4. Measurements and non-metric traits

1.c. Further additional analyses

1.c.1. ***4 additional analyses (per analysis with prehistoric comparative samples)***:

A.5. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Prehistoric comparative samples*)

A.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Prehistoric comparative samples*)

A.7. Alternative comparative samples (*stepwise - Mahalanobis distance: minimal protocol – matrix: Alternative prehistoric comparative samples*)

A.8. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated alternative prehistoric comparative samples*)

1.c.2. ***3 additional analyses (per analysis with modern comparative samples)***:

B.5. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Modern comparative samples*)

B.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Modern comparative samples*)

B.7. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated modern comparative samples*)

<u>2. 5 Wadi Howar mean individuals</u>

Sets of individualised discriminant function analyses (per 02/1 mean individual, 02/28 mean individual, 96/120-Handessi mean individual, pre-Leiterband mean individual, Leiterband mean individual, Wadi Howar mean individual)

2.a. ***6 core analyses*** (*stepwise - Mahalanobis distance and manual simultaneous entry: strict protocol – selected normalised or dichotomised variables – matrices: Prehistoric comparative samples, Modern comparative samples*):

A. Prehistoric comparative samples:	A.1. Cranial and dental measurements
	A.2. Scaled cranial and dental measurements
	A.3. Cranial and dental non-metric traits
B. Modern comparative samples:	B.1. Cranial and dental measurements
	B.2. Scaled cranial and dental measurements
	B.3. Cranial and dental non-metric traits

2.b. Additional analyses

2.b.1. ***7 additional analyses (per analysis with prehistoric comparative samples)***:

A.4. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Prehistoric comparative samples*)

A.5. Mahalanobis distance (*stepwise: minimal protocol – matrix: Prehistoric comparative samples*)

A.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Prehistoric comparative samples*)

A.7. Alternative comparative samples (*stepwise - Mahalanobis distance: minimal protocol – matrix: Alternative prehistoric comparative samples*)

A.8. Alternative comparative samples (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Alternative prehistoric comparative samples*)

A.9. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated alternative prehistoric comparative samples*)

A.10. Raw matrix (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Untreated alternative prehistoric comparative samples*)

2.b.2. ***5 additional analyses (per analysis with modern comparative samples)***:

B.4. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Modern comparative samples*)

B.5. Mahalanobis distance (*stepwise: minimal protocol – matrix: Modern comparative samples*)

B.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Modern comparative samples*)

B.7. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated modern comparative samples*)

B.8. Raw matrix (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Untreated modern comparative samples*)

<u>3. 3 sets of Wadi Howar groups</u>

Sets of discriminant function analyses (per set of Wadi Howar groups – sites: 02/1, 02/28, 96/120; occupation phases: pre-Leiterband, Leiterband, Handessi; whole sample: Wadi Howar)

3.a. ***6 core analyses*** (*stepwise - Mahalanobis distance and manual simultaneous entry: strict protocol – selected normalised or dichotomised variables – matrices: Prehistoric comparative samples with Wadi Howar sample, Modern comparative samples with Wadi Howar sample*):

A. Prehistoric comparative samples:	A.1. Cranial and dental measurements
	A.2. Scaled cranial and dental measurements
	A.3. Cranial and dental non-metric traits
B. Modern comparative samples:	B.1. Cranial and dental measurements
	B.2. Scaled cranial and dental measurements
	B.3. Cranial and dental non-metric traits

3.b. Further additional analyses

3.b.1. ***7 additional analyses (per analysis with prehistoric comparative samples)***:

A.4. Simultaneous entry (*all variables in the matrix: minimal protocol – matrix: Prehistoric comparative samples with Wadi Howar sample*)

A.5. Mahalanobis distance (*stepwise: minimal protocol – matrix: Prehistoric comparative samples with Wadi Howar sample*)

A.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Prehistoric comparative samples with Wadi Howar sample*)

A.7. Alternative comparative samples (*stepwise - Mahalanobis distance: minimal protocol – matrix: Alternative prehistoric comparative samples with Wadi Howar sample*)

A.8. Alternative comparative samples (*simultaneous entry – all variables in the matrix: minimal protocol – matrix: Alternative prehistoric comparative samples with Wadi Howar sample*)

A.9. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated alternative prehistoric comparative samples with Wadi Howar sample*)

A.10. Raw matrix (*simultaneous entry – all variables in the matrix: minimal protocol – matrix: Untreated alternative prehistoric comparative samples with Wadi Howar sample*)

3.b.2. ***5 additional analyses (per analysis with modern comparative samples)***:

B.4. Simultaneous entry (*all variables in the matrix: minimal protocol – matrix: Modern comparative samples with Wadi Howar sample*)

B.5. Mahalanobis distance (*stepwise: minimal protocol – matrix: Modern comparative samples with Wadi Howar sample*)

B.6. Wilk's Lambda (*stepwise: minimal protocol – matrix: Modern comparative samples with Wadi Howar sample*)

B.7. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Untreated modern comparative samples with Wadi Howar sample*)

B.8. Raw matrix (*simultaneous entry – all variables in the matrix: minimal protocol – matrix: Untreated modern comparative samples with Wadi Howar sample*)

4. 4 comparative sample mean individuals
Sets of individualised discriminant function analyses (per Jebel Sahaba/Tushka mean individual, A-Group mean individual, Malian Sahara mean individual, "Sudanese Hotchpotch" mean individual)
4.a. ***6 analyses*** (*stepwise - Mahalanobis distance: relaxed protocol – normalised or dichotomised variables – matrix: Modified prehistoric comparative samples with Wadi Howar sample, Modern comparative samples*):

A. Prehistoric comparative samples:
- A.1. Cranial and dental measurements
- A.2. Scaled cranial and dental measurements
- A.3. Cranial and dental non-metric traits

B. Modern comparative samples:
- B.1. Cranial and dental measurements
- B.2. Scaled cranial and dental measurements
- B.3. Cranial and dental non-metric traits

4.b. Additional analyses
4.b.1. ***6 additional analyses (per analysis with prehistoric comparative samples)***:
- A.4. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Modified prehistoric comparative samples with Wadi Howar sample*)
- A.5. Wilk's Lambda (*stepwise: minimal protocol – matrix: Modified prehistoric comparative samples with Wadi Howar sample*)
- A.6. Alternative comparative samples (*stepwise - Mahalanobis distance: minimal protocol – matrix: Modified alternative prehistoric comparative samples with Wadi Howar sample*)
- A.7. Alternative comparative samples (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Modified alternative prehistoric comparative samples with Wadi Howar sample)*
- A.8. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Modified untreated alternative prehistoric comparative samples with Wadi Howar sample*)
- A.9. Raw matrix (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Modified untreated alternative prehistoric comparative samples with Wadi Howar sample*)

4.b.2. ***4 additional analyses (per analysis with modern comparative samples)***:
- B.4. Simultaneous entry (*all variables in the individualised matrix: minimal protocol – matrix: Modified modern comparative samples with Wadi Howar sample*)
- B.5. Wilk's Lambda (*stepwise: minimal protocol – matrix: Modified modern comparative samples with Wadi Howar sample*)
- B.6. Raw matrix (*stepwise - Mahalanobis distance: minimal protocol – matrix: Modified untreated modern comparative samples with Wadi Howar sample*)
- B.7. Raw matrix (*simultaneous entry – all variables in the individualised matrix: minimal protocol – matrix: Modified untreated modern comparative samples with Wadi Howar sample*)

Figure 61: Overview of the performed discriminant function analyses.

The method's ability to assign any ungrouped case to that predefined group to which it is most similar was utilised to determine to which prehistoric and modern comparative sample each Wadi Howar individual was morphologically closest. Each Wadi Howar individual was entered into sets of separate, individualised discriminant function analyses. The reliability with which an analysis classified the comparative individuals, i.e. the cases with a priori defined group membership, correctly was considered a dependable indicator of how reliably it assigned the Wadi Howar individual to the comparative sample to which it was most similar. Each Wadi Howar individual, five mean Wadi Howar individuals, two sets of Wadi Howar sub-groups, the Wadi Howar sample and four comparative sample mean individuals were entered into specifically designed sets of discriminant function analyses (see Figure 61). Except for the additional analyses which were based on the "Alternative prehistoric comparative samples", the "Untreated alternative prehistoric comparative samples" and the "Untreated modern comparative samples" matrix, all performed core and additional core discriminant function analyses were computed with appropriate matrices. These matrices included only samples of sufficient size and only consisted of normally distributed continuous or dichotomised ordinal and nominal variables.

A strict discriminant function analysis protocol was developed. This protocol included the generally recommended measures necessary to ensure the reliability of discriminant function analyses (e.g. Backhaus *et al*. 2003: 155-228; Bortz 2005: 605-625; Cox/Snell 1999: 132-139; Finch/Schneider 2007; Henke 1997: 22-28; Howitt/Cramer 2005; Kinnear/Gray 2008; Klecka 1980; Knußmann 1988(d): 750-766; Krzanowski 1977; Lachenbruch 1975; Lachenbruch/Goldstein 1979; Moosbrugger/Richter 1999; Tabachnick/Fidell 2001). All core analyses, i.e. all discriminant function analyses which were not merely performed to broaden the basis for discussion, used this protocol. The analyses were carried out with *SPSS 15.0.1* (SPSS Inc.) (see Figure 62).

1. Stepwise - Mahalanobis distance, within-groups	
- Use stepwise method	
- Statistics	Descriptives: Means, Univariate ANOVAs, Box's M Function Coefficients: Fisher's, Unstandardized Matrices: Within-groups correlation, Within-groups covariance, Separate-groups covariance, Total covariance
- Method:	Method: Mahalanobis distance Criteria: Use probability of F - Entry: .05, Removal: .10 Display: Summary of steps, F for pairwise distances
- Classification:	Prior Probabilities: Compute from group sizes Display: Casewise results, Summary table, Leave-one-out classification Use covariance matrix: Within-groups Plots: Combined-groups, Separate-groups, Territorial map Replace missing values with mean
2.a. Simultaneous entry, within-groups	
- Enter independents together	
- Statistics	Descriptives: Means, Univariate ANOVAs, Box's M Function Coefficients: Fisher's, Unstandardized Matrices: Within-groups correlation, Within-groups covariance, Separate-groups covariance, Total covariance
- Method:	INACTIVE
- Classification:	Prior Probabilities: Compute from group sizes Display: Casewise results, Summary table, Leave-one-out classification Use covariance matrix: Within-groups Plots: Combined-groups, Separate-groups, Territorial map Replace missing values with mean
2.b. Simultaneous entry, separate-groups	
- Enter independents together	
- Statistics	Descriptives: Means, Univariate ANOVAs, Box's M Function Coefficients: Fisher's, Unstandardized Matrices: Within-groups correlation, Within-groups covariance, Separate-groups covariance, Total covariance
- Method:	INACTIVE
- Classification:	Prior Probabilities: Compute from group sizes Display: Casewise results, Summary table (Leave-one-out classification: INACTIVE) Use covariance matrix: Separate-groups Plots: Combined-groups, Separate-groups, Territorial map Replace missing values with mean

Figure 62: *SPSS* settings for the strict protocol analyses.

The strict procedure consisted of the following steps. Firstly, the matrix was reduced to the variables with values of the ungrouped individual (see III.B.2.d.1. and III.B.2.d.2.e.). Secondly, the group membership of the members of the comparative samples was defined. Thirdly, an initial stepwise analysis using the Mahalanobis distance statistic to enter or remove variables was run. The result of this analysis formed the basis for the manual optimisation of the accuracy with which the members of the comparative samples were assigned to their own groups. Fourthly, the classification accuracy was manually optimised by trying out different combinations of variables. Choosing the "enter independents together" option, the analysis was repeated until the set of variables was found which produced the highest classification accuracies. Usually, finding this optimal set of variables meant exhausting recommended variables to cases ratios. Combinations of variables which exceeded the recommended variables to cases ratios were, however, not deemed acceptable. Accordingly, no set of variables was tested that would have led to an analysis including less than four to five cases per variable or more variables than the number of cases in the smallest sample minus two (see Figure 63). When the Box's M test had been failed, i.e. the M value was significant, the classification option "separate-groups" was activated. In such a case, the "separate-groups" classification accuracy was regarded as the main value which needed to be improved. Otherwise, the “within-groups” classification option was chosen and the “within-groups” classification accuracy was seen as the most important value. However, regardless of whether the Box’s M test had been failed or not, both variants of the analysis were carried out and the “leave-one-out” classification accuracy was always taken into consideration. Ideally, all three classification accuracy values could be improved. When the accuracy of the original stepwise analysis could not be increased and the analysis did not violate the adopted variables to cases ratio guideline, its variables were recognised as the optimal set. When the original stepwise analysis did violate this guideline, its variables were not recognised as the optimal set, even if its classification accuracies could not be increased.

Prehistoric comparative samples
65 cases (21 Jebel Sahaba/Tushka, 21 A-Group, 23 Malian Sahara)

4 cases to 1 variable ratio:	65 / 4 = 16.25
5 cases to 1 variable ratio:	65 / 5 = 13
Number of cases in smallest sample minus 2:	21 – 2 = 19
Adopted maximum number of variables:	**14**

Alternative prehistoric comparative samples
83 cases (21 Jebel Sahaba/Tushka, 21 A-Group, 23 Malian Sahara, 18 “Sudanese Hotchpotch”)

4 cases to 1 variable ratio:	83 / 4 = 20.75
5 cases to 1 variable ratio:	83 / 5 = 16.6
Number of cases in smallest sample minus 2:	18 – 2 = 16
Adopted maximum number of variables:	**16**

Prehistoric comparative samples with Wadi Howar sample
97 cases (21 Jebel Sahaba/Tushka, 21 A-Group, 23 Malian Sahara, 32 Wadi Howar)

4 cases to 1 variable ratio:	97 / 4 = 24.25
5 cases to 1 variable ratio:	97 / 5 = 19.4
Number of cases in smallest sample minus 2:	21 – 2 = 19
Adopted maximum number of variables:	**19**

Alternative prehistoric comparative samples with Wadi Howar sample
115 cases (21 Jebel Sahaba/Tushka, 21 A-Group, 23 Malian Sahara, 18 “Sudanese Hotchpotch”, 32 Wadi Howar)

4 cases to 1 variable ratio:	115 / 4 = 28.75
5 cases to 1 variable ratio:	115 / 5 = 23
Number of cases in smallest sample minus 2:	18 – 2 = 16
Adopted maximum number of variables:	**16**

Modern comparative samples
108 cases (24 Southern Sudan, 22 Chad, 22 Mandinka, 20 Somalis, 20 Haya)

4 cases to 1 variable ratio:	108 / 4 = 27
5 cases to 1 variable ratio:	108 / 5 = 21.6
Number of cases in smallest sample minus 2:	20 – 2 = 18
Adopted maximum number of variables:	**18**

Modern comparative samples with Wadi Howar sample
140 cases (24 Southern Sudan, 22 Chad, 22 Mandinka, 20 Somalis, 20 Haya, 32 Wadi Howar)

4 cases to 1 variable ratio:	140 / 4 = 35
5 cases to 1 variable ratio:	140 / 5 = 28
Number of cases in smallest sample minus 2:	20 – 2 = 18
Adopted maximum number of variables:	**18**

Figure 63: Calculation of recommended maximum variable numbers.

Fifthly, once the optimal set of variables was identified, the analysis was examined and, if necessary, corrected. Any variables which were found to have failed the tolerance test were excluded. A variable had failed the tolerance test, when its value in the “Tolerance” column of the “Variables in the Analysis” table was smaller than 0.1. Likewise, cases which could be identified as outliers were removed. To find outliers, the appropriate critical value was computed and compared to the Mahalanobis D^2 values in the “Squared Mahalanobis Distance to Centroid” column in the “Casewise Statistics” table. When a case had a Mahalanobis D^2 value in relation to the group it had been assigned to that was greater than the critical value, it was defined as an outlier. Sixthly, when the analysis had to be corrected, the third, fourth and fifth step were repeated until an optimal set of variables was found and the resulting analysis did not need to be corrected. When the analysis did not have to be corrected, its result was accepted. Lastly, when the Box's M test had been passed, the results of the "within-groups" version of this accepted analysis were reported, including the classification accuracy and the sample to which the ungrouped case was assigned. Conversely, when the Box's M test had been failed, the details of the "separate-groups" version of the analysis were given as the final results.

The strict protocol was also used for the two additional core analyses (see Figure 61: 1.b.). These additional analyses were carried out to counteract the effects of poor preservation. When an individual's separate metric and non-metric core analyses could only be based on ten or fewer variables, additional core analyses relying on both metric and non-metric data were performed. Nevertheless, the additional core analyses were not regarded as intrinsically less reliable. Although most recent publications recommend using logistic regression in such situations, there was absolutely no reason to assume that processing matrices containing both continuous and binary data with discriminant function analyses was going to be problematic. Indeed, as expected, the additional core analyses, with their broader data bases, usually produced more reliable results than the separate analyses (e.g. Buzon 2006(a); Cox/Snell 1999: 132-139, 163-165; Krzanowski 1975, 1977: 193; Lachenbruch/Goldstein 1979: 82-83; Lease/Sciulli 2005; Moore 1973: 404; Press/Wilson 1978; Walker 2008; Weinberg *et al*. 2005). The analyses of the comparative sample mean individuals which were analogous to the core analyses of the Wadi Howar individuals were carried out following a relaxed discriminant function analysis protocol (see Figure 61: 4.a.). The relaxed protocol did neither include steps dedicated to the manual improvement of classification accuracies nor procedures to make sure that the variables to cases ratio guidelines were not violated. Each "Prehistoric comparative samples with Wadi Howar sample" matrix intended for these and the associated additional analyses had to be modified. The comparative sample whose mean individual was to be processed was removed from the matrix. Then, non-normally distributed variables were taken out of the matrix before the mean individual's set of analyses was performed (see III.B.2.d.2.e.). Similarly, the comparative sample whose mean individual was to be assigned was deleted from the "Untreated alternative prehistoric comparative samples with Wadi Howar sample" matrix which was used for its mean individual's analyses. A minimal protocol was used for all additional analyses (see Figure 61: 1.c., 2.b., 3.b., 4.b.). These analyses were merely run selecting the specified matrices and *SPSS* settings (see Figure 61 and 62). The *SPSS* settings of the additional Wilk's Lambda analyses differed from those for the Mahalanobis distance analyses only in one regard. Under the "Method" menu, the "Wilk's lambda" instead of the "Mahalanobis distance" option was activated (see Figure 62: 1.). Unlike the core simultaneous entry analyses, which only included manually selected sets of variables, the additional simultaneous entry analyses incorporated all variables in a matrix.

III.B.2.d.4. Interpretation of the classification patterns

The analysis of the results of the discriminant function analyses was a twofold process. Firstly, the overall results of each set of individual and group core analyses had to be determined. Secondly, the pattern in which the Wadi Howar individuals, sub-groups and group were assigned to the prehistoric and modern comparative samples had to be interpreted.

	Modern comparative samples - Cranial and dental measurements	Modern comparative samples - Scaled cranial and dental measurements	Modern comparative samples - Non-metric cranial and dental traits	Modern comparative samples - Measurements and non-metric traits
Abu Tabari 02/28-15	***Chad*** *99.1% (D^2: 1.941),* *Southern Sudan (D^2: 5.391)*	***Southern Sudan*** *89.8% (D^2: 1.143),* *Chad (D^2: 9.383)*	***Southern Sudan*** *100.0% (D^2: 5.204),* *Chad (D^2: 28.037)*	-
Conical Hill 95/4	***Southern Sudan*** *99.1% (D^2: 133.357),* *Chad (D^2: 207.323)*	***Southern Sudan*** *88.9% (D^2: 14.128),* *Chad (D^2: 16.952)*	***Mandinka*** *98.1% (D^2: 2.775),* *Southern Sudan (D^2: 24.256)*	-
Conical Hill 02/3-4	*(**Southern Sudan** 66.7% (D^2: 2.300), Somalis (D^2: 2.664))*	*(**Mandinka** 60.2% (D^2: 8.956), Haya (D^2: 9.841))*	***Southern Sudan*** *81.5% (D^2: 2.795),* *Haya (D^2: 4.141)*	*(**Southern Sudan** 87.0% (D^2: 2.900), Somalis (D^2: 5.706))*
Djabarona 96-4	*[**Haya** 52.9% (D^2: 1.200), Chad (D^2: 1.335)]*	*[**Chad** 40.2% (D^2: 1.124), Haya (D^2: 1.161)]*	*[**Chad** 42.6% (D^2: 2.993), Haya (D^2: 5.982)]*	*(**Chad** 63.9% (D^2: 1.115), Haya (D^2: 2.603))*

(a)

	Modern comparative samples
Abu Tabari 02/28-15	***Southern Sudan*** *96.30%; 84.57%*
Conical Hill 95/4	***Southern Sudan*** *95.37%; 83.03%*
Conical Hill 02/3-4	*(**Southern Sudan** 73.85%; 58.58%)*
Djabarona 96-4	*(**Chad** 49.90%; 48.25%)*

(b)

Figure 64: Excerpts of the individual discriminant function analyses results tables. Selected results of analyses with the modern comparative samples (bold: classification; normal: classification accuracy; in brackets: squared Mahalanobis distance to nearest centroid; fine: second closest centroid; fine and in brackets: squared Mahalanobis distance to second closest centroid – whole result in square brackets: unreliable; whole result in round brackets: reliability uncertain) (a) and the overall results based on these analyses (bold: classification; normal: mean classification accuracy; fine: mean leave-one-out accuracy – whole result in round brackets: reliability uncertain) (b).

The two overall results of each set of individual core analyses were determined by examining the result of each relevant core analysis (see Figure 61: 1.a.). For instance, the modern comparative sample to which an individual was closest in the majority of its core analyses was regarded as the modern group to which the individual was generally most similar (see Figure 64). In cases in which there was no such group, the groups to which an individual was second closest in the core analyses and the individual's D^2 distances to their centroids were also taken into account. Additional core analyses could be particularly important. If their classification accuracies were greater than those of the separate core analyses, their results were seen as more informative and given more weight. If not, they were treated like an additional, normal separate core analysis. The mean classification and leave-one-out classification accuracies, reported together with the overall closest groups, were simply calculated by averaging the classification and leave-one-out accuracies of the relevant separate core analyses (see Figure 64: (b)). The overall results of the sets of core and core-equivalent analyses to which the mean individuals were subjected were determined in the same fashion.
The reliability of the results of core analyses and overall assignments could be declared "uncertain". Moreover, the results of core analyses and overall assignments could be defined as "unreliable" (see Figure 64 and 66). Whether or not core analyses and overall assignments were treated as not or not fully reliable depended on their classification accuracies and the breadth of their data bases. To be

considered reliable an analysis had to meet two conditions. That it had to be based on a matrix comprising a minimum of ten variables was the first condition. That its classification accuracies were comfortably above the prior proportional chance classification accuracy was the second condition (see Figure 65). That all three classification accuracies of an analysis, i.e. the “within-groups”, “separate-groups” and “leave-one-out” classification accuracy, were at least 25% higher than the prior proportional chance classification accuracy was adopted as an arbitrary minimal requirement in this context (e.g. Backhaus *et al*. 2003: 155-228; Bortz 2005: 605-625; Klecka 1980; Lachenbruch 1975; Moosbrugger/Richter 1999; Tabachnick/Fidell 2001). An overall assignment was deemed to be not or not fully reliable, whenever the core analyses upon which it was based were not or only partly reliable.

<u>Prehistoric comparative samples</u> (65 individuals)		
Jebel Sahaba/Tushka (21 individuals)	21 / 65 = 0.323	$0.323^2 = 0.104329$
A-Group (21 individuals)	21 / 65 = 0.323	$0.323^2 = 0.104329$
Malian Sahara (23 individuals)	23 / 65 = 0.354	$0.354^2 = 0.125316$
0.104329 + 0.104329 + 0.125316 = 0.333974		0.333974 · 100 = 33.3974% ≈ **<u>33.4%</u>** (chance)
		1.25 · 33.4 = 41.75 ≈ **<u>41.8%</u>** (chance + 25%)
<u>Modern comparative samples</u> (108 individuals)		
Southern Sudan (24 individuals)	24 / 108 = 0.222	$0.222^2 = 0.049284$
Chad (22 individuals)	22 / 108 = 0.204	$0.204^2 = 0.041616$
Mandinka (22 individuals)	22 / 108 = 0.204	$0.204^2 = 0.041616$
Somalis (20 individuals)	20 / 108 = 0.185	$0.185^2 = 0.034225$
Haya (20 individuals)	20 / 108 = 0.185	$0.185^2 = 0.034225$
0.049284 + 0.041616 + 0.041616 + 0.034225 + 0.034225 = 0.200966		0.200966 · 100 = 20.0966 ≈ **<u>20.1%</u>** (chance)
		1.25 · 20.1 = 25.125 ≈ **<u>25.1%</u>** (chance + 25%)

Figure 65: Calculation of the prior proportional chance classification accuracy and the prior proportional chance classification accuracy increased by 25%.

The assignment frequencies of the members of the Wadi Howar sub-groups and the Wadi Howar group, not the Mahalanobis distances of the Wadi Howar sub-groups and the Wadi Howar group to the centroids of the comparative samples, were regarded as the relevant results of the group core analyses (see Figure 61: 3.a.). This decision was taken because discriminant function analysis was developed to separate groups not to establish representative distances between them (e.g. Backhaus *et al*. 2003: 155-228; Bortz 2005: 605-625; Henke 1997; Knußmann 1988(d); Moosbrugger/Richter 1999; Ousley *et al*. 2009: 71-72; Tabachnick/Fidell 2001). Accordingly, the results of the group core analyses were reported by providing assignment frequencies (see Figure 66: (a)). The primary classification of the members of the Wadi Howar sub-groups and the Wadi Howar group was of secondary importance in this context. This was the case because each skeleton should be most similar to its own group. The secondary classification frequencies, i.e. the percentages of individuals closest to the most frequent “second highest groups”, constituted the actual results. Therefore, the comparative sample to which the majority of the members of a Wadi Howar sub-group or the Wadi Howar group were assigned in the context of the secondary classification was regarded as the sample to which that Wadi Howar sub-group or the Wadi Howar group was most similar. These results of the separate group core analyses were then used to determine which comparative sample each Wadi

Howar sub-group and the Wadi Howar group was generally closest to (see Figure 66: (b)). This procedure was analogous to that described for the Wadi Howar individuals.

	Modern comparative samples - Cranial and dental measurements	Modern comparative samples - Scaled cranial and dental measurements	Modern comparative samples - Non-metric cranial and dental traits
pre-Leiterband	100.0% pre-Leiterband; 62.5% ***Southern Sudan***; *100.0%*	100.0% pre-Leiterband; 100.0% ***Chad***; *98.6%*	100.0% pre-Leiterband; 87.5% ***Southern Sudan***; *97.9%*
Leiterband	100.0% Leiterband; 81.0% ***Southern Sudan***; *100.0%*	100.0% Leiterband; 76.2% ***Somalis***; *98.6%*	100.0% Leiterband; 81.0% ***Southern Sudan***; *97.9%*
Handessi	[100.0% Handessi; 100.0% ***Southern Sudan***]; *100.0%*	[100.0% Handessi; 100.0% ***Somalis***]; *98.6%*	[100.0% Leiterband; 100.0% ***Southern Sudan***]; *97.9%*
Wadi Howar	100.0% Wadi Howar; 56.3% ***Southern Sudan***; *99.3%*	100.0% Wadi Howar; 75.0% ***Chad***; *96.4%*	100.0% Wadi Howar; 93.8% ***Southern Sudan***; *99.3%*

(a)

	Modern comparative samples
pre-Leiterband	***Southern Sudan*** *94.17%; 90.00%*
Leiterband	***Southern Sudan*** *94.17%; 90.00%*
Handessi	[***Southern Sudan*** *94.17%; 90.00%*]
Wadi Howar	***Southern Sudan*** *94.53%; 87.63%*

(b)

Figure 66: Excerpts of the Wadi Howar sub-groups and the Wadi Howar group discriminant function analyses results tables. Selected results of analyses with the modern comparative samples (fine: percentage of individuals closest to the most frequent "highest group", most frequent "highest group"; normal: percentage of individuals closest to the most frequent "second highest group", bold: most frequent "second highest group"; normal: classification accuracy of the analysis – whole result in square brackets: unreliable) (a) and the overall results based on these analyses (bold: classification; normal: mean classification accuracy; fine: mean leave-one-out accuracy – whole result in square brackets: unreliable) (b).

The results of all core analyses were summarised and examined. The classification patterns which became apparent during this process could be interpreted. To establish which prehistoric and which modern comparative sample each Wadi Howar sub-group and the Wadi Howar material as a whole shared most affinities with, the relevant individual classifications were simply counted. The classification frequencies of the three culturally defined sub-groups, i.e. the pre-Leiterband, the Leiterband and the Handessi sub-sample, were also statistically compared (see Figure 67). 32 Pearson's and Yates's χ^2 tests were calculated by hand to detect significant differences in classification frequencies between these three sub-samples (e.g. Knußmann 1988(d): 677-680; Madrigal 1998: 192-203; Pearson 1900, 1934; Plackett 1983; Yates 1934; Zöfel 1992: 181-202).

Prehistoric classification frequencies		
A. Individual by individual frequencies	A.1. All classifications	A.1.a. Pearson's χ^2 test
		A.1.b. Yates's χ^2 test
	A.2. Reliable classifications	A.2.a. Pearson's χ^2 test
		A.2.b. Yates's χ^2 test
B. Analysis by analysis frequencies	B.1. All classifications	B.1.a. Pearson's χ^2 test
		B.1.b. Yates's χ^2 test
	B.2. Reliable classifications	B.2.a. Pearson's χ^2 test
		B.2.b. Yates's χ^2 test
Modern classification frequencies		
A. Individual by individual frequencies	A.1. All classifications	A.1.a. Pearson's χ^2 test
		A.1.b. Yates's χ^2 test
	A.2. Reliable classifications	A.2.a. Pearson's χ^2 test
		A.2.b. Yates's χ^2 test
B. Analysis by analysis frequencies	B.1. All classifications	B.1.a. Pearson's χ^2 test
		B.1.b. Yates's χ^2 test
	B.2. Reliable classifications	B.2.a. Pearson's χ^2 test
		B.2.b. Yates's χ^2 test

Figure 67: Overview of the χ^2 tests performed to detect differences in classification frequencies between the pre-Leiterband, Leiterband and Handessi sub-sample.

IV. Results[6]

Chapter synopsis

The main osteological characteristics of the Wadi Howar sample as a whole could be revealed by examining the results of the individual osteological analyses and the additionally gathered data (see IV.A.). The in situ *positions were fairly varied. Whereas some individuals were apparently buried in extended positions or sitting in their graves with flexed and adducted arms and legs, most Wadi Howar individuals must have been interred lying on one side assuming a more or less tightly flexed foetal position. Seemingly unusual* in situ *positions were caused by post-depositional movements. The sample's state of preservation was extraordinarily poor. The material was affected by advanced fragmentation and combinations of bone decomposition, animal gnawing, sandblasting, bleaching and deformations due to soil pressure. Males and females were almost equally well represented in the Wadi Howar sample, females outnumbering males by two individuals. The mean age at death was 26.8 years with and 29.1 years without sub-adult individuals. The frequency of sub-adults was 15.63%. Post-adult individuals occurred at the same frequency. With an average living height of 158.78 cm, the Wadi Howar individuals were comparatively short. Moreover, they were very slender. The sample's mean living weight and body mass index were 47.26 kg and 1.87 g/cm^2 respectively. The high mean crural index value, 86.84, illustrated that the prehistoric inhabitants of the Wadi Howar displayed markedly tropically adapted body proportion. Distinctly biologically sub-Saharan morphological traits, such as pronounced alveolar prognathism, a low, round nasal saddle (*Sella nasi*) and an ill-defined inferior nasal margin (*Margo infranasalis*), were identified as hallmarks of the sample. Other typical, less generalised biologically sub-Saharan, features included very long and high* Crania*, strikingly high mandibular symphyses (*Symphyses mandibularum*) and extremely large, morphologically fairly complex teeth. Various epigenetic traits were considered noteworthy. Among them were an Inca bone (*Os incae*), a large parastyle (*Tuberculum paramolare*), a peg-shaped upper third molar (*Dens molaris superior III*) and paranasal as well as intertrochlear foramina (*Foramina paranasalia et intertrochlearia*). The variability of the expressions of robusticity traits was rather high. On average, robusticity levels were moderate to low. Especially degrees of antebrachial and femoral shaft bowing as well as interosseous border (*Margo interosseus*) and pilaster sizes were, however, considerable. In addition, several cases of increased cortical thickness were noted. Traces of occupational stress were particularly evident in three areas. Firstly, apparently interconnected cranial and cervical markers appeared repeatedly. Secondly, the generally advanced dental abrasion was usually angled and often cupped. Additionally, notched and labial wear as well as chipping occurred. Thirdly, enlarged attachment sites, enthesiopathic lesions and arthrotic changes could often be spotted on bones of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*). It seemed that the members of the Wadi Howar sample were in relatively good health. One, possibly two, specimens had lesions which appeared to represent cranial injuries and three individuals had teeth artificially removed. Otherwise, evidence suggestive of trauma was scarce. Only very few pathological changes were found which could be indicative of non-specific or specific infectious diseases. The advanced thinning of a frontal bone (*Os frontale*), patches of small lesions on the outer surface (*Tabula externa*) of a parietal*

[6] The presentation of all results was intended to be as concise as possible. More detailed descriptions as well as explanations, discussions, interpretations and the associated relevant references were therefore deliberately confined to the appropriate parts of the discussion chapter (see V.C.).

*bone (*Os parietale*) and osteolytic lesions affecting a cervical vertebra (*Vertebra cervicalis*) were the most prominent of these changes. The incidence of dental and periodontal pathologies was comparatively low. Nonetheless, especially periodontal pathologies did occur fairly frequently. Moreover, enamel hypoplasia was common and the lesions were severe in several instances.*

The tests performed to detect intra-observer error showed that the differences between the original and the control data of 17 (i.e. 3.97%) of the 428 sets of pairs were either significantly or in tendency different from zero (see IV.B.). However, no sets contained original and control data which differed significantly or in tendency from each other. Furthermore, the absolute maximum and mean differences between the data pairs of the 17 sets in question were either negligible or caused by the discrepancies between laboratory estimates and in situ *measurements of long bone lengths. Consequently, no variables were judged to be unreliable or removed in the context of the intra-observer error analyses.*

The search for diachronic differences revealed that the pre-Leiterband and Leiterband values of 63 (i.e. 35.39%) of the 178 tested variables differed significantly or in tendency from each other (see IV.C.). Leiterband Crania *were thinner, their occipital regions (*Regiones occipitales*) were less robust and, like their mandibles (*Mandibulae*), displayed less prominent muscle attachment sites. Leiterband musculoskeletal stress markers were also less pronounced in general. The pre-Leiterband individuals had sharper mandibular ramus angles and higher mandibular symphyses (*Symphyses mandibularum*). Additionally, the members of the pre-Leiterband sub-sample were characterised by more abraded teeth and had relatively and absolutely more severely worn anterior teeth. Antimeric Leiterband molars were less symmetrical. Leiterband individuals suffered from more and markedly more advanced enamel hypoplasia as well. They were also more frequently affected by dental caries. Whereas the bones of the pre-Leiterband individuals' upper free extremities (*Partes liberae membrorum superiorum*) were more slender, they still had thicker cortical bone (*Substantia compacta*) and were characterised by both stronger bowing and greater interosseous border (*Margo interosseus*) sizes. Finally, the mean adult age at death of the pre-Leiterband sub-sample was 12.4 years higher than that of the Leiterband sub-sample.*

The 234 performed core discriminant function analyses produced unambiguous results (see IV.D.). As far as the prehistoric comparative samples were concerned, the Wadi Howar material shared most affinities with the Malian Sahara sample. In terms of modern affinities, the Wadi Howar material was closest to the Southern Sudan and, to a lesser extent, the Chad sample. These affinities manifested themselves both in the separate individual and the various group analyses. None of the 16 χ^2 tests, with which the frequencies of the reliable individual classifications were compared, detected significant differences between the pre-Leiterband, Leiterband and Handessi assignment frequencies. However, those group analyses, which involved the site-specific sub-samples, on the one hand, and the occupation phase-specific sub-samples, on the other hand, showed that the main Wadi Howar sub-samples were usually closer to the Malian Sahara and Southern Sudan sample than they were to each other. Moreover, under certain circumstances, the pre-Leiterband and the Abu Tabari 02/1 sub-sample were positioned near the Jebel Sahaba/Tushka sample.

IV.A. Description of the sample

Relying on both the results of the individual osteological analyses and the additionally collected data, it became possible to describe the Wadi Howar sample in its entirety. Accordingly, it was decided to conflate the two sets of results and report them together. Nevertheless, to ensure that they stayed readily available regardless of this decision, the results of the individual osteological analyses were also separately tabulated (see Table 6).

Table 6: Overview of the results of the individual osteological analyses.

	Abu Tabari 95/2-3	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5
***In situ* position**	● tightly flexed (foetal position), on its right side	● flexed, on its right side ● possible use of a perishable head rest	● flexed, on its right side	● probably flexed, on its left side ● post-depositional movements most likely due to erosion and strong winds
Preservation	● very poor ● all surfaces eroded; insect damage; crushed bones consolidated *in situ* ● preservation lists full: 5.94% (46:775) alternative shortened: 9.09% (29:319) shortened: 0.49% (1:206)	● poor to fair ● combinations of bleaching, sandblasting, soil pressure and animal gnawing; partially consolidated *in situ* ● 4 small bone masses attached to bones of the lower free extremities ● preservation lists full: 58.32% (452:775) alternative shortened: 72.41% (231:319) shortened: 65.53% (135:206)	● poor to fair ● many bone surfaces eroded; combinations of bleaching, sandblasting, soil pressure and animal gnawing; partially consolidated *in situ* ● preservation lists full: 38.97% (302:775) alternative shortened: 58.93% (188:319) shortened: 52.43% (108:206)	● very poor ● some surfaces eroded; combinations of bleaching, sandblasting, soil pressure and animal gnawing ● small bone mass attached to the right *Humerus* ● preservation lists full: 12.65% (98:775) alternative shortened: 21.63% (69:319) shortened: 5.83% (12:206)
Sex	● probably male	● female	● female	● probably male
Age	● adult or older	● late *Adultus* ● ca. 35-40 years	● *Maturus* - x ● ca. 40-x years	● middle to late *Adultus* ● ca. 30-40 years
Height	● ca. 165.7 cm	● ca. 165.9 cm	● ca. 159.0 cm	● ca. 159.9 cm
Weight	● ca. 47.8 kg	● ca. 48.2 kg	● ca. 45.2 kg	● ca. 50.8 kg
Physique	● leptosome-athletic ● rather robust remains ● BMI: 1.74	● leptosome-athletic ● long and slender long bones with pronounced muscle markings ● BMI: 1.75	● leptosome ● very gracile, long and slender long bones ● BMI: 1.79	● leptosome-athletic ● relatively robust remains with very pronounced muscle markings ● BMI: 1.99
Biological ancestry	● [(Jebel Sahaba/Tushka)], [(Haya)]	● sub-Saharan Africa ● Malian Sahara, Chad	● sub-Saharan Africa ● Malian Sahara, Chad	● (Malian Sahara), (Haya)
Epigenetic traits	-	● small *Foramen paranasale*, *Caput mandibulae dex.* with a *Fossa*, *Foramina intertrochlearia*	● *Trema*	-
Occupational stress	● femoral torsion	● paramasticatory tooth use (anterior dentition with wide notches) ● most long bones with diaphyseal medullary stenosis ● humeral, radial and ulnar shaft bowing ● widespread evidence of elevated habitual stress levels (muscle markings, tendons, joints, etc. - esp. *Claviculae*, *Antebrachia*, *Phalanges*, *Femora*) ● evidence of left-handedness	● paramasticatory tooth use (anterior dentition with labial and notched wear) ● extreme abrasion (esp. anterior dentition, posterior dentition with cupped wear) ● ulnar and femoral shaft bowing ● evidence of elevated habitual stress levels (esp. muscle markings)	● paramasticatory tooth use and extreme abrasion (anterior dentition with large notches and cupping of posterior dentition) ● humeral and femoral shaft bowing ● widespread evidence of elevated habitual stress levels (esp. muscle markings - e.g. *Myositis ossificans* distal to the *Origo* of the right *M. brachialis* and hypertrophic right *Crista m. supinatoris*)
Health	-	● small to moderate amounts of calculus and parodontosis ● caries (UP2r), *ante mortem* tooth loss (UM1r) and a root abscess (UP2r) ● osteolytic lesions in the *Corpora* of 2 *Vertebrae cervicales* ● faint *Striae* on the left *Femur* and *Tibia*	● small to moderate amounts of calculus ● parodontosis and advanced parodontitis ● *ante mortem* tooth loss (UP1r, UP2l, UM1l, UM2l, LM3r) ● root abscesses (UI1l, UP1l)	● faint *Striae* on the right *Tibia* ● traces of moderate *Spondylosis deformans*
Remarks	-	● crowding of the anterior mandibular dentition	● high, dome-shaped palate	-

	Abu Tabari 02/1-6	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2
***In situ* position**	-	● probably flexed, on its left side ● post-depositional movements most likely due to erosion and strong winds	● probably flexed, on its left side ● post-depositional movements most likely due to erosion and strong winds	● very tightly flexed (exaggerated foetal position), on its right side ● possibly originally sitting
Preservation	● very poor ● most surfaces eroded; combinations of bleaching and sandblasting ● preservation lists full: 0.00% (0:775) alternative shortened: 0.00% (0:319) shortened: 0.00% (0:206)	● very poor ● all bone surfaces eroded; combinations of bleaching and sandblasting ● preservation lists full: 7.61% (59:775) alternative shortened: 14.73% (47:319) shortened: 8.25% (17:206)	● very poor ● most bone surfaces eroded; combinations of bleaching and sandblasting ● preservation lists full: 32.77% (254:775) alternative shortened: 47.34% (151:319) shortened: 58.25% (120:206)	● fair to poor ● cranial deformation caused by soil pressure; moderate amounts of bleaching and animal gnawing ● 2 small bone masses attached to the left *Humerus* ● preservation lists full: 47.48% (368:775) alternative shortened: 34.80% (111:319) shortened: 44.66% (92:206)
Sex	● indeterminate	● probably male	● probably male	● probably male
Age	● adult or older	● middle *Adultus* - x ● ca. 30-x years	● early to middle *Iuvenis* ● ca. 12-15 years	● *Infans II* ● ca. 6-8 years
Height	-	● ca. 151.9 cm	● ca. 122.4 cm	● ca. 113.9 cm
Weight	-	● ca. 38.0 kg	● ca. 26.3 kg	● ca. 21.8 kg
Physique	-	● probably leptosome-athletic ● long and slender long bones with pronounced muscle markings ● BMI: 1.65	● BMI: 1.75	● BMI: 1.68
Biological ancestry	-	● (Malian Sahara), (Southern Sudan)	● Malian Sahara, Southern Sudan	● sub-Saharan Africa ● Malian Sahara, Southern Sudan
Epigenetic traits	-	-	-	● *Os incae*, *Os astericum*, *Os epiptericum*, small *Foramen paranasale*
Occupational stress	● *Phalanx media* with severe diaphyseal medullary stenosis ● *Tuberositas phalangis distalis* with traces of tufting	● severe abrasion ● femoral shaft bowing ● platymeria	● evidence of paramasticatory tooth use	● evidence of paramasticatory use of the *Dentes decidui* ● evidence of right-handedness ● tibial retroversion
Health	-	-	● severe enamel hypoplasia (esp. *Dentes molares II*) ● traces of calculus ● faint *Striae* on the left *Femur* and *Tibia*	● patches of small lesions on the *Tabula externa* of the left *Os parietale*
Remarks	-	● very high and robust *Symphysis mandibulae* with a *Torus transversus superior*-like structure ● evidence of tooth crowding	● crowding of the anterior maxillary and mandibular dentition	● very large teeth

	Abu Tabari 02/28-3	Abu Tabari 02/28-4	Abu Tabari 02/28-5	Abu Tabari 02/28-7
***In situ* position**	● tightly flexed, on its right side ● probably post-depositional movements caused by burrowing animals	-	● originally flexed ● possibly originally sitting ● post-depositional movements due to the build-up of putrefaction gasses	● flexed (foetal position), on its right side
Preservation	● very poor ● most bone surfaces eroded; combinations of bleaching, weathering, sandblasting and animal gnawing ● preservation lists full: 33.55% (260:775) alternative shortened: 49.84% (159:319) shortened: 37.38% (77:206)	● very poor ● small number of very badly preserved radial, ulnar and femoral fragments ● preservation lists full: 0.90% (7:775) alternative shortened: 3.76% (12:319) shortened: 0.00% (0:206)	● fair ● combinations of soil pressure, animal gnawing, sandblasting and bleaching ● preservation lists full: 64.26% (498:775) alternative shortened: 84.64% (270:319) shortened: 80.10% (165:206)	● very poor to poor ● advanced bone decomposition; all bone surfaces badly eroded; animal gnawing ● preservation lists full: 25.55% (198:775) alternative shortened: 35.74% (114:319) shortened: 38.83% (80:206)
Sex	● probably female	● probably male	● probably female	● probably female
Age	● early to middle *Maturus* ● ca. 40-50 years	● probably adult or older	● early *Adultus* ● ca. 20-25 years	● late *Iuvenis* ● ca. 15-20 years
Height	● ca. 160.0 cm	-	● ca. 149.2 cm	● ca. 150.6 cm
Weight	● ca. 52.2 kg	● ca. 48.0 kg	● ca. 42.6 kg	● ca. 45.6 kg
Physique	● leptosome ● long and slender long bones ● BMI: 2.04	● very robust femoral shaft fragment	● pyknic-athletic ● relatively short and robust long bones ● BMI: 1.91	● probably leptosome-hypoplastic ● very gracile remains ● BMI: 2.01
Biological ancestry	● probably sub-Saharan Africa ● Malian Sahara, Chad	-	● sub-Saharan Africa ● Malian Sahara, Southern Sudan	● probably sub-Saharan Africa ● Malian Sahara, Southern Sudan
Epigenetic traits	● large *Tuberculum paramolare* (UM2l)	-	● multiple *Foramina* superior to the nasal root, large *Foramina paranasalia*, enlarged *Foramen mentale*	-
Occupational stress	● paramasticatory tooth use (esp. *Dentes canini* with large notches and chipping) ● posterior dentition with cupped wear ● radial shaft bowing ● pilasterism ● evidence suggestive of elevated habitual stress levels ● traces of sub-pathological changes (e.g. *Fovea dentis atlantis*, distal end of the fibular *Membrana interossea* attachment area)	-	● furrows leading into *Foramina nutritia* ● humeral and femoral shaft bowing ● *Femora*: torsion, severe platymeria, shifted pilasters, deep *Fovea capitis femoris dex*. ● squatting facets ● widespread evidence of elevated habitual stress levels (e.g. *Claviculae*, *Phalanges*, *Fibulae*; increased rugosity - e.g. *M. temporalis*, *M. sternocleido-mastoideus*; enlargement - e.g. *Processus mastoidei*, *Tuberositates deltoideae*, *Trochanteres minores*)	-
Health	● traces of moderate amounts of calculus ● severe enamel hypoplasia ● right *Tibia* with vessel impression	-	● depressed cranial fractures ● traces of calculus and parodontosis ● enamel hypoplasia ● costal fragments with *Striae* and possible vessel impressions	● traces of calculus ● evidence indicative of the extraction of the lower central (and probably upper lateral) incisors
Remarks	● probably very prominent *Os zygomaticum*	● possibly more than one individual	● cranial vessel impressions (esp. *Os frontale*) ● large teeth, anterior tooth crowding and pronounced molar crown compression	● remarkably dolichocranic ● crown compression (esp. pronounced in upper molars)

	Abu Tabari 02/28-8	Abu Tabari 02/28-11	Abu Tabari 02/28-13	Abu Tabari 02/28-14
***In situ* position**	● flexed, on its left side ● post-depositional movements most likely caused by the build-up of putrefaction gasses	● flexed ● probably originally sitting ● post-depositional movements due to various taphonomic processes (gravity, putrefaction gasses, erosion, winds, etc.)	● isolated human bone and tooth fragments in association with the remains of a ceramic vessel	● probably flexed, on its left side ● possibly originally sitting ● post-depositional movements due to various taphonomic processes (gravity, putrefaction gasses, erosion, winds, etc.)
Preservation	● poor ● all bone surfaces eroded; widespread insect gnawing (esp. *Cranium*) ● small bone mass attached to the *Fossa mandibularis sin*. ● preservation lists full: 38.71% (300:775) alternative shortened: 53.92% (172:319) shortened: 53.40% (110:206)	● poor ● many bone surfaces partially eroded or covered by a grey concrete-like patina; sandblasting and bleaching ● preservation lists full: 14.06% (109:775) alternative shortened: 15.99% (51:319) shortened: 3.40% (7:206)	● very poor ● superficial erosion; sandblasting and bleaching ● preservation lists full: 1.16% (9:775) alternative shortened: 1.57% (5:319) shortened: 1.94% (4:206)	● very poor to poor ● many bone surfaces eroded; sandblasting and bleaching ● preservation lists full: 30.45% (236:775) alternative shortened: 40.13% (128:319) shortened: 49.03% (101:206)
Sex	● female	● male	● indeterminate	● probably male
Age	● late *Iuvenis* to early *Adultus* ● ca. 18-24 years	● adult or older	● probably late *Iuvenis* to early *Adultus*	● *Infans II* ● ca. 7-12 years
Height	● ca. 144.3 cm	● ca. 157.8 cm	-	● ca. 109.1 cm
Weight	● ca. 41.1 kg	● ca. 45.4 kg	-	● ca. 21.5 kg
Physique	● probably leptosome ● very gracile remains ● BMI: 1.97	● probably leptosome ● BMI: 1.82	-	● BMI: 1.81
Biological ancestry	● probably sub-Saharan Africa ● Malian Sahara, Southern Sudan	● (Jebel Sahaba/Tushka), (Haya)	● (Jebel Sahaba/Tushka), [(Southern Sudan)]	● Malian Sahara, Southern Sudan
Epigenetic traits	● shovel- and double shovel-shaped incisors	-	● large *Foramen paranasale*	● shovel- and double shovel-shaped incisors, “Bushman canines”
Occupational stress	● *Proc. mastoideus sin*. with increased rugosity of the *Insertio* of the *M. sterno-cleidomastoideus* ● *Atlas* and *Axis*: enlarged *Facies articulares* with arthrotic changes ● possible traces of *Spondylarthrosis deformans* (lower spine) ● right *Ulna* with medullary stenosis ● femoral torsion and pronounced shaft bowing	● traces of very slight *Spondylarthrosis deformans* (lower spine) ● very deep *Fossa trochanterica sin*. ● left *Fibula* with diaphyseal medullary stenosis	-	-
Health	● ossified structure on the *Tabula interna* of the *Os parietale sin*. ● traces of moderate amounts of calculus ● caries (LM3r) ● evidence indicative of the extraction of the lower central (and probably upper lateral) incisors	● moderate *Spondylosis deformans* (*Vertebrae lumbales*, *Promontorium*)	-	● enamel hypoplasia (esp. *Dentes canini inferiores*)
Remarks	-	-	-	● very large teeth

	Abu Tabari 02/28-15	Abu Tabari 02/28-20	Abu Tabari 02/28-21	Abu Tabari 02/28-22
***In situ* position**	● flexed (probably tightly) ● post-depositional movements probably due to putrefaction gases, animal burrowing, erosion, winds, etc.	● pit or grave cut by a pit; commingled fragments of human and animal remains mixed with pottery shards and ostrich eggshell beads	● probably originally flexed and sitting ● post-depositional movements most likely due to gravity, putrefaction gasses, erosion, winds, etc.	● flexed, on its right side
Preservation	● poor ● combinations of soil pressure, sandblasting and bleaching ● small bone masses attached to the *Os metacarpus I dex*., *Os metacarpus II sin*. and *Tibia sin*. ● preservation lists full: 48.00% (372:775) alternative shortened: 62.70% (200:319) shortened: 64.08% (132:206)	● very poor ● extremely fragmented; most surfaces eroded ● preservation lists full: 9.42% (73:775) alternative shortened: 12.23% (39:319) shortened: 10.19% (21:206)	● poor ● many surfaces eroded; often advanced bone decomposition; animal gnawing, sandblasting and bleaching ● preservation lists full: 43.23% (335:775) alternative shortened: 58.93% (188:319) shortened: 57.28% (118:206)	● very poor ● many bone surfaces eroded; bleaching, sandblasting, insect and rodent gnawing ● small bone mass attached to *Os metatarsale I dex*. ● preservation lists full: 62.45% (484:775) alternative shortened: 68.65% (219:319) shortened: 61.65% (127:206)
Sex	● probably female	● probably male	● probably female	● female
Age	● early to middle *Adultus* ● ca. 20-30 years	● early to middle *Adultus* ● ca. 20-25 years	● middle to late *Adultus* ● ca. 30-40 years	● late *Adultus* - early *Maturus* ● ca. 35-45 years
Height	● ca. 167.8 cm	-	● ca. 157.1 cm	● ca. 160.0 cm
Weight	● ca. 51.5 kg	● ca. 46.4 kg	● ca. 46.7 kg	● ca. 50.7 kg
Physique	● probably leptosome-athletic ● long and slender long bones ● BMI: 1.83	-	● (pyknic)-athletic ● remarkably robust *Mandibula* ● BMI: 1.89	● (leptosome)-athletic ● BMI: 1.98
Biological ancestry	● sub-Saharan Africa ● Malian Sahara, Southern Sudan	● [(Malian Sahara)], (Chad)	● sub-Saharan Africa ● Malian Sahara, Chad	● probably sub-Saharan Africa ● Malian Sahara, Chad
Epigenetic traits	● mylohyoid bridging, enlarged *Foramen mentale*, shovel-shaped incisors	● fairly large cusp on the lingual surface of UM3r	● weak *Torus palatinus*, peg-shaped UM3l	● *Ossa suturalia*, multiple *Foramina zygomaticofacialia*, *Foramen intertrochleare*, vastus notches
Occupational stress	● possible notched wear (UI1l, LCl) and chipping (UI2l) ● *Atlas* and *Axis*: enlarged *Facies articulares* with arthrotic changes; other *Vertebrae*: traces of *Spondylosis* and *Spondylarthrosis deformans* ● occasional medullary stenosis and furrows leading into *Foramina nutritia* ● enthesiopathic changes: *Impressio lig. costoclavicularis sin*., *Trochanter minor sin*.; increased rugosity: *Tuberositas glutaealis sin*.	-	● possible notched wear (LCr), possible chipping (UI1r) and angled molar wear ● *Atlas* and *Axis*: enlarged *Facies articulares* with arthrotic changes ● left *Clavicula* with enthesiopathic changes ● evidence of elevated habitual stress levels (e.g. *Crista m. supinatoris sin*., *Tuberositas ulnae sin*.) ● furrows leading into *Foramina nutritia*	● notched (UCr, LCr) and angled wear (premolars and molars) ● *Atlas* and *Axis*: enlarged *Facies articulares* with arthrotic changes ● widespread evidence of elevated habitual stress levels (e.g. pronounced muscle markings, large attachment sites, thick cortical bone, furrows leading into *Foramina nutritia*) ● indications of elevated manual stress levels ● pilasterism
Health	● traces of calculus and widespread parodontitis ● faint *Striae* on *Tibiae* and vessel impressions on the left *Tibia*	● traces of calculus ● traces of slight *Spondylarthrosis deformans*	● opening and porosities in the *Processus palatinus maxillae dex*. ● traces of parodontosis ● *Vertebra lumbalis V* and *Os sacrum* with *Spondylosis deformans* (beaks) ● *Facies articularis superior tibiae dex*. with eburnation grooves	● enamel hypoplasia, traces of calculus and associated alveolar recession, abscess distal to the LM3l
Remarks	● crowding of the anterior mandibular dentition	-	● crowding of the anterior mandibular dentition	● remarkably dolicho- and hypsicranic, occipital bunning ● crown compression (esp. molars)

	Abu Tabari 02/28-23	Abu Tabari 03/31	Abu Tabari 03/34-1	Conical Hill 95/4
***In situ* position**	● flexed, probably on its left side ● post-depositional movements probably due to animal borrowing, putrefaction gasses and strong winds	-	● flexed (foetal position), on its right side ● post-depositional movements probably caused by putrefaction gasses	● disturbed burial
Preservation	● very poor ● many bone surfaces eroded; sandblasting, bleaching and animal gnawing ● preservation lists full: 44.77% (347:775) alternative shortened: 59.25% (189:319) shortened: 75.24% (155:206)	● very poor ● grey patina; sandblasting, bleaching and animal gnawing ● preservation lists full: 1.81% (14:775) alternative shortened: 5.64% (18:319) shortened: 0.00% (0:206)	● very poor ● tooth surfaces and most bone surfaces eroded; animal gnawing ● preservation lists full: 29.81% (231:775) alternative shortened: 48.90% (156:319) shortened: 51.94% (107:206)	● very poor ● most bone surfaces eroded; partly consolidated *in situ* (resulting matrix); cranial deformation caused by soil pressure; animal (esp. insect) gnawing ● preservation lists full: 31.23% (242:775) alternative shortened: 40.44% (129:319) shortened: 51.94% (107:206)
Sex	● female	● probably male	● probably female	● male
Age	● late *Iuvenis* to early *Adultus* ● ca. 18-25 years	● probably adult or older	● late *Iuvenis* to early *Adultus* ● ca. 15-25 years	● late *Adultus* to early *Maturus* ● ca. 35-45 years
Height	-	● ca. 173.2 cm	● ca. 159.5 cm	-
Weight	● ca. 46.1 kg	● ca. 64.6 kg	● ca. 40.0 kg	-
Physique	● very gracile remains	● fairly robust femoral fragment ● BMI: 2.15	● probably leptosome-athletic ● BMI: 1.57	● very robust remains
Biological ancestry	● probably sub-Saharan Africa ● Jebel Sahaba/Tushka, Chad	-	● Malian Sahara, Southern Sudan	● sub-Saharan Africa ● Malian Sahara, Southern Sudan
Epigenetic traits	● *Torus palatinus*	-	● a large distal and mesial cusp on the lingual surface of each UM3	● *Sutura incisiva*
Occupational stress	-	● pronounced muscle markings ● platymeria	● fairly pronounced muscle markings ● platymeria	● likely paramasticatory use of the anterior dentition (left *Dentes incisivi* and *canini* decidedly more abraded) ● markedly angled molar wear
Health	● advanced thinning of the *Os frontale* ● molar roots (UM1l, UM2l) penetrate the left *Sinus maxillaris* ● multiple abscesses (LMs, UP1l, UP2l, UM1l, possibly also UP1r) ● parodontitis ● traces of calculus ● caries (esp. UM2l, LCl, LM2s, LM3s) ● enamel hypoplasia	-	● two molars (UM2l, LM1l) with minute caries lesions ● enamel hypoplasia	● enamel hypoplasia ● traces of calculus
Remarks	● occipital bunning ● pronounced prognathism	-	● crowding and malalignment of the anterior maxillary dentition (linguoversion of the UI2s)	● remarkably dolicho- and hypsicranic ● exceptional cranial thickness ● marked sagittal keeling ● high, dome-shaped *Palatum osseum* ● very high *Corpus mandibulae* ● pronounced prognathism ● large teeth

	Conical Hill 95/4-1	**Conical Hill 02/3-4**	**Djabarona 96/1-1**	**Djabarona 96/1-2**
***In situ* position**	● from the same disturbed burial as Conical Hill 95/4	● flexed, sitting ● post-depositional movements caused by disarticulation and gravity	● extended	● extended
Preservation	● very poor ● two isolated teeth ● preservation lists full: 2.19% (17:775) alternative shortened: 3.13% (10:319) shortened: 3.88% (8:206)	● very poor to poor ● bone and tooth surfaces eroded; *post mortem* damage mimicking paramasticatory tooth use (LM2r, LM3r); consolidated *in situ* (resulting matrix); soil pressure and animal (incl. insect) gnawing ● preservation lists full: 13.29% (103:775) alternative shortened: 21.32% (68:319) shortened: 16.50% (34:206)	● poor to very poor ● all bone surfaces bleached and eroded; sandblasted holes (esp. *Radius dex.*); animal (esp. insect) gnawing ● preservation lists full: 44.65% (346:775) alternative shortened: 57.99% (185:319) shortened: 59.22% (122:206)	● very poor ● all fragments eroded and bleached, most with abraded edges ● preservation lists full: 10.19% (79:775) alternative shortened: 17.24% (55:319) shortened: 13.11% (27:206)
Sex	● probably female	● male	● probably female	● probably female
Age	● *Infans II* to early *Iuvenis* ● ca. 9-14 years	● late *Iuvenis* to early *Adultus* ● ca. 18-22 years	● late *Iuvenis* to early *Adultus* ● ca. 17-25 years	● late *Iuvenis* to early *Adultus* ● ca. 17-25 years
Height	-	● ca. 161.2 cm	● ca. 156.1 cm	● ca. 149.1 cm
Weight	-	● ca. 49.5 kg	● ca. 45.9 kg	● ca. 44.5 kg
Physique	-	● probably athletic ● very robust remains ● BMI: 1.91	● leptosome ● comparatively gracile remains ● BMI: 1.88	● leptosome ● gracile remains ● BMI: 2.00
Biological ancestry	● (Jebel Sahaba/Tushka), (Chad)	● sub-Saharan Africa ● (Jebel Sahaba/Tushka), (Southern Sudan)	● sub-Saharan Africa ● Malian Sahara, Chad	● (Malian Sahara), (Haya)
Epigenetic traits	-	● probably *Ossa suturae lambdoideae*	● *Ossa suturae lambdoideae*	-
Occupational stress	-	● *Axis*: enlarged *Facies articulares superiores* with arthrotic changes ● long bones with thick cortical bone (*Substantia compacta*)	● paramasticatory use of the anterior dentition (symmetrical, mesial notched wear with labial tendencies on the UI1s) ● radial and femoral shaft bowing ● furrows leading into *Foramina nutritia* ● right *Humerus* markedly more robust than the left	-
Health	-	● lower central incisors avulsed ● root abscess (LCl) ● enamel hypoplasia	● inflammatory alveolar reaction around LM3l ● comparatively severe enamel hypoplasia	● LM2r with minute caries lesions
Remarks	-	● dolichocranic ● considerable cranial thickness ● very robust *Planum nuchale* and very prominent *Glabella* ● marked prognathism ● large and very robust *Mandibula* with a very high and massive *Symphysis*	● mesocranic ● short *Mandibula* with a *Torus transversus superior*-like structure and an unusually large ramus angle ● pronounced lingual inclination of the LM3s	● mesial inclination of the LM3r (impacted by the LM2r)

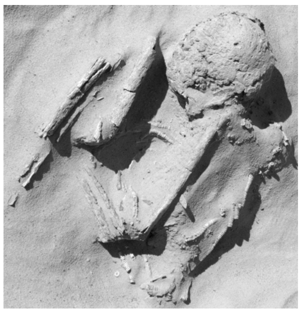
	Djabarona 96/4	Djabarona 96/120-3	Djabarona 96/120-4	Djabarona 96/120-5
***In situ* position**	● extended	-	● flexed, on its right side	● flexed, on its left side
Preservation	● very poor ● all bone surfaces severely eroded and bleached, some weathered, many with abraded edges, some with sandblasted holes; *post mortem* damage mimicking paramasticatory tooth use (all remaining molars) ● preservation lists full: 6.71% (52:775) alternative shortened: 12.85% (41:319) shortened: 5.34% (11:206)	● very poor ● eroded and bleached fragments; *post mortem* damage mimicking paramasticatory tooth use (LM3r) ● preservation lists full: 0.77% (6:775) alternative shortened: 0.31% (1:319) shortened: 0.00% (0:206)	● very poor ● all bone surfaces substantially eroded and bleached, many with abraded edges, some with sandblasted holes; animal gnawing ● preservation lists full: 9.03% (70:775) alternative shortened: 11.60% (37:319) shortened: 2.91% (6:206)	● very poor ● virtually all bone surfaces eroded (many severely) and bleached, many with abraded edges ● preservation lists full: 4.39% (34:775) alternative shortened: 7.52% (24:319) shortened: 8.25% (17:206)
Sex	● probably male	● probably female	● probably male	● probably female
Age	● late *Iuvenis* to early *Adultus* ● ca. 16-25 years	● middle *Adultus* ● ca. 25-35 years	● middle *Adultus* ● ca. 25-35 years	● *Adultus* ● ca. 20-40 years
Height	● ca. 165.7 cm	-	● ca. 161.7 cm	-
Weight	● ca. 49.7 kg	-	● ca. 46.5 kg	-
Physique	● probably athletic ● comparatively robust remains ● BMI: 1.81	● gracile clavicular fragment	● leptosome ● long and very slender long bones, fairly robust cranial remains ● BMI: 1.78	● fairly robust cranial remains
Biological ancestry	● (Jebel Sahaba/Tushka), (Chad)	-	● probably sub-Saharan Africa ● (Jebel Sahaba/Tushka), [(Haya)]	● sub-Saharan Africa ● (Malian Sahara), (Haya)
Epigenetic traits	-	-	-	-
Occupational stress	● *Femora*: pronounced shaft bowing, pronounced pilasterism, torsion and platymeria ● thick cortical bone (*Substantia compacta*) (esp. *Tibia dex.*)	-	● radial shaft bowing ● right *Radius* with diaphyseal medullary stenosis ● relatively thick cortical bone (*Substantia compacta*) (esp. *Tibiae*) ● furrows leading into *Foramina nutritia*	-
Health	-	-	-	-
Remarks	-	-	-	● pronounced prognathism

IV.A.1. *In situ* position

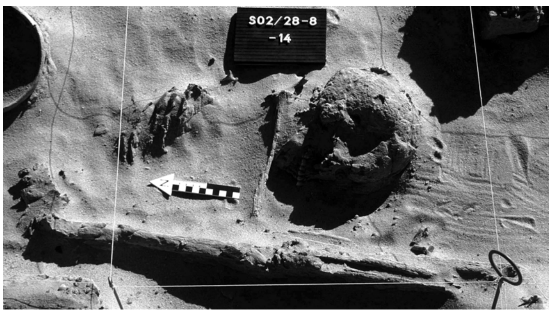
56.25% (i.e. 18) of the 32 members of Wadi Howar sample were laid to rest in a more or less tightly flexed foetal position (see Table 6 and Appendix X. for all relevant available *in situ* photographs). Nine (50.00%) of these 18 flexed skeletons were lying on their right, seven (38.89%) on their left side. Evidence suggestive of a connected sex-specific pattern was only found at Abu Tabari 02/1. There, males were apparently buried on their left and females on their right side. Six individuals (18.75% of the sample) were not interred in foetal positions. Conical Hill 02/3-4 was definitely originally sitting in his grave, with bent and adducted arms and legs drawn closely to the body. Abu Tabari 02/28-11 and -21 were most likely initially sitting in their graves as well. That Abu Tabari 02/28-2, -5 and -14 were buried in comparable positions could not be entirely ruled out either. However, it did not seem overly likely. Extended positions were limited to three burials, i.e. 9.38% of the members of the sample. Only Djabarona 96/1-1, -2 and 96/4 constituted full-length burials.

Post-depositional movements were encountered in 17 (i.e. 53.13%) of the cases (see Table 6). The mechanisms responsible for these movements were diverse and had often interacted in different combinations. Several teeth and bones were probably moved by strong winds after they had been temporarily exposed on the surface. Activities of animals, especially burrowing ones, appeared to have caused some movements of skeletal elements. There was little doubt that body parts of a few individuals, most notably Abu Tabari 02/28-5 and -8, had moved due to the build up of gasses during putrefaction. Moreover, gravity repositioned a number heads, legs and arms after they had obviously been disarticulated by naturally occurring taphonomic processes. Lastly, Abu Tabari 02/28-20 and Conical Hill 95/4 could be characterised as disturbed burials.

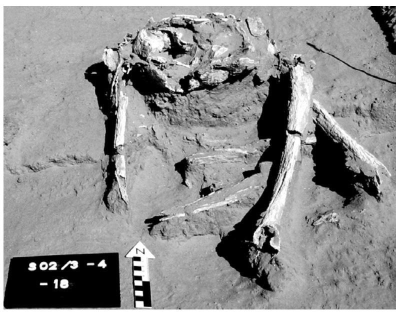
(a)



(b)



(c)



(d)

Figure 68: Selected individuals *in situ*. Abu Tabari 02/28-5: post-depositional movements caused by the build-up of putrefaction gasses (a), Abu Tabari 02/28-7: tightly flexed foetal position (b), Abu Tabari 02/28-8: post-depositional movements caused by the build-up of putrefaction gasses (c) and Conical Hill 02/3-4: effects of disarticulation and gravity on a seated body (d) (a: F. Godhoff; c: E. Fäder; d: Godhoff/Jesse; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*; b: D. Haberlah).

IV.A.2. Preservation

Generally, the Wadi Howar sample's state of preservation was extraordinarily poor (see Table 6). The material was very fragile, extremely fragmented and often in advanced stages of bone decomposition. Additionally, the skeletons were invariably characterised by *post mortem* damage caused by various combinations and degrees of bleaching, weathering, sandblasting, soil pressure and animal gnawing. On average, the fragments were small. At least a few bones of virtually all individuals were affected by some form of bleaching. Countless surfaces were damaged and smoothed down by sandblasting. Several cranial and postcranial elements were deformed by the pressure of the soil they had been buried in. Rodents and insects were responsible for the majority of the extremely widespread animal-induced damage. *Post mortem* lesions probably brought about by other animals, such as *Suidae* or *Canidae*, on the other hand, were rather rare. Animal gnawing, sandblasting and sintering also created a number of pseudo-pathologies and structures which could be mistaken for occupational stress markers. Surface erosion was the most commonly encountered form of bone decomposition. Occasionally, bones were covered with a natural, thin grey patina.

In addition to this primary *post mortem* damage, secondary *post mortem* damage was unfortunately unavoidable. Under the limiting circumstances in the field, only minimal measures could be taken to minimise additional breakage during and after the retrieval of the skeletons. Both fierce winds, which regularly reburied and displaced already exposed bones, and the extremely loose sediment frequently necessitated somewhat unorthodox strategies in this regard. In absence of a biological anthropologist, some remains unearthed before 2003 were consolidated *in situ*. Regrettably, airborne sand, and in some cases sediment attached to parts of the skeletons, could not be prevented from mixing with the glue used in this undertaking. The at least three-day-long transport through a most demanding desert terrain and on, at times, rather bumpy roads by car undoubtedly caused further *post mortem* damage. Finally, shipping the material to Europe by air introduced yet another source of damage.

As a result of all this primary and secondary *post mortem* damage, countless minute pieces of bones and teeth could not be incorporated when larger or diagnostically valuable fragments were reassembled later. Moreover, the concrete-like matrix, which covered most of the material treated with glue *in situ*, often proved impossible to remove without causing additional damage.

(a)

(b)

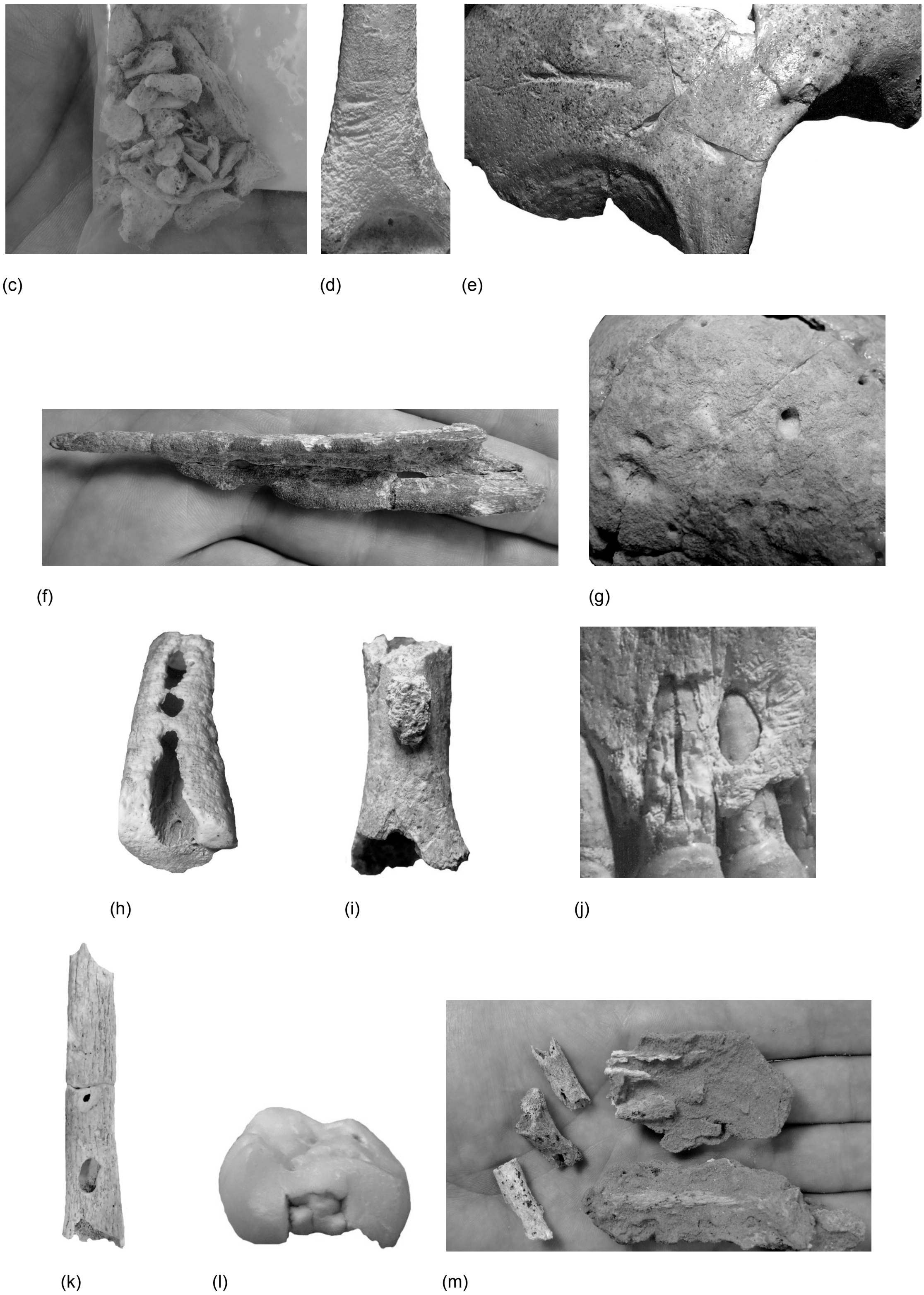


Figure 69: State of preservation. Abu Tabari 02/28-23: *in situ* (a), Abu Tabari 02/1-2, -3, 02/28-2, -3, -5, -7, -8, -15, -21 and Conical Hill 02/3-4: majority of the remains after their reconstruction (b), Abu Tabari 02/1-5: cranial fragments (c), Abu Tabari 02/28-2: left *Humerus* with damage caused by mammal (probably not rodent) gnawing (d), Abu Tabari 02/28-5: vessel impression modified by sandblasting reminiscent of cut marks on the frontal bone (*Os frontale*) (e), Abu Tabari 02/28-7: partially decomposed and weathered fragment of the left *Femur* (f), Abu Tabari 02/28-8: left parietal bone (*Os parietale*) with damage caused by insect gnawing (g), Abu Tabari 02/28-15: sandblasted and bleached fragment of the right *Femur* (h), Abu Tabari 02/28-15: pseudo-neoplasm on the second metacarpal bone (*Os metacarpale II*) of the left hand (i), Abu Tabari 02/28-21: root of the left upper first premolar (*Dens praemolaris superior I*) exposed by rodent gnawing (j), Djabarona 96/1-1: bleached right *Radius* with animal damage enlarged by sandblasting (k), Djabarona 96/4: right lower first molar (*Dens molaris inferior I*) with facets mimicking paramasticatory wear (l) and Conical Hill 02/3-4: bone fragments in glue matrix (m) (a: F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The mean full and shortened preservation data list index values of the Wadi Howar sample were 24.20 and 30.66% respectively (see Appendix XI. for all calculated preservation indices). 0.00 and 64.26% and 0.00 and 80.10% were the respective minima and maxima. Even these low values could only be computed on the basis of the data which was collected after the extremely time-consuming efforts to reconstruct as many parts of bones and teeth as possible. These facts further illustrated how poorly the Wadi Howar material was actually preserved.

	Full list (%)	Cranial metric data (%)	Dental metric data (%)	Postcran. metric data (%)	Cranial morph. data (%)	Cranial epigenetic data (%)	Dental epigenetic data (%)	Postcran. epigenetic data (%)
Wadi Howar	24.20	14.88	38.67	21.53	27.64	12.46	31.64	8.11

	Cranial robusticity data (%)	Postcranial robusticity data (%)	Cranial musculo-skeletal stress data (%)	Postcranial musculo-skeletal stress data (%)	Dental abrasion data (%)	Enamel hypoplasia data (%)	Dental caries data (%)	***Cribra orbitalia* data (%)**
Wadi Howar	32.03	39.69	11.06	20.51	45.90	41.99	46.68	18.75

(a)

	Shortened list (%)	Cranial metric data (%)	Dental metric data (%)	Cranial morph. data (%)	Cranial epigenetic data (%)	Dental epigenetic data (%)
Wadi Howar	30.66	19.27	38.67	32.14	23.58	33.18
Prehistoric comparative samples[1]	63.39	80.06	55.41	88.24	81.54	48.52
Modern comparative samples	64.23	79.96	49.19	96.56	96.13	53.26
Jebel Sahaba/Tushka	70.09	86.77	66.89	93.88	83.12	51.47
A-Group	65.95	84.57	55.13	88.44	85.71	52.53
Malian Sahara	54.94	69.81	45.18	82.92	76.28	42.17
“Sudanese Hotchpotch”	19.26	14.40	25.00	34.52	34.34	11.55
Southern Sudan	67.46	78.78	57.68	95.24	94.70	56.75
Chad	54.55	68.35	40.91	89.61	90.50	42.50
Mandinka	59.16	81.14	34.59	99.68	100.00	49.13
Somalis	74.56	87.69	63.75	100.00	96.82	64.76
Haya	66.24	85.09	49.61	98.93	99.09	53.97

[1] The values were calculated without the data of the “Sudanese Hotchpotch” sample.

(b)

	Additional shortened list (%)	Postcranial metric data (%)	Cranial robusticity data (%)	Postcranial robusticity data (%)	Cranial musculo-skeletal stress data (%)	Postcranial musculo-skeletal stress data (%)	Enamel hypoplasia data (%)
Wadi Howar	35.26	34.72	33.85	37.11	12.50	20.63	41.99
Jebel Sahaba/ Tushka[1]	80.24	80.85	100.00	74.17	66.67	92.67	73.96

[1] The values were based on the 15 individuals processed using the alternative shortened data collection list.

(c)

Figure 70: Excerpts from Appendix XI.. Full preservation data list and its sub-sections: Wadi Howar sample (a), shortened preservation data list and its sub-sections: all samples (b) and alternative shortened preservation data list and its sub-sections: Wadi Howar and Jebel Sahaba/Tushka sample (c).

IV.A.3. Measurements

Merely processing the Wadi Howar sample metrically did not reveal many remarkable characteristics (see Appendix XII., XIII. and XIV. for all cranial, dental and postcranial measurements, indices and scaled measurements as well as the accompanying descriptive statistics). The sample’s dolichocranic cranial index (I1.) value, 70.93, approached the “hyper-dolichocranic” category. The mean subnasal angle (74.) of 63.33° underlined the material’s hyper-prognathous nature. The taken dental measurements made clear just how megadont the prehistoric inhabitants of the Wadi Howar really were. In comparison with the average dental dimensions of the 21 specimens of the Jebel Sahaba/Tushka sample, for example, all but three mean Wadi Howar crown lengths (81.) surpassed the mean Jebel Sahaba/Tushka crown lengths. The remaining three were equal in size. As far as mean crown widths (81(1).) were concerned, seven mean Wadi Howar crowns were larger. However, one was of equal size and eleven were 0.1, five 0.2 and six 0.4 to 0.6 mm smaller. On average, the Wadi Howar individuals also had slightly longer *Femora* (F1.) and *Tibia*e (T1a.) than the 15 Jebel Sahaba/Tushka skeletons which were processed using the alternative shortened data collection list. The differences amounted to 6.4 and 10.5 mm respectively. The Wadi Howar *Femora* were platymeric (FI4. *Index platymericus*: 81.16) and the *Tibiae* distinctly eurycnemic (TI2. *Index cnemicus*: 74.28). Finally, the mean Wadi Howar crural index (IPM030 - *Modified tibio-femoral index) value, 86.84, clearly classified the sample as dolichocnemic.

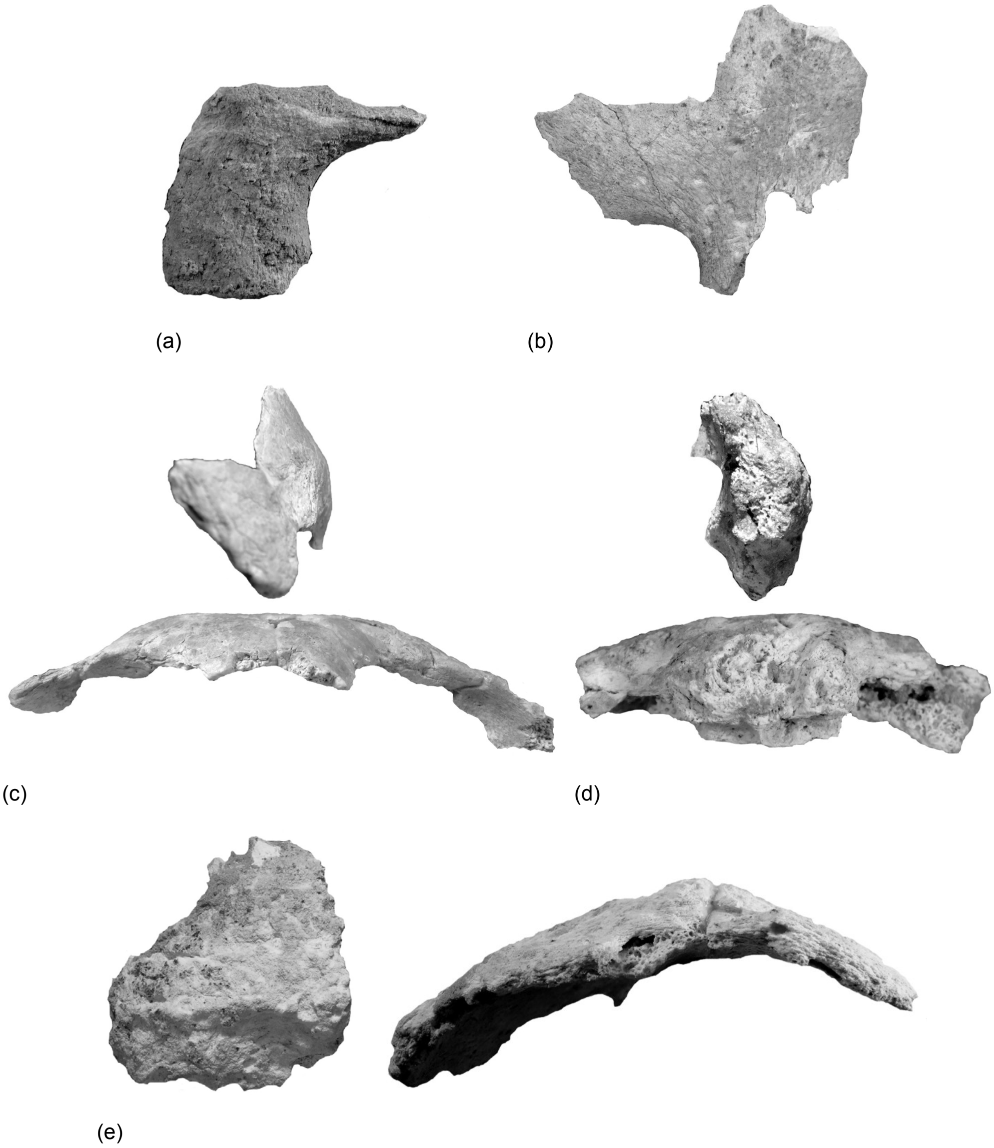


Figure 71: Examples of sexually dimorphic structures. Abu Tabari 02/1-3 (female): right greater sciatic notch (*Incisura ischiadica major*) (a), Abu Tabari 02/28-22 (female): right greater sciatic notch (*Incisura ischiadica major*) (b), Abu Tabari 02/28-11 (male): *Glabella* in lateral (*Norma lateralis*) and basilar view (*Norma basilaris*) (c), Conical Hill 02/3-4 (male): *Glabella* in lateral (*Norma lateralis*) and basilar view (*Norma basilaris*) (d) and Conical Hill 02/3-4 (male): left part of the occipital bone (*Os occipitale*) in occipital (*Norma occipitalis*) and whole occipital bone (*Os occipitale*) in vertical view (*Norma verticalis*) (e).

IV.A.4. Sex

Table 7: Sex diagnoses overview.

	All diagnoses	Confident diagnoses	Reasonably confident diagnoses
Abu Tabari 95/2	1 male	-	-
Abu Tabari 02/1	2 female, 3 male, 1 indeterminate	02/1-2 (female - pelvic morphology), 02/1-3 (female - cranial morphology)	02/1-7 (probably male)
Abu Tabari 02/28	8 female, 5 male, 1 indeterminate	02/28-11 (male - pelvic morphology), 02/28-22 (female - pelvic morphology), 02/28-23 (female - cranial morphology)	02/28-2 (probably male), 02/28-7 (probably female), 02/28-8 (female), 02/28-14 (probably male), 02/28-15 (probably female)
Abu Tabari 03/31	1 male	-	-
Abu Tabari 03/34	1 female	-	-
Conical Hill 95/4	1 female, 1 male	95/4 (male - cranial morphology)	-
Conical Hill 02/3	1 male	02/3-4 (male - cranial morphology)	-
Djabarona 96/1	2 female	-	-
Djabarona 96/4	1 male	-	-
Djabarona 96/120	2 female, 1 male	-	-
Total	16 female, 14 male, 2 indeterminate	4 female, 3 male	3 female, 3 male

With 16 females and 14 males, 50.00% and 43.75% of the sample respectively, the sexes were almost equally well represented. Unfortunately, only seven individuals (21.88% of all skeletons) could be confidently sexed. The sex of another 18.75% (i.e. six) of the members of the sample could be diagnosed with reasonable rather than full confidence. The remaining 19 individuals (59.38% of the series) either exhibited ambiguous morphological and metric characteristics or their state of preservation made satisfactory sex estimations impossible. In two (i.e. 6.25%) of the altogether 32 cases sex could not be estimated.

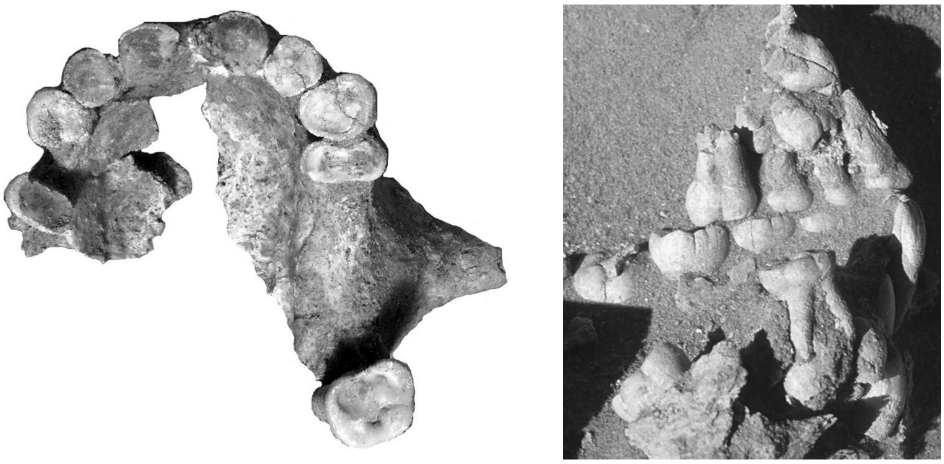
Table 8: The results of the metric dental sex diagnoses based on two of Langenscheidt's (1983) formulae (male: > 0; female: < 0) in comparison with the relevant results of the overall osteological sex diagnoses.

	Langenscheidt (1983): LI1 (81.), LI1 (81(1).), LC (81(1).)	Langenscheidt (1983): LC (81.), LC (81(1).)	Osteological diagnoses	Confident osteological diagnoses	Reasonably confident osteological diagnoses
Abu Tabari 02/1-2	1.51906	0.76617	female	female	-
Abu Tabari 02/1-3	-	0.73507	female	female	-
Abu Tabari 02/1-8	-1.40626	1.09669	probably male	-	-
Abu Tabari 02/28-2	1.67418	3.84065	probably male	-	probably male
Abu Tabari 02/28-3	1.98001	3.07438	probably female	-	-
Abu Tabari 02/28-5	-1.15604	1.32017	probably female	-	-
Abu Tabari 02/28-7	-	-0.63257	probably female	-	probably female
Abu Tabari 02/28-8	-	-1.07266	female	-	female
Abu Tabari 02/28-14	1.25468	4.04605	probably male	-	probably male
Abu Tabari 02/28-15	-1.63091	-0.35991	probably female	-	probably female
Abu Tabari 02/28-21	-2.00623	-0.69296	probably female	-	-
Abu Tabari 02/28-22	-	-0.43151	female	female	-
Abu Tabari 02/28-23	0.66211	-0.22358	female	female	-
Abu Tabari 03/34-1	-0.96186	0.36839	probably female	-	-
Conical Hill 95/4	-	3.72674	male	male	-
Djabarona 96/1-1	-4.99789	-2.61894	probably female	-	-

Most measurements showed relatively clear sex differences (see Appendix XII.). Furthermore, those variables which could be expected to separate males and females particularly well usually did so (see Figure 30). Nonetheless, the only standardised metric method which was not found to diagnose virtually all individuals as females or produce completely erratic results, namely the one presented by Langenscheidt (1983), still proved rather unreliable (see Table 8).

IV.A.5. Age

Not unlike the sex diagnoses, the age at death estimates could often only be given with considerable uncertainty. The degree of uncertainty was directly reflected in the age description and the span of the analysis age at death provided for each reported diagnosis (see Appendix XV. for all individual estimates and the accompanying descriptive statistics). The overall mean age at death was 26.8 years. The mean age at death without sub-adult individuals was 29.5 years. When Abu Tabari 02/28-7 was included in the "adult" category this age dopped to 29.1 years. Not counting Abu Tabari 02/28-7 as a sub-adult specimen, the sample contained four individuals (12.5%) in the "*Infans I*", "*Infans II*" or "*Iuvenis*" category. Counting Abu Tabari 02/28-7 as a sub-adult specimen, the sample contained 15.63% (5:32) sub-adults. The sample also contained 15.63% (5:32) post-adults, provided the individuals with an analysis age of 40 years were included in this group. Without them, the number of individuals in the "*Maturus*" or "*Senilis*" category dropped to two (6.25%).



(a) (b)

Figure 72: Examples of dental age markers. Abu Tabari 02/1-3's advanced maxillary abrasion (a) and the stage of Abu Tabari 02/28-14's dental development *in situ* (b) (b: A. Willmy; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

IV.A.6. Height

Living height could be estimated for 23 individuals, 71.88% of the sample (see Appendix XVI.A. and B. for all individual results and the accompanying descriptive statistics). However, the vast majority of the necessary calculations had to be based on *in situ* measurements or laboratory length estimates (see Appendix XII.C.). In comparison with relevant prehistoric samples and modern African populations, the members of the Wadi Howar sample were rather short. On a global scale, the overall mean height of 158.78 cm could be classified as "above medium height" for females (157-161 cm) and "short" for males (152-161 cm). The maximum height, 173.19 cm, fell into the male "tall" (172-182 cm) and 144.32 cm, the minimum adult height, fell into the female "short" category (142-150 cm). 162.14 cm, the mean male living height, belonged in the "below medium height" sub-category (161-165 cm) of male “average” heights (161-172 cm). The mean female living height, 156.55 cm, could be placed in the female “average” height sub-category “medium height” (154-157 cm).

IV.A.7. Weight

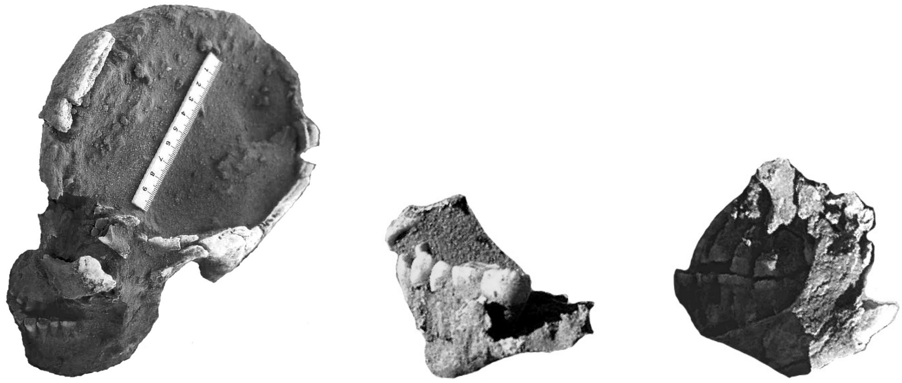
A living weight estimate could be given for 81.25% (26 out of 32) of the Wadi Howar individuals (see Appendix XVI.A. and C. for all individual results and the accompanying descriptive statistics). Most measurements required for the relevant equations could be taken without difficulty (see Appendix XII.C.). The average living weights of the sample were low. 48.67, 46.18 and 47.26 kg were calculated for males, females and both sexes respectively. The lowest adult weight estimate was 38.03 kg, 64.61 kg the highest.

IV.A.8. Physique

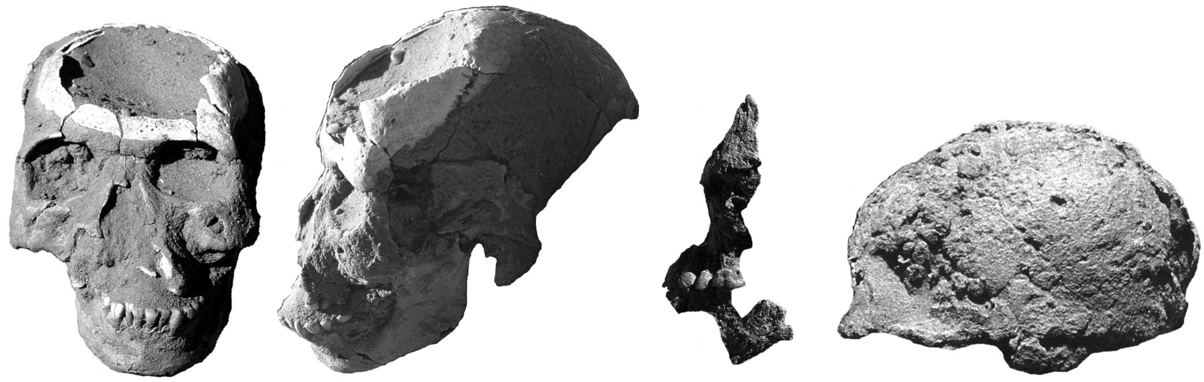
The prehistoric inhabitants of the Wadi Howar appeared to have been long-legged, lean, leptosome individuals (see IV.A.3.). Height-weight indices could be computed for 71.88% (23 out of 32) of the sample (see Appendix XVI.A. for all individual results and the accompanying descriptive statistics). The mean Quetelet index value, 2.98 g/cm, was closest to reference value for “emaciated” individuals (2.9). Although 1.87 g/cm^2, the sample’s average body mass index, approached the “very lean” category, it remained within the “lean” range (1.81-2.14). The mean Rohrer index, 1.18 g/cm^3, could be classified as “low” (1.13-1.19). In fact, it was below the lowest value still deemed “healthy” (1.2). With an average of 2.28 g$^{0.333}$/cm, the sample as a whole could be positioned at the upper end of the “lean” category (2.20-2.29) of the *Index ponderalis*. Even the highest height-weight index values were still moderate. The Quetelet index maximum of 3.73 g/cm, the body mass index maximum value of 2.15 g/cm^2, the Rohrer index maximum value of 1.37 g/cm^3 and the *Index ponderalis* maximum value of 2.39 g$^{0.333}$/cm were “lean” (lean: 3.6, normal: 4.0), “average” (2.15-2.56), “high” (1.33-1.39) and “average” (2.30-2.39) respectively.
The data of 34.38% (11 out of 32) of the Wadi Howar individuals were sufficient to determine a humeral robusticity index (HI1.) value (see Appendix XIII.C.). Considering the low sample average of this index, 17.71, it was hardly surprising that only four (21.05%) of all 19 diagnosed individuals were not classified as fully or partly “leptosome” (see Table 6). Five (45.45%) of the eleven individuals with humeral robusticity indices (HI1.) were categorised as “leptosome”, four (36.36%) as “leptosome-athletic” and two (18.18%) as “pyknic-athletic”. Another eight individuals (25.00% of the entire sample) without humeral robusticity index (HI1.) values were tentatively classified. One (12.50%) of these eight specimens was diagnosed as probably “leptosome-hypoplastic”, two (25.00%) as probably “leptosome”, three (37.50%) as probably “leptosome-athletic” and two (12.50%) as probably “athletic”.

IV.A.9. Biological ancestry

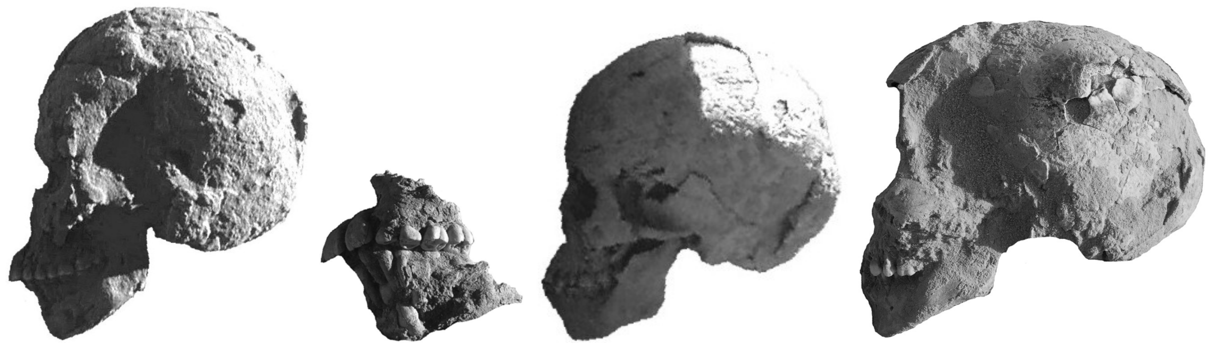
Even without relying on statistical comparisons (see IV.D.), the Wadi Howar material could be confidently positioned within the context of modern African populations. Firstly, the series could be identified as clearly biologically sub-Saharan. Secondly, the remains could be described as particularly similar to skeletal samples representative of groups of speakers of Nilo-Saharan languages, especially those encountered in Southern Sudan.



(a) (b) (c)



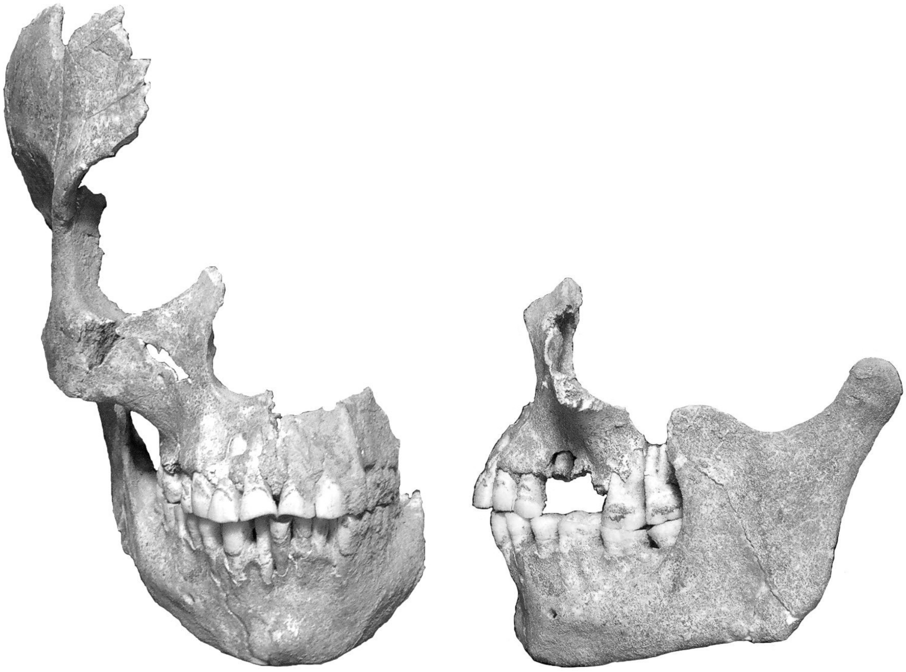
(d) (e)



(f) (g) (h) (i)

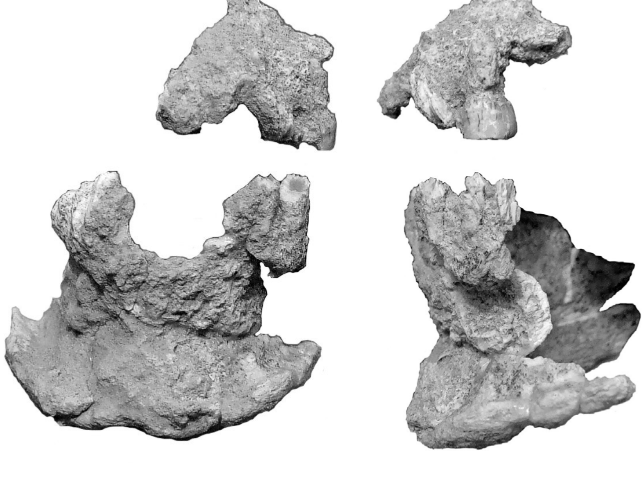
Figure 73: Selected cranial remains *in situ*. Abu Tabari 02/1-3 (a), Abu Tabari 02/1-8 (horizontally flipped) (b), Abu Tabari 02/28-3 (c), Abu Tabari 02/28-5 (d), Abu Tabari 02/28-7 (e), Abu Tabari 02/28-8 (horizontally flipped) (f), Abu Tabari 02/28-14 (horizontally flipped) (g), Abu Tabari 02/28-22 (h) and Abu Tabari 02/28-23 (horizontally flipped) (i) (a: Hilpert/Lange; b, d, e, i: F. Godhoff; c, f: E. Fäder; g: A. Willmy; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*; h: A. Gundelwein).

The consistently recurring generalised biologically sub-Saharan morphological traits included, for example, pronounced alveolar prognathism, a low, round nasal saddle (*Sella nasi*) and an ill-defined inferior nasal margin (*Margo infranasalis*) (see Figure 73 and 74). Examining the expressions of such widely used and other traits, the biological ancestry of 50.00% (16 out of 32 members) of the series could be estimated osteologically (see Appendix XVII. for the individual scores of all systematically evaluated cranial morphological traits and the accompanying descriptive statistics). Ten individuals (31.25% of the sample) were well-preserved enough to be classified as biologically sub-Saharan African. Although they were less well-preserved, a further six individuals (18.75% of all the members of the series) could still be diagnosed as probably biologically sub-Saharan African (see Table 6).



(a)

(b)



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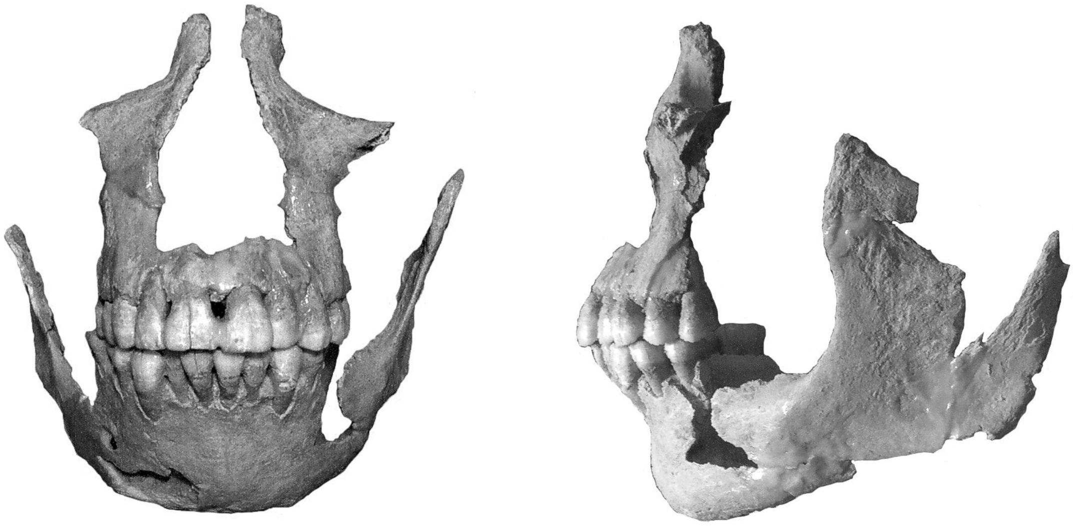

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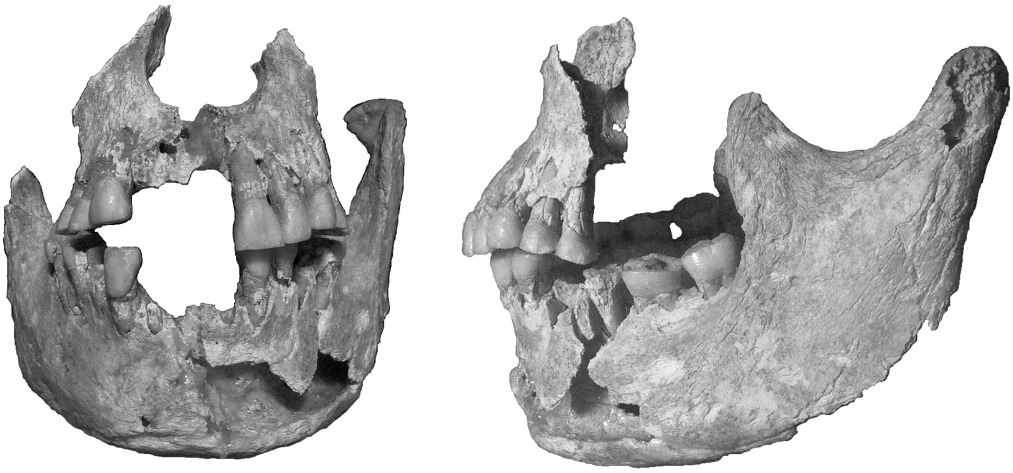
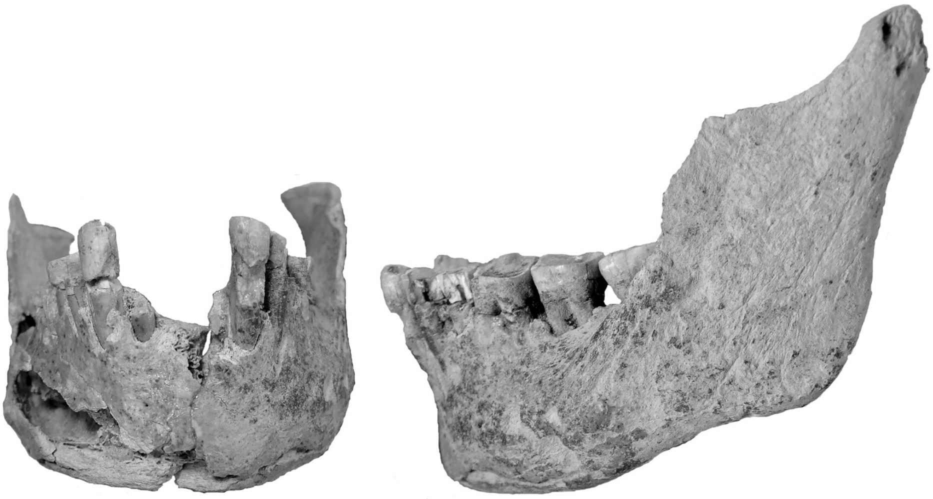
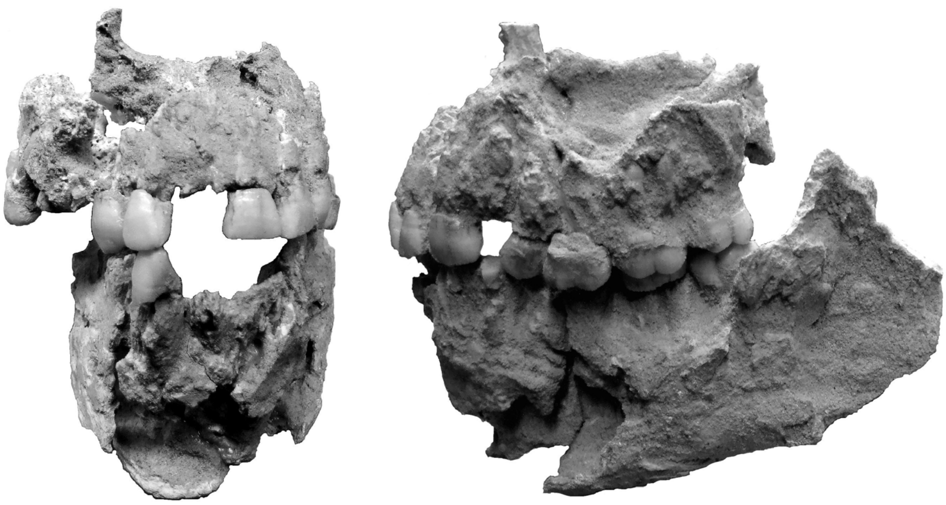


(g)

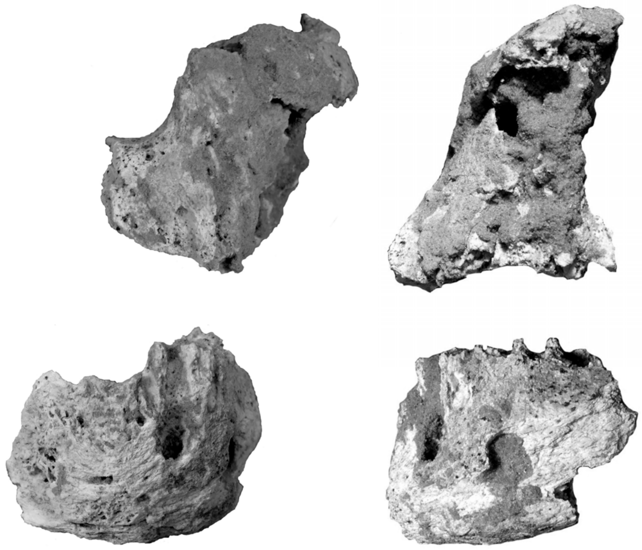


(h)

(i)



(j)



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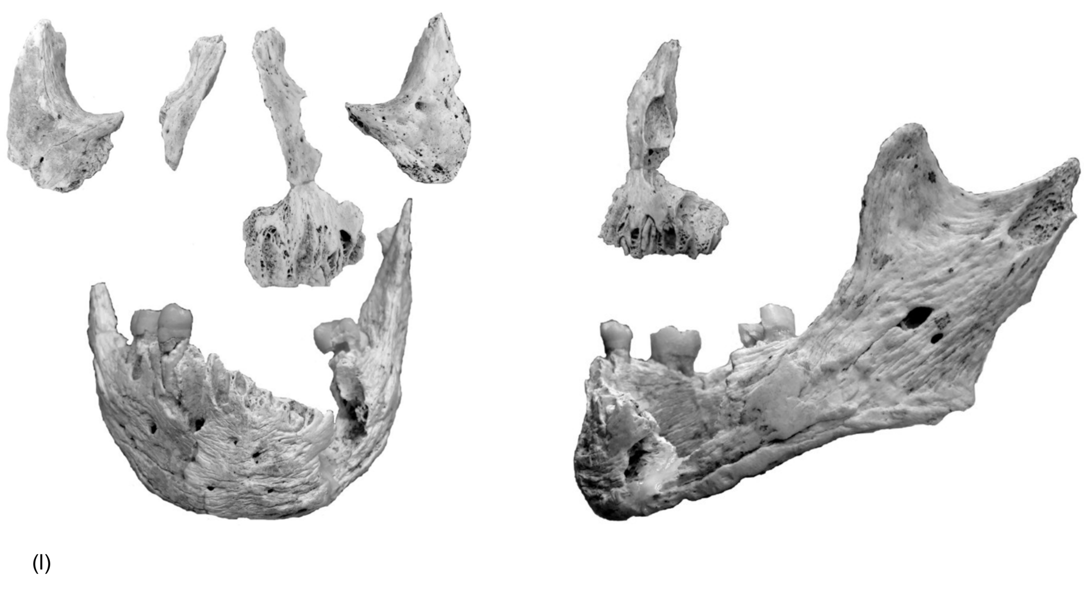
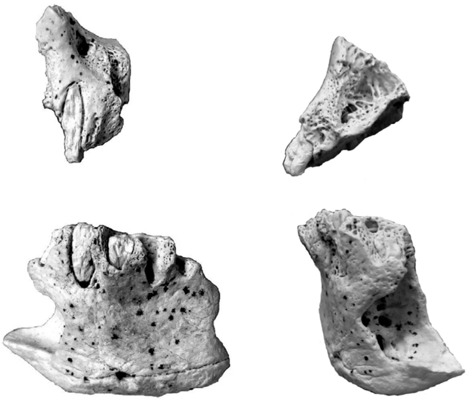


(l)

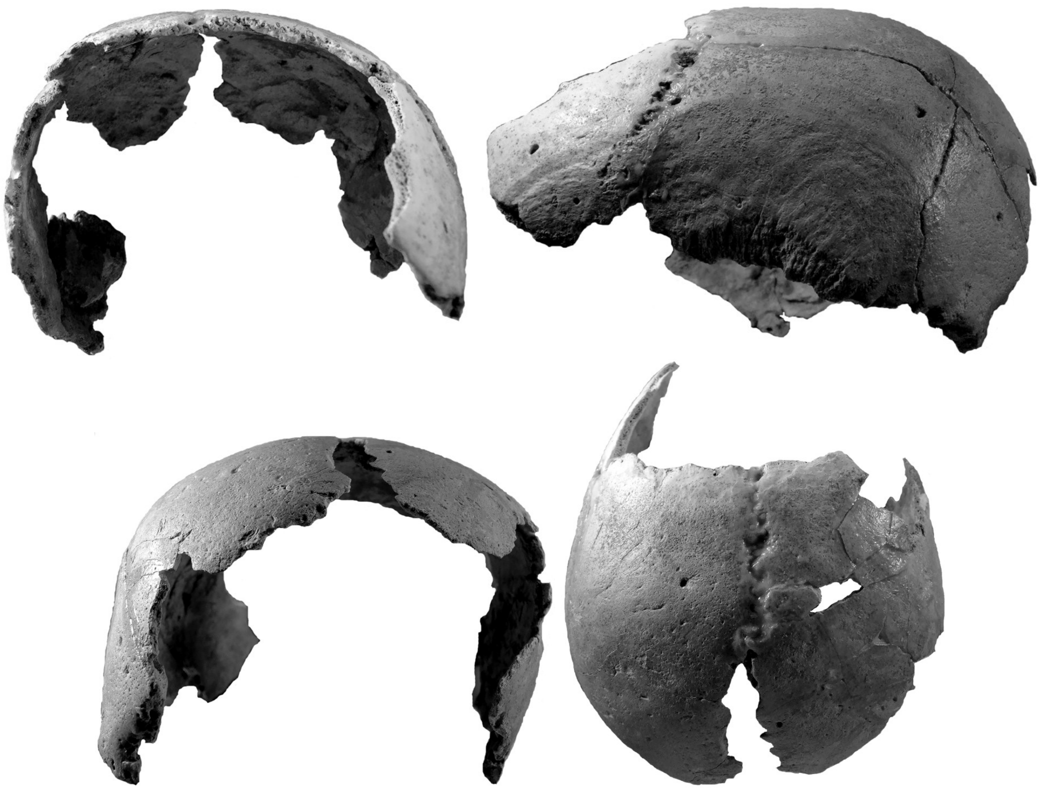


(m)

Figure 74: Reconstructed cranial remains in frontal (*Norma frontalis*) and lateral view (*Norma lateralis sinistra*). Abu Tabari 02/1-2: frontal bone (*Os frontale*), right zygomatic bone (*Os zygomaticum*), *Maxilla* and mandible (*Mandibula*) (lateral view horizontally flipped) (a), Abu Tabari 02/1-3: *Maxilla* and mandible (*Mandibula*) (b), Abu Tabari 02/1-7: *Maxilla* and mandible (*Mandibula*) (c), Abu Tabari 02/28-2: left zygomatic bone (*Os zygomaticum*), left *Maxilla* and left mandibular body (*Corpus mandibulae*) (d), Abu Tabari 02/28-5: *Maxilla* and mandible (*Mandibula*) (e), Abu Tabari 02/28-15: *Maxilla* and mandible (*Mandibula*) (f), Abu Tabari 02/28-21: *Maxilla* and mandible (*Mandibula*) (g), Abu Tabari 02/28-22: mandible (*Mandibula*) (h), Abu Tabari 02/28-23: *Maxilla* and mandible (*Mandibula*) (i), Conical Hill 95/4: *Maxilla* and mandible (*Mandibula*) (j), Conical Hill 02/3-4: left zygomatic bone (*Os zygomaticum*), left *Maxilla* and mandible (*Mandibula*) (k), Djabarona 96/1-1: zygomatic bones (*Ossa zygomatica*), *Maxilla* and mandible (*Mandibula*) (l) and Djabarona 96/120-5: left *Maxilla* and mandible (*Mandibula*) (lateral view horizontally flipped) (m).

The members of this sample also typically exhibited characteristics whose combination is more or less peculiar to Nilo-Saharan speakers in sub-Saharan Africa, such as remarkably dolicho- as well as hypsicranic skulls (*Crania*), sagittal keeling and extremely high mandibular symphyses (*Symphyses mandibularum*) (see Figure 73, 74 and 75). The both extremely large and morphologically rather complex teeth, the decidedly tropically adapted body proportions and the remarkably slender build were seen as further evidence supporting this more specific overall estimation of biological ancestry (see also IV.A.3., 8. and 10.). Rarely, expressions of relevant traits usually considered not or not necessarily biologically sub-Saharan did occur as well (see Figure 74 and Appendix XVII.). These were, however, exceptional and similar expressions were also occasionally observed in the biologically sub-Saharan modern comparative samples.

(a)



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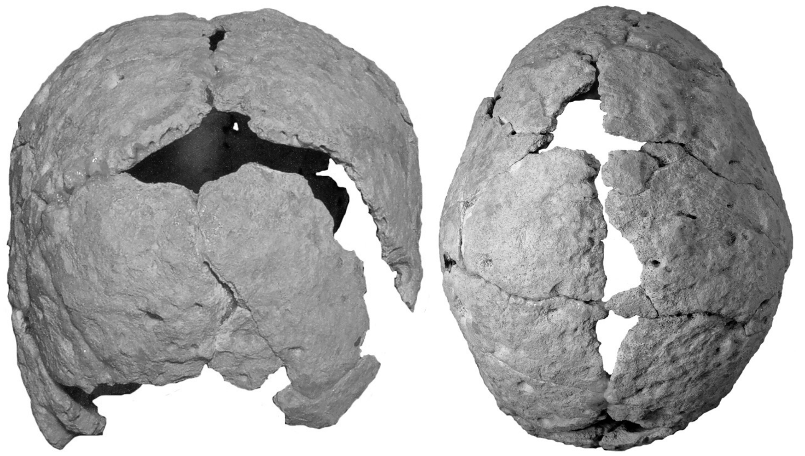

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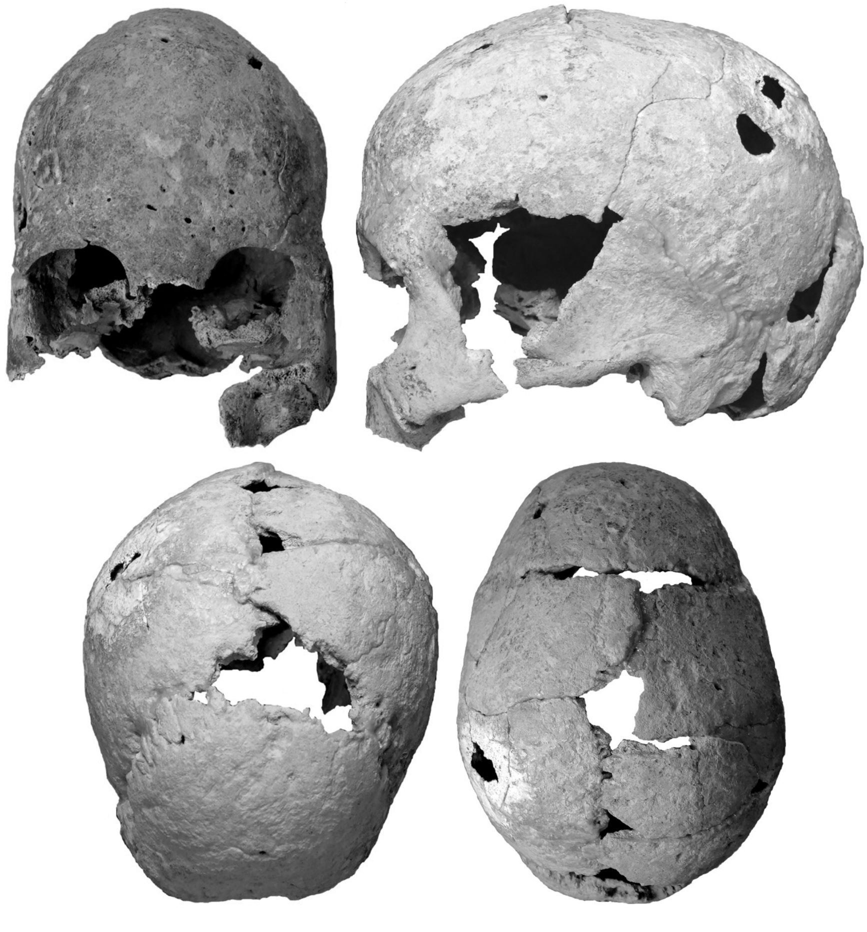

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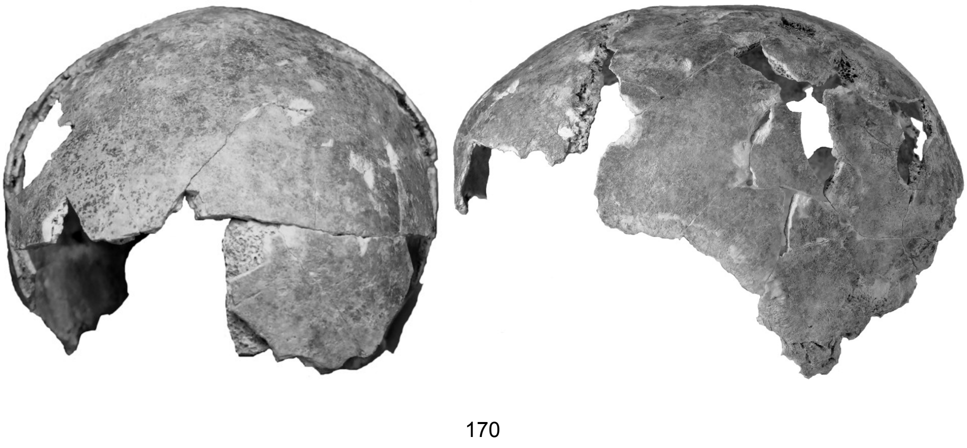


(e)

(f)

(g)

Figure 75: Reconstructed cranial remains in frontal (*Norma frontalis*), lateral (*Norma lateralis sinistra*), occipital (*Norma occipitalis*) and vertical view (*Norma verticalis*). Abu Tabari 02/28-2: *Viscero*- and *Neurocranium* (a), Abu Tabari 02/28-5: *Neurocranium* (b), Abu Tabari 02/28-8: *Neurocranium* (c), Abu Tabari 02/28-22: *Viscero*- and *Neurocranium* (d), Abu Tabari 02/28-23: *Neurocranium* (e), Conical Hill 95/4: *Neurocranium* (f) and Djabarona 96/1-1: *Neurocranium* (g).

IV.A.10. Epigenetic traits

A number of Wadi Howar individuals displayed epigenetic traits which appeared to be worth noting (see Table 6 and Figure 76). The majority of these were cranial epigenetic traits (see Appendix XVIII.A. for the individual scores of all systematically evaluated cranial epigenetic traits and the accompanying descriptive statistics). Generally rather common wormian bones (*Ossa suturalia*) were observed in three (9.38%) out of 32 skeletons, namely Abu Tabari 02/28-22, Conical Hill 02/3-4 and Djabarona 96/1-1. Abu Tabari 02/28-2 exhibited a true Inca bone (*Os incae*), a comparatively rare epigenetic trait in biologically sub-Saharan African series. An epipteric bone (*Os epiptericum*) and an ossicle at the *Asterion* (*Os astericum*) could be reported for the same *Cranium*. Multiple *Foramina* were located superior to Abu Tabari 02/28-5's nasal root (*Radix nasi*). Paranasal foramina (*Foramina paranasalia*) could be detected in four cases, i.e. 12.50% of the sample members (see Table 6 and Appendix XVIII.A.). Abu Tabari 02/28-5's expression of the trait was particularly salient. A *Foramen* was located immediately lateral to and on either side of this specimen's nasal aperture (*Apertura piriformis*). Three findings suggested that this phenomenon might be an independent, as yet undescribed, epigenetic trait. Firstly, the trait was expressed bilaterally. Secondly, Abu Tabari 02/1-2, 02/28-2, -13, -23 and Djabarona 96/1-1 had similar *Foramina*. Thirdly, the *Foramina* did not appear to be connected with the infraorbital foramen (*Foramen infraorbitale*). Abu Tabari 02/28-22's zygomatic bones (*Ossa zygomatica*) were perforated by multiple zygomaticofacial foramina (*Foramina zygomaticofacialia*). An enlarged mental foramen (*Foramen mentale*) was observed twice, in Abu Tabari 02/28-5's and -15's mandible (*Mandibula*) (i.e. in 6.25% of the individuals). Abu Tabari 02/28-21 and -23 each exhibited a palatine torus (*Torus palatinus*). The anterior aspect of Abu Tabari 02/28-23's and Conical Hill 95/4's *Maxilla* was divided by the remains of an incisive suture (*Sutura incisiva*). A *Fossa* was the main distinguishing feature of Abu Tabari 02/1-2's right head of the mandible (*Caput mandibulae*). Mylohyoid bridging (*Ponticulus mylohyoideus*) occurred once. Abu Tabari 02/28-15's left mandibular ramus (*Ramus mandibulae*) was characterised by this fairly uncommon trait.

Several dental epigenetic traits were judged to be sufficiently remarkable to be mentioned individually (see Appendix XVIII.B. for the individual scores of all systematically evaluated dental epigenetic traits and the accompanying descriptive statistics). A sizeable midline diastema (*Trema*) separated Abu Tabari 02/1-3's upper first incisors (*Dentes incisivi superiores I*). Most of the assessable upper incisors (*Dentes incisivi superiores*) of the Wadi Howar sample were shovel-shaped. Some, for example Abu Tabari 02/28-8's and -14's upper first incisors (*Dentes incisivi superiores I*), were double shovel-shaped as well. One of Conical Hill 95/4's and both of Abu Tabari 02/28-14's upper canines (*Dentes canini superiores*) could be categorised as "Bushman canines". The left upper second molar (*Dens molaris superior II*) of Abu Tabari 02/28-3 bore a large parastyle (*Tuberculum paramolare*). Additional cusps (*Cuspides*) on the lingual surface (*Facies lingualis*) were discovered on Abu Tabari 02/28-20's and 03/34-1's upper third molars (*Dentes serotini superiores*). The left upper third molar (*Dens molaris superior III*) of Abu Tabari 02/28-21 was hypoplastic.

Only two postcranial epigenetic traits were considered noteworthy (see Appendix XVIII.C. for the individual scores of all systematically evaluated postcranial epigenetic traits and the accompanying descriptive statistics). Intertrochlear foramina (*Foramina intertrochlearia*) were present in 6.25% of the individuals, i.e. in Abu Tabari 02/1-2's and 02/28-22's *Ulnae*. In the case of Abu Tabari 02/1-2, an oval, about 6.5 mm long and 2 mm wide *Foramen* directly posterior to the radial notch (*Incisura radials*) and distal to the trochlear notch (*Incisura trochlearis*) was found bilaterally. These openings appeared to be best explained in association with the capsular attachment of the elbow joint (*Articulatio cubiti*) or as large, unusually placed nutrient foramina (*Foramina nutritia*). The second notable observation in the context of postcranial epigenetic traits was that Abu Tabari 02/28-22's *Patellae* had most likely been reduced in size by vastus notches (*Incisurae vastae*).

(a)

(b)

(c)

(d)

(e)

(f)

(g) (h) (i)

(j) (k) (l)

Figure 76: Examples of noteworthy epigenetic traits. Abu Tabari 02/28-2: Inca bone (*Os incae*) *in situ* (a), Abu Tabari 02/28-5: *Maxilla* with paranasal foramina (*Foramina paranasalia*) (b), Abu Tabari 02/1-2: right mandibular head (*Caput mandibulae*) with a *Fossa* (c), Abu Tabari 02/28-15: mylohyoid bridging (*Ponticulus mylohyoideus*) (d), Abu Tabari 02/28-15: enlarged mental foramen (*Foramen mentale*) (e), Abu Tabari 02/28-14: shovel-shaped right upper first incisor (*Dens incisivus superior I*) (f), Abu Tabari 02/28-14: double shovel-shaped right upper first incisor (*Dens incisivus superior I*) (g), Abu Tabari 02/28-14: "Bushman canine" - left upper canine (*Dens caninus superior*) with a very pronounced mesial ridge (*Crista marginalis*) which is incorporated into the dental tubercle (*Tuberculum dentale*) (h), Abu Tabari 02/28-3: left upper second molar (*Dens molaris superior II*) with a parastyle (*Tuberculum paramolare*) (i), Abu Tabari 02/28-21: left upper second and peg-shaped, hypoplastic third molar (*Dens molaris superior II et III*) (j), Abu Tabari 03/34-1: additional cusps (*Cuspides*) on the lingual surface (*Facies lingualis*) of the right upper third molar (*Dens serotinus superior*) (k) and Abu Tabari 02/1-2: left *Ulna* with an intertrochlear foramen (*Foramen intertrochleare*) (l) (a: F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

IV.A.11. Robusticity

As far as the expressions of robusticity traits were concerned, the Wadi Howar sample was highly variable (see Appendix XIX. for the individual scores of all systematically evaluated robusticity traits and the accompanying descriptive statistics). On average, robusticity levels were low to moderate. Moreover, the long bones were, almost without exception, long and slender. Nevertheless, the series contained both extremely gracile and decidedly robust individuals. The very robust Conical Hill 95/4, 02/3-4 and, to a certain extent, Abu Tabari 02/28-5, on the one hand, and the extremely gracile Abu Tabari 02/28-7, -8, -23 and, to a certain extent, Djabarona 96/120-4, on the other hand, exemplified the extremes of the encountered range of skeletal size and robusticity. In some cases, only certain parts of a skeleton were extraordinarily robust. For example, Abu Tabari 02/1-2's *Ulnae*, Abu Tabari 02/1-7's or 02/28-21's mandible (*Mandibula*) and the generally very large teeth constituted such isolated robust structures (see IV.A.3.).

Despite of the overall gracility of the majority of the remains, advanced shaft bowing, particularly of the bones of the forearms (*Antebrachia*) and the *Femora*, considerable interosseous border (*Margo interosseus*) sizes and pronounced pilasterism were fairly common.

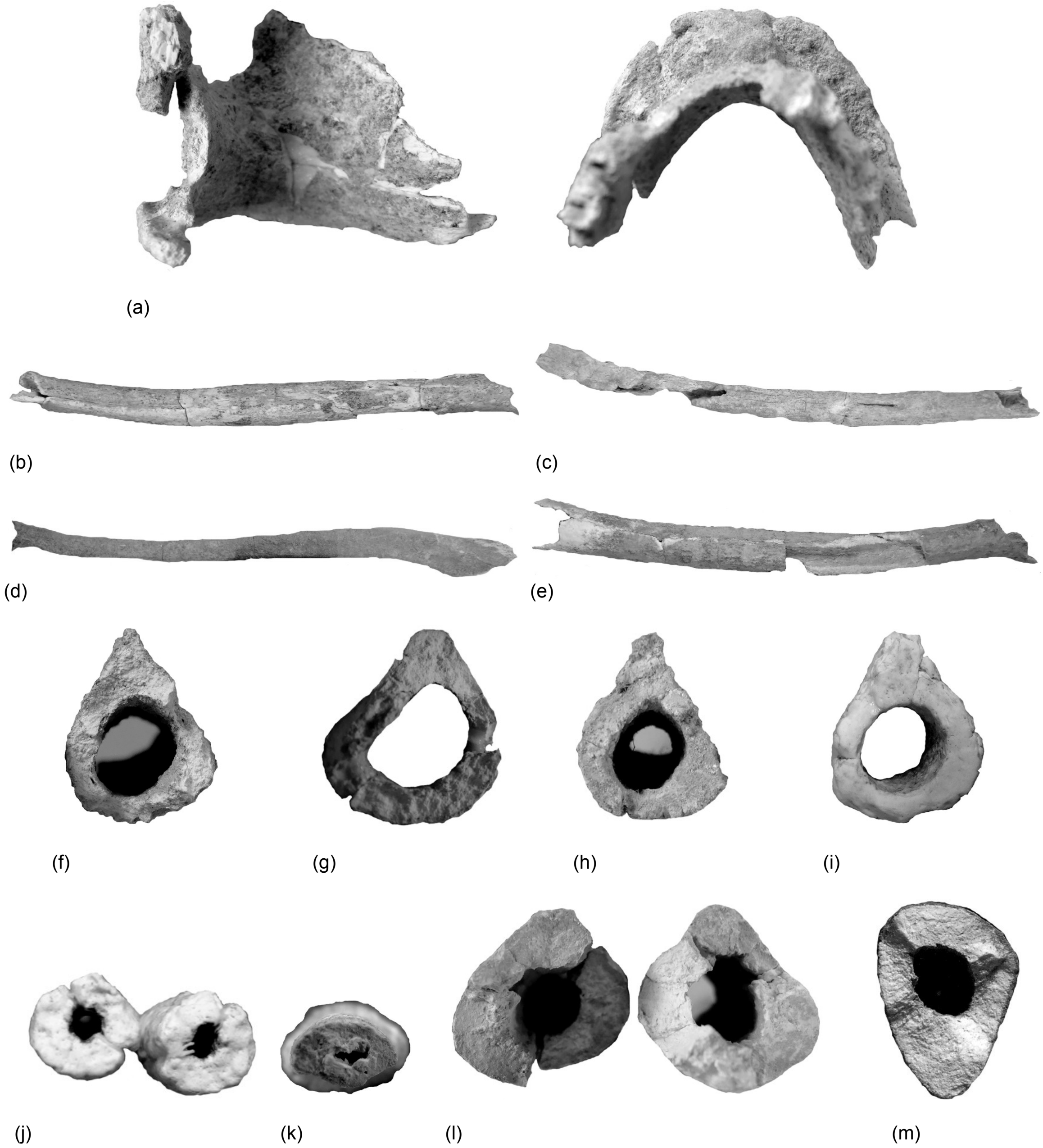


Figure 77: Selected evidence of elevated levels of skeletal robusticity. Abu Tabari 02/1-7: mandibular fragment with the remnants of a probably very robust bony chin (*Mentum osseum*) and a *Torus transversus superior*-like structure (a), shaft bowing: Abu Tabari 02/1-5 - right *Humerus* (b), Abu Tabari 02/28-3 - left *Radius* (c), Abu Tabari 02/1-2 - left *Ulna* (d) and Abu Tabari 02/1-5 - right *Femur* (e), pilasterism: Abu Tabari 02/1-7 - left *Femur* (f), Abu Tabari 02/28-5 - left *Femur* (g), Abu Tabari 02/28-22 - right *Femur* (h) and Djabarona 96/4 - right *Femur* (i) and increased cortical thickness and medullary stenosis: Djabarona 96/120-4 - right *Radius* (j), Abu Tabari 02/1-6 - *Phalanx media* (*Digitus medius dex.*) (k), Abu Tabari 02-28-11 - right *Femur* (l) and Abu Tabari 02/1-2 - left *Tibia* (m).

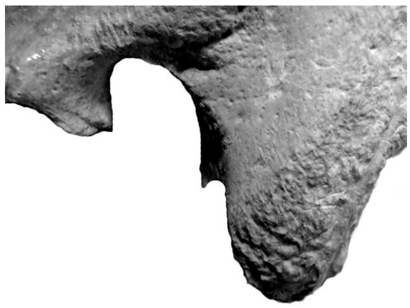
"Pronounced" or "pronounced to very pronounced" humeral, radial and ulnar shaft bowing was observed in two (13.33%), three (21.48%) and two individuals (14.23% of the diagnosable skeletons) respectively. The shafts (*Corpora*) of the *Femora* of nine skeletons, i.e. 28.13% of the whole sample and 47.37% of the 19 individuals with sufficiently well preserved *Femora*, were classified as "fully" or "extremely bowed". Four individuals (33.33% of the scored skeletons) had *Ulnae* and three (25.00% of the scored skeletons) *Radii* with "large" or "large to very large" interosseous borders (*Margines interossei*). A "very large" or "very to extremely large" pilaster was present in five skeletons (15.63% of the sample). These five skeletons constituted 26.32% of all assessed individuals. Another 31.58% (i.e.

six) of these 19 assessed individuals were characterised by a “large to very large” pilaster. Occasionally, cases of conspicuously increased cortical thickness or medullary stenosis were noticed (see Table 6). Six skeletons (18.75% of the sample) were affected by some degree of non-pathological medullary stenosis. Long bones with especially thick cortical bone (*Substantia compacta*) were recorded three times (i.e. in 9.38% of the members of the sample). Additionally, 6.25% of the Wadi Howar skeletons, namely Conical Hill 95/4 and 02/3-4, exhibited very thick cranial bones (*Ossa cranii*).

IV.A.12. Occupational stress

Occupational stress markers were frequently encountered. Observations which were considered to be indicative of particularly strenuous habitually performed tasks included specific types or patterns of dental wear, enlarged or unusually rough muscle attachment sites, shape alterations of bones or articular surfaces (*Facies articulares*), enthesiopathic lesions and arthrotic changes (see Table 6). However, in view of the materials poor state of preservation, only certain observations of this type were systematically scored (see Appendix XX. for all dental abrasion scores, the scores of all systematically evaluated musculoskeletal stress traits and the accompanying descriptive statistics).
The most striking traces of arduous activities were primarily found in three areas. Together, the *Cranium* and the cervical vertebrae (*Vertebrae cervicales*) made up one such area. The teeth (*Dentes*) and the bones of the upper extremities (*Ossa membrorum superiorum*) formed the other two. Although it was usually less spectacular and did not appear in similarly recurring patterns, limited evidence of elevated levels of occupational stress was also discovered in other anatomical regions. Additionally, several more or less isolated but nevertheless still remarkable occupational stress markers were spotted (see Table 6).

(a)



(b)

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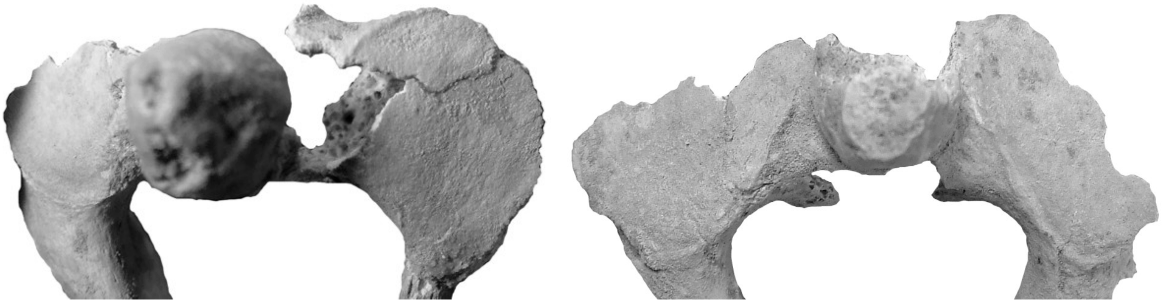
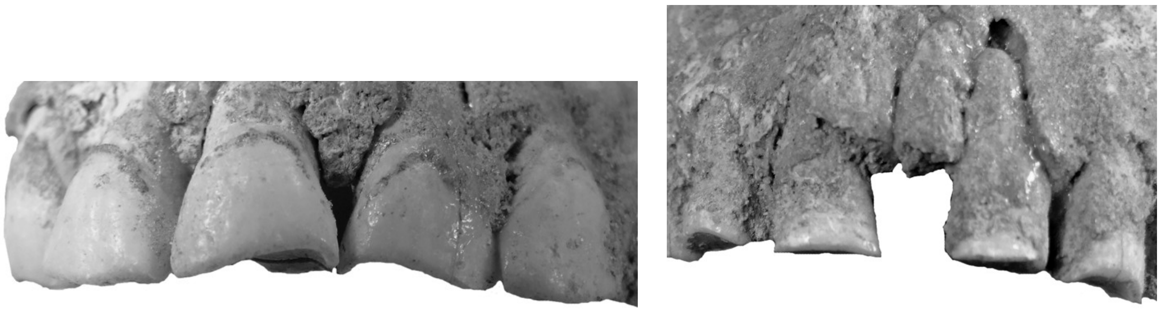


(e) (f)

Figure 78: Examples of cranial and cervical occupational stress markers. Abu Tabari 02/1-2: mastoid process (*Processus mastoideus*) (a), Abu Tabari 02/28-5: mastoid process (*Processus mastoideus*) (b), Abu Tabari 02/28-15: inferior articular surfaces (*Facies articulares inferiores*) of the *Atlas* (c), Abu Tabari 02/28-21: superior articular surfaces (*Facies articulares superiores*) of the *Atlas* (d), Abu Tabari 02/28-21: right superior articular surface (*Facies articularis superior*) of the *Axis* (e) and Abu Tabari 02/28-22: superior articular surfaces (*Facies articulares superiores*) of the *Axis* (f).

A number of most likely interconnected cranial and cervical markers appeared repeatedly. Six individuals (i.e. 18.75% of the members of the sample) had a preserved *Atlas*, a preserved *Axis* or both with enlarged articular surfaces (*Facies articulares*), which usually also exhibited arthrotic changes. Occasionally, traces of degenerative changes could be identified in other cervical vertebrae (*Vertebrae cervicales*) as well. Moreover, rugged and/or enlarged mastoid processes (*Processus mastoidei*) and comparatively prominent cranial attachment sites of back (*Musculi dorsi*) and neck muscles (*Musculi colli*) were spotted fairly often. A “pronounced”, “pronounced to very pronounced” or “very pronounced” origin (*Origo*) of the trapezius muscle (*Musculus trapezius*) was displayed by 42.86% of the skeletons with an assessable expression of this trait, i.e. three individuals. Five individuals (83.33% of the skeletons with an assessable expression of this trait) had “pronounced” or “pronounced to very pronounced” insertions (*Insertiones*) of the sternocleidomastoid muscles (*Musculi sternocleidomastoidei*). “Robust to very robust” or “very robust” mastoid processes (*Processus mastoidei*) were noted in three cases, i.e. 37.50% of the skeletons with assessable mastoid processes (*Processus mastoidei*) (see Appendix XIX.A.).



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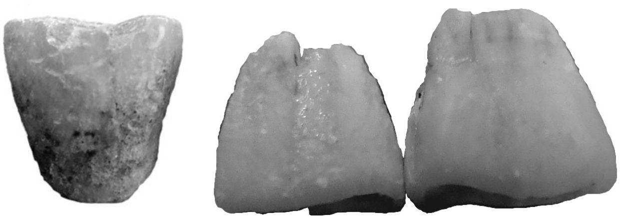


(c) (d) (e) (f)

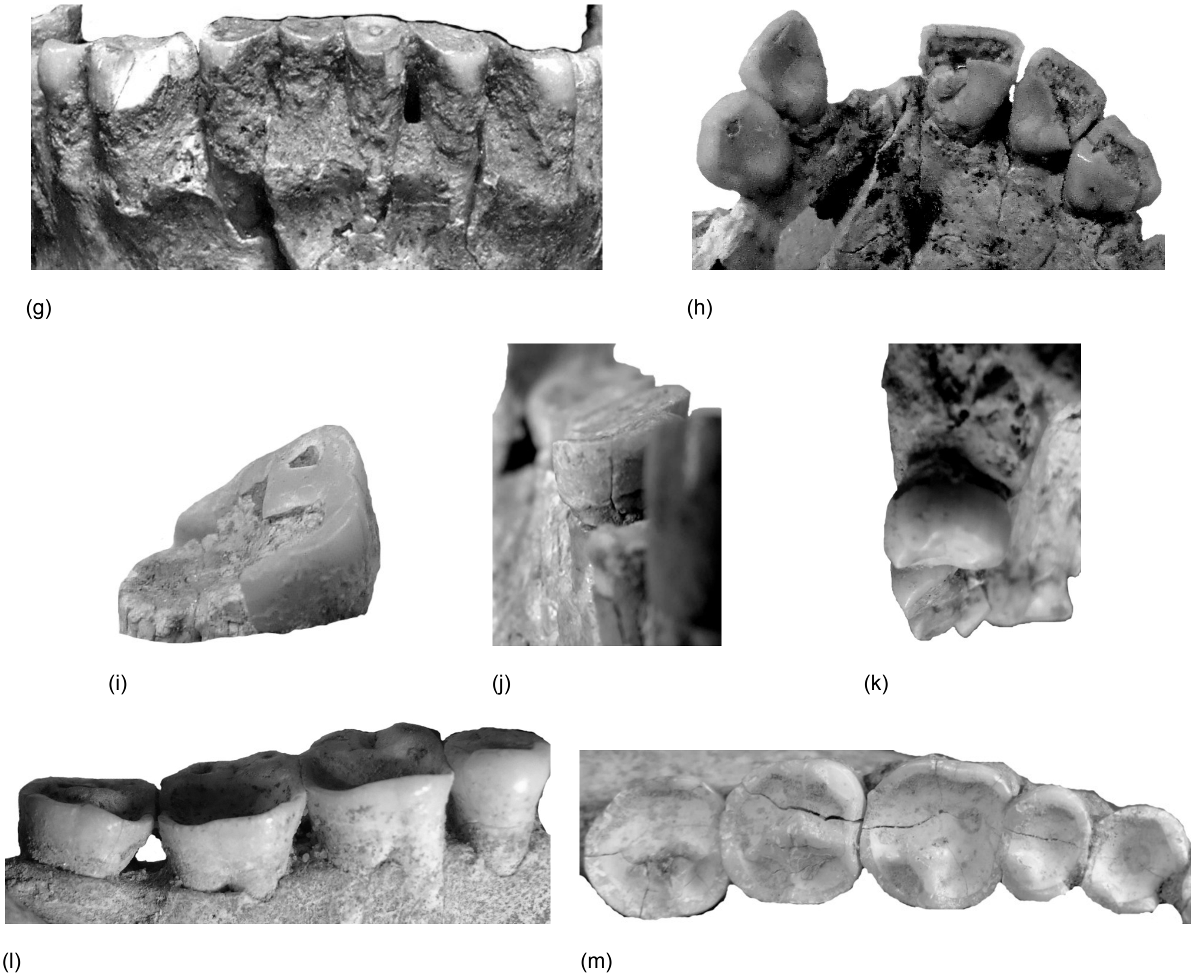
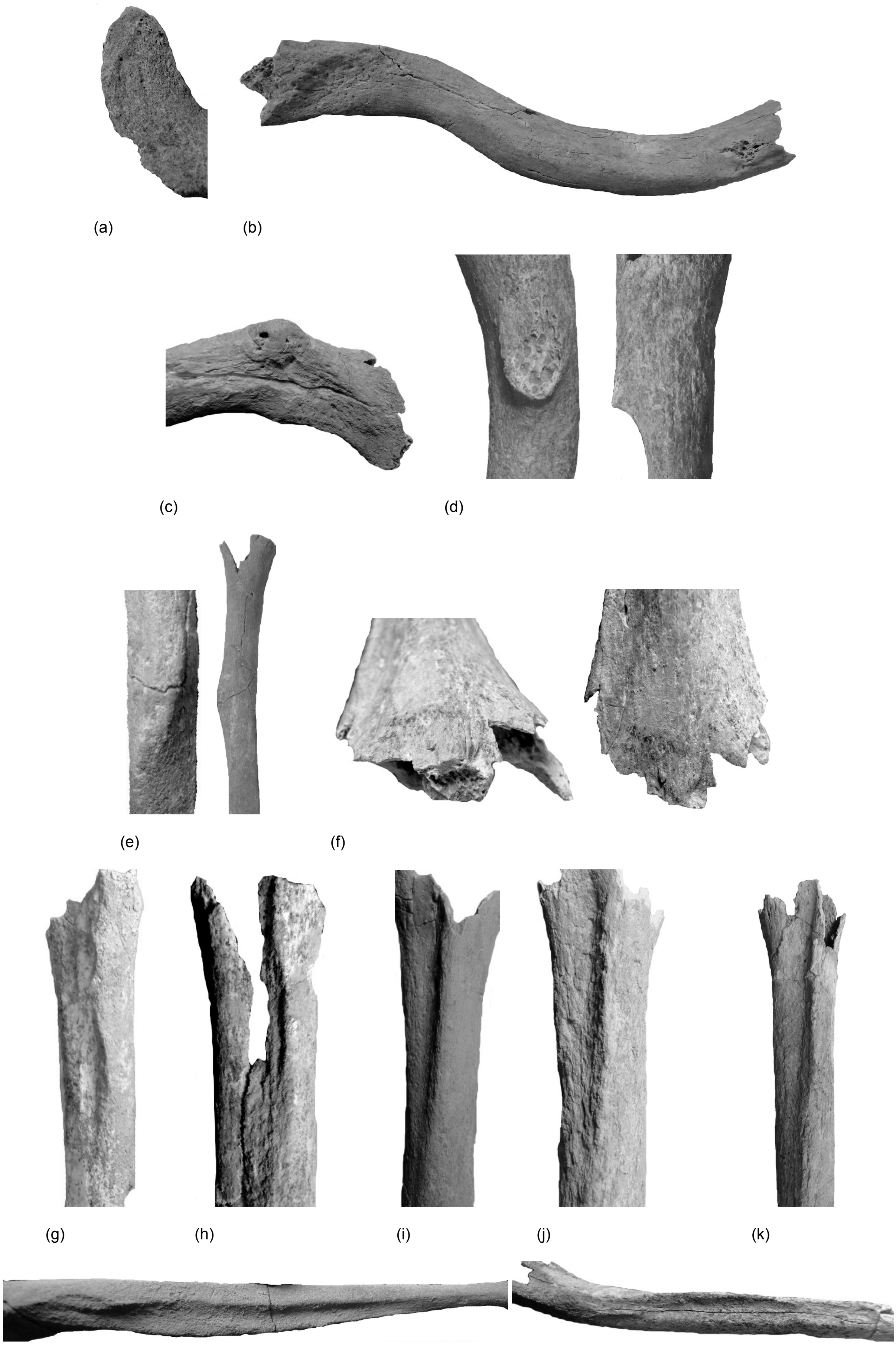


Figure 79: Examples of abrasion patterns. Abu Tabari 02-1-2: upper first incisors (*Dentes incisivi superiores I*) with notched wear (a), Abu Tabari 02/1-3: upper second incisors (*Dentes incisivi superiores II*) with notched wear (b), Abu Tabari 02-28-22: right upper canine (*Dens caninus superior*) with notched wear (c), Djabarona 96/1-1: upper first incisors (*Dentes incisivi superiores I*) with notched wear (d), Abu Tabari 02/28-3: left upper canine (*Dens caninus superior*) with chipping (e), Abu Tabari 02/28-3: right upper canine (*Dens caninus superior*) with chipping (f), Abu Tabari 02/1-3: lower incisors (*Dentes incisivi inferiores*) with labial wear (g), Conical Hill 95/4: upper incisors and canines (*Dentes incisivi et canini superiores*) with unilateral wear (h), Abu Tabari 02/28-21: right upper first molar (*Dens molaris superior I*) with angled wear (i), Abu Tabari 02/28-22: right lower second premolar (*Dens praemolaris inferior II*) and right lower molars (*Dentes molares inferiores*) with angled wear (j), Conical Hill 95/4: left upper second premolar (*Dens praemolaris superior II*) and left upper first and second molar (*Dens molaris superior I et II*) with angled wear (k), Abu Tabari 02/1-2: right lower second premolar (*Dens praemolaris inferior II*) and right lower molars (*Dentes molares inferiores*) with cupped wear (l) and Abu Tabari 02/1-3: left lower premolars (*Dentes praemolares inferiores*) and left lower molars (*Dentes molares inferiores*) with cupped wear (m).

The overall rather advanced dental wear appeared to be best understood in connection with other traces of masticatory stress. The mean abrasion score of all teeth of all adult or older skeletons was 34.03. 21.88% of the individuals (seven out of 32) had average scores which exceeded 40. Abu Tabari 02/1-3 even had a mean abrasion score of 52.88. The sample's mean anterior score, i.e. the score based on the abrasion of all incisors and canines (*Dentes incisivi et canini*), was higher than its mean posterior score, i.e. the score based on the abrasion of all molars (*Dentes molares*). The former was 34.72, the latter 30.79. In accordance with this, mean anterior scores were higher than their posterior counterparts in 63.16% of the assessable cases. The opposite only occurred in 36.84% of the examined dentitions. Furthermore, the mean anterior scores of four individuals (i.e. of 12.50% of the members of the sample) surpassed 40, that of two others (i.e. 6.25%) 50. However, a mere 18.75% of the sample (six individuals) had mean posterior scores above 40. Both this asymmetrical pattern of wear and several other observations were deemed to be indicative of paramasticatory tooth use.

Teeth of eight individuals (25.00% of the Wadi Howar skeletons) displayed notched wear. Labial anterior wear was present in Abu Tabari 02/1-2's, 3's and Djabarona 96/1-1's teeth. These three cases constituted 9.38% of all individuals. Chipping was identified in 9.38% of the members of the sample, i.e. three times. Another four individuals (12.50% of the sample) had distributions of wear which were most likely also caused by paramasticatory habits. The more advanced stages of molar and premolar abrasion were usually associated with relatively high wear angles and/or cupping. The wear of 9.38% of the members of the sample (i.e. of three individuals) was especially marked. Very pronounced cupped wear was also noted in three cases. The dental evidence of elevated levels of masticatory stress was accompanied by moderate to pronounced gonial eversion and fairly rugose attachment areas of muscles such as the temporalis (*Musculus temporalis*) and medial pterygoid (*Musculus pterygoideus medialis*). "Indifferent to robust" or "robust" gonial eversion characterised five individuals, i.e. 41.67% of all scored mandibles (*Mandibulae*) (see Appendix XIX.A.). The origins (*Origines*) and insertions (*Insertiones*) of temporalis muscles (*Musculi temporales*) were "pronounced" or "pronounced to very pronounced" in 50% (two out of four) and 80% (four out of five) of the assessable cases respectively. Additionally, no medial pterygoid (*Musculus pterygoideus medialis*) insertion (*Insertio*) was judged to be less than "moderately" developed.

Considering the thick cortical bone (*Substantia compacta*), the substantial interosseous border (*Margo interosseus*) sizes and the curvature of the *Humeri*, *Radii* and *Ulnae* (see IV.A.11.), it was hardly unexpected that many bones of the pectoral girdle (*Cingulum pectorale*) and upper free extremities (*Partes liberae membrorum superiorum*) displayed enlarged and/or very rough attachment sites, enthesiopathic lesions and arthrotic changes. Some underlying activities must have involved moving the whole arms, others the forearms and hands. Especially those tasks which required forceful and repetitive movements of the forearms and hands left prominent traces. A "pronounced" or "pronounced to very pronounced" insertion (*Insertio*) of a pectoralis major muscle (*Musculus pectoralis major*) was encountered in six skeletons (i.e. in 66.67% of the scored individuals). 16.67% (two out of twelve) of the mean deltoid muscle (*Musculus deltoideus*) insertion (*Insertio*) scores were 7 or 8.5 ("pronounced" or "pronounced to very pronounced"). That four individuals (12.50% of the sample) had clavicles (*Claviculae*) with enthesiopathic abnormalities of varying severity was seen as a related finding. 100.00% (ten out of ten) of the mean brachialis muscle (*Musculus brachialis*) insertion (*Insertio*) and 44.44% (four out of nine) of the mean biceps brachii muscle (*Musculus biceps brachii*) insertion (*Insertio*) scores were above 5 ("moderate"). 20.00% (two out of ten) of the mean brachialis muscle (*Musculus brachialis*) insertion (*Insertio*) scores even went as high as 7.5 and 8 ("pronounced" to "pronounced to very pronounced" and "pronounced to very pronounced"). Several observations were considered to be more or less directly connected with these comparatively high musculoskeletal stress scores. The overall ruggedness of the *Radii* and *Ulnae* of three skeletons (i.e. 9.38% of the sample members) was particularly striking. *Phalanges* with conspicuous changes affecting the interphalangeal joints (*Articulationes interphalangeales*), tufting of at least one distal tuberosity (*Tuberositas phalangis distalis*) or alterations of insertions (*Insertiones*) of muscles, such as the flexor digitorum superficialis (*Musculus flexor digitorum superficialis*), flexor digitorum profundus (*Musculus flexor digitorum profundus*) and extensor digitorum (*Musculus extensor digitorum*), were discovered in four cases (12.50% of all individuals).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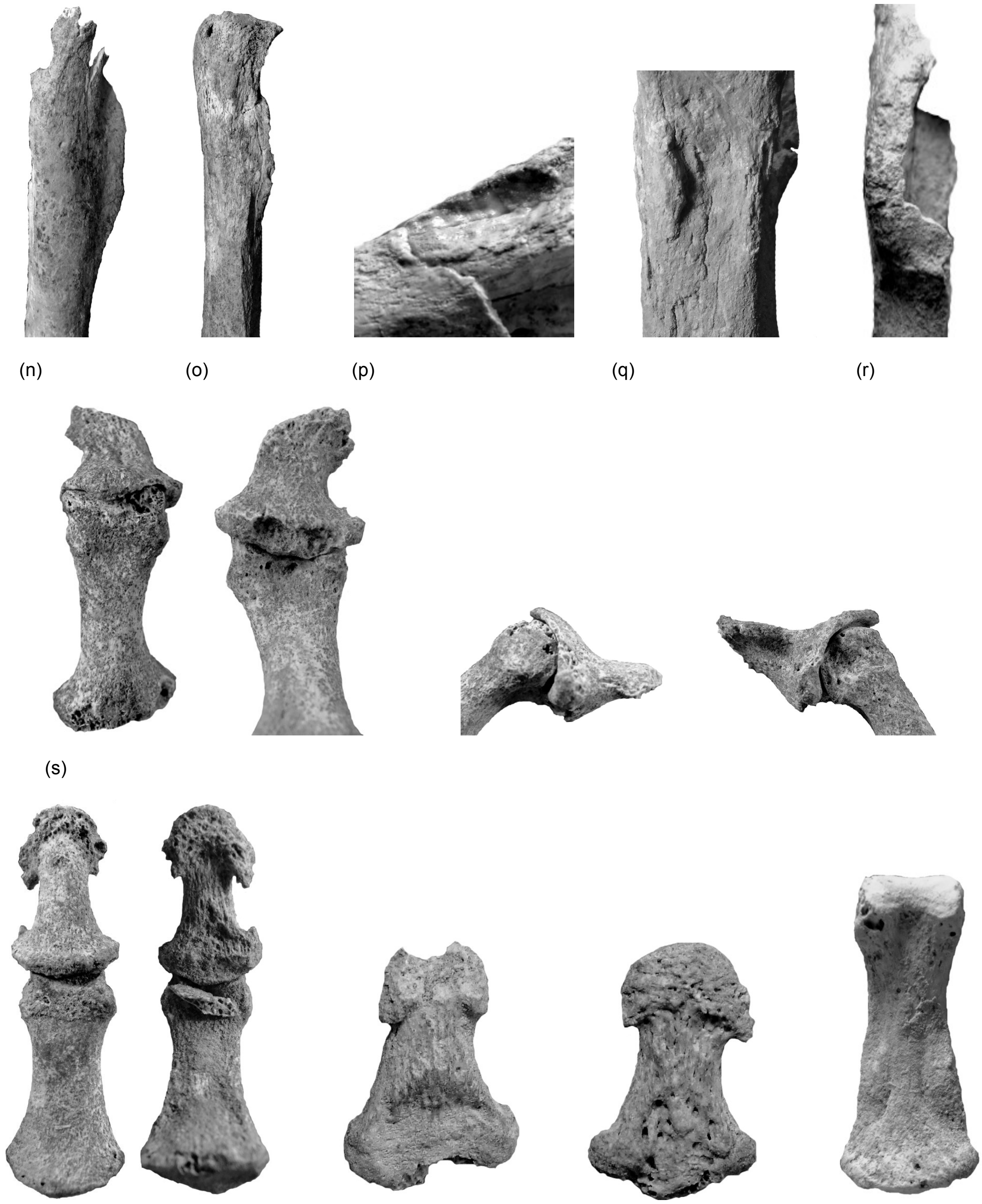
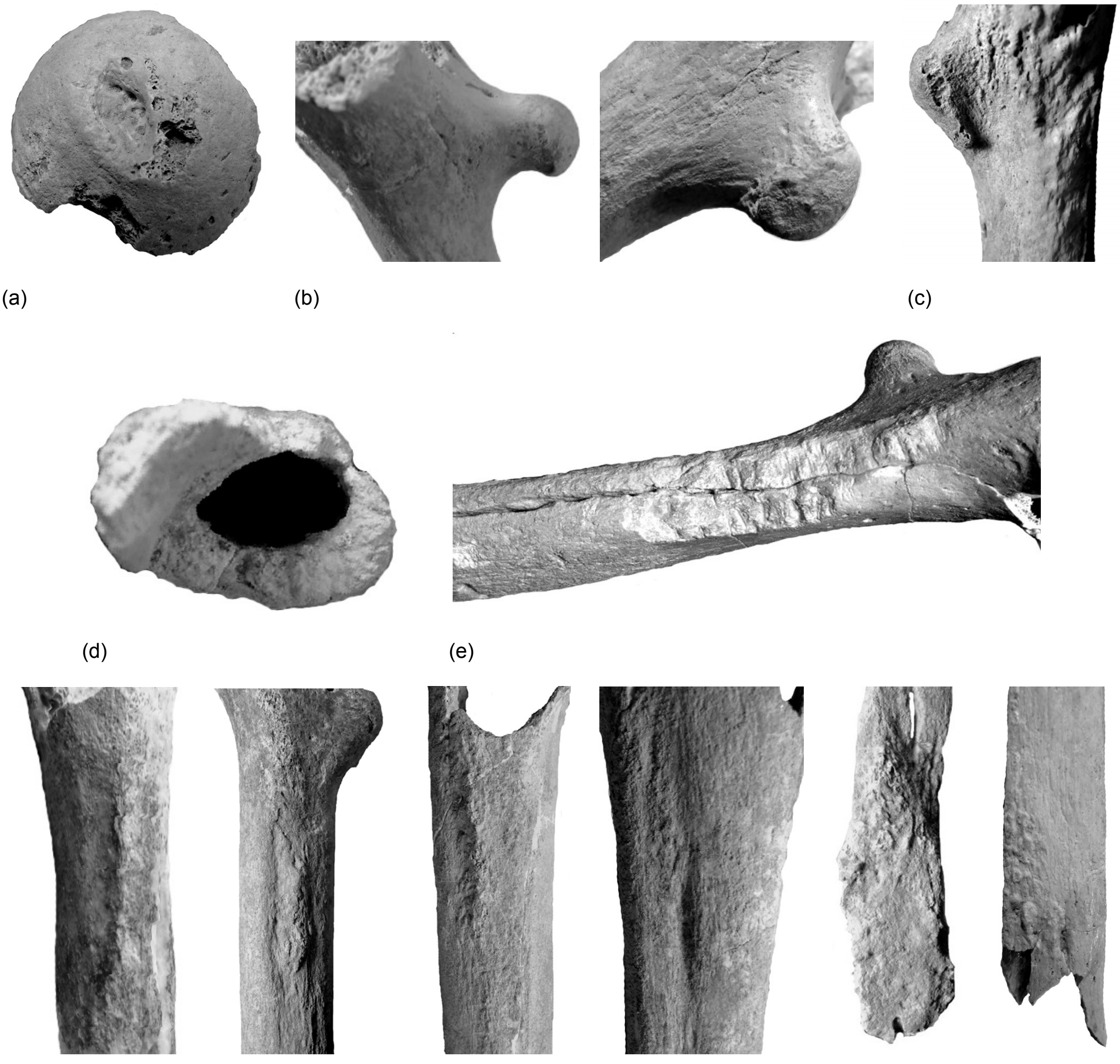


Figure 80: Examples of occupational stress markers of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*). Abu Tabari 02/1-2: right *Acromion* with a *Facies articularis inferior*, i.e. an articular facet (*Facies articularis*) on its inferior surface (*Facies inferior*) (a), Abu Tabari 02/28-5: inferior surface (*Facies inferior*) of the left clavicle (*Clavicula*) (b), Abu Tabari 02/28-5: conoid tubercle (*Tuberculum conoideum*) of the right clavicle (*Clavicula*) (c), Abu Tabari 02/28-15: impression for the costoclavicular ligament (*Impressio ligamenti costoclavicularis*) of the left clavicle (*Clavicula*) (d), Abu Tabari 02/28-5: left deltoid tuberosity (*Tuberositas deltoidea*) (e), Abu Tabari 02/1-5: traces of *Myositis ossificans* on the anterior surface (*Facies anterior*) of the distal end of the right *Humerus* (f), left pectoralis major (*Musculus pectoralis major*) insertions (*Insertiones*): Abu Tabari 02/1-3 (g), -5 (h), 02/28-5 (i), -21 (j) and -22 (k), Abu Tabari 02/1-2: posterior surface (*Facies posterior*) of the left *Ulna* (l), Abu Tabari 02/1-5: posterior surface (*Facies posterior*) of the right *Ulna* (m), Abu Tabari 02/1-5: right supinator crest (*Crista musculi supinatoris*) (n), Abu Tabari 02/28-22: right supinator crest (*Crista musculi supinatoris*) (o), Abu Tabari 02/1-5: left ulnar tuberosity (*Tuberositas ulnae*) (p), Abu Tabari 02/28-21: left ulnar tuberosity (*Tuberositas ulnae*) (q), Abu Tabari 02/1-5: right radial tuberosity (*Tuberositas radii*) (r), Abu Tabari 02/1-2: proximal and distal phalanx of the left thumb (*Phalanx proximalis et distalis I*) - dorsal, palmar, radial and ulnar (s), Abu Tabari 02/1-2: middle and distal phalanx of the left index finger (*Phalanx media et distalis II*) - dorsal, palmar (t), Abu Tabari 02/28-5: distal phalanx of the left thumb (*Phalanx distalis I*) - palmar (u), Abu Tabari 02/28-5: distal phalanx of the left index finger (*Phalanx distalis II*) - palmar (v) and Abu Tabari 02/28-11: middle phalanx of the right middle finger (*Phalanx media III*) - palmar (w).

Although it was neither as striking nor as widespread as the observations described above, evidence of occupational stress was fairly common in the bones of the lower free extremities (*Partes liberae membrorum inferiorum*) as well. This evidence also tied in well with the occurrence of increased femoral and tibial cortical thickness, femoral shaft bowing and pilasterism (see IV.A.11.). Both findings appeared to be symptomatic of relatively high levels of locomotory stress. Whether or not the pronounced platymeria, which was noted in five cases (15.63% of all skeletons), was caused by related locomotory demands was less obvious, however (see IV.A.3.).



(a) (b) (c)

(d) (e)

(f) (g) (h) (i) (j) (k)

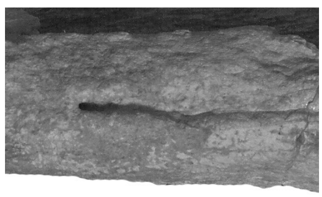
Figure 81: Examples of occupational stress markers of the lower free extremities (*Partes liberae membrorum inferiorum*). Abu Tabari 02/28-5: fovea of the right femoral head (*Fovea capitis femoris*) (a), Abu Tabari 02/28-5: right lesser trochanter (*Trochanter minor*) (b), Abu Tabari 02/28-15: left lesser trochanter (*Trochanter minor*) (c), Abu Tabari 02/1-7: platymeria of the left *Femur* (d), Abu Tabari 02/28-5: platymeria of the right *Femur* (e), Abu Tabari 02/1-8: right gluteal tuberosity (*Tuberositas glutaealis*) (f), Abu Tabari 02/28-15: left gluteal tuberosity (*Tuberositas glutaealis*) (g), Abu Tabari 03/31: left gluteal tuberosity (*Tuberositas glutaealis*) (h), Abu Tabari 02/1-2: left soleal line (*Linea musculi solei*) (i), Abu Tabari 02/28-3: medial surface (*Facies medialis*) of the distal end of the right *Fibula* (j) and Abu Tabari 02/28-5: medial surface (*Facies medialis*) of the distal end of the right *Fibula* (k).

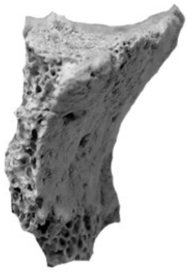
The *Femora* of five individuals (15.63% of the sample) were characterised by stress markers, like a very deep fovea of the head (*Fovea capitis femoris*), a very deep trochanteric fossa (*Fossa trochanterica*), an altered lesser trochanter (*Trochanter minor*) or a very rugged gluteal tuberosity

(*Tuberositas glutaealis*). The femoral musculoskeletal stress scores lent further weight to these individual osteological observations. All (four out of four) mean iliopsoas muscle (*Musculus iliopsoas*) insertion (*Insertio*) scores were equal to or greater than 6 ("moderate to pronounced"). A mean score of 7 ("pronounced") or 9 ("very pronounced") was calculated in 75.00% of the cases. A mean gluteus maximus muscle (*Musculus gluteus maximus*) insertion (*Insertio*) score of 6 or above was recorded for nine out of ten examined skeletons. 40% of these ten skeletons had mean scores of 7 or above. The data of one of the two mean tibial musculoskeletal stress variables were also quite telling. Half of the six mean soleus muscle (*Musculus soleus*) origin (*Origo*) scores represented expressions which were at least "moderate" (5). A third of the six scored expressions was "pronounced" or "pronounced to very pronounced". That two individuals (6.25% of the sample) had *Fibulae* with sub-pathological changes, primarily of the distal end of attachment area of the interosseous membrane (*Membrana interossea*), was interpreted as a most likely related discovery.

Certain other occupational stress markers also deserved to be mentioned. Although their expression was especially striking in six individuals (18.75% of the sample), virtually all skeletons had furrows leading into nutrient foramina (*Foramina nutritia*) of long bones (*Ossa longa*). These furrows appeared to be a side effect of the physiological responses which had brought about the various non-pathological stenotic conditions as well. Traces of *Spondylosis* or *Spondylarthrosis deformans* affecting thoracic (*Vertebrae thoracicae*) or lumbar vertebrae (*Vertebrae lumbales*) were scarce and never particularly prominent. Nevertheless, they were discovered in the remains of six skeletons (18.75% of the sample members). Obvious signs of handedness were present in three skeletons (9.38% of all individuals). In Abu Tabari 02/1-2's case, they were suggestive of left-handedness. Two findings were indicative of habitual squatting. Firstly, Abu Tabari 02/1-2's, 02/28-5's and -15's *Tibiae* exhibited squatting facets (see Appendix XVIII.C.). Secondly, the tibial retroversion of 50.00% of the examined individuals, i.e. four skeletons or 12.50% of the sample, was "pronounced" or "pronounced to very pronounced" (see Appendix XIX.B.).


(a)


(b)


(c)


(d)

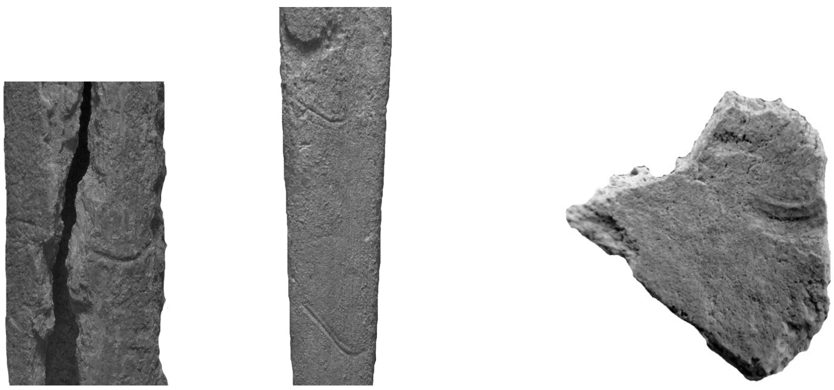

(e)

(f) (g)

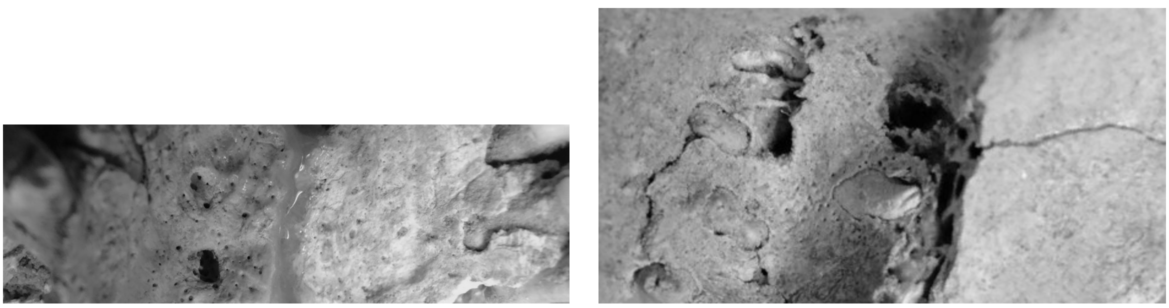
Figure 82: Miscellaneous occupational stress markers. Abu Tabari 02/28-5: furrow leading into a nutrient foramen (*Foramen nutritium*) of the left *Femur* (a), Abu Tabari 02/28-15: furrow leading into a nutrient foramen (*Foramen nutritium*) of the left *Femur* (b), Abu Tabari 02/28-11: lumbar vertebra (*Vertebra lumbalis*) with *Spondylosis deformans* (c), Abu Tabari 02/28-11: sacrum (*Os sacrum*) with *Spondylosis deformans* (d), Abu Tabari 02/28-21: fifth lumbar vertebra (*Vertebra lumbalis V*) and sacrum (*Os sacrum*) with *Spondylosis deformans* (e), Abu Tabari 02/28-2: retroverted right *Tibia* (f) and Abu Tabari 02/28-5: left *Tibia* with squatting facet (g).

IV.A.13. Health

All available evidence suggested that the prehistoric inhabitants of the Wadi Howar were comparatively healthy. Firstly, not many pathological changes were observed (see Table 6). Secondly, the expressions of the systematically scored and otherwise noted health indicators were usually rather moderate (see Appendix XXI. for all health scores and the accompanying descriptive statistics).



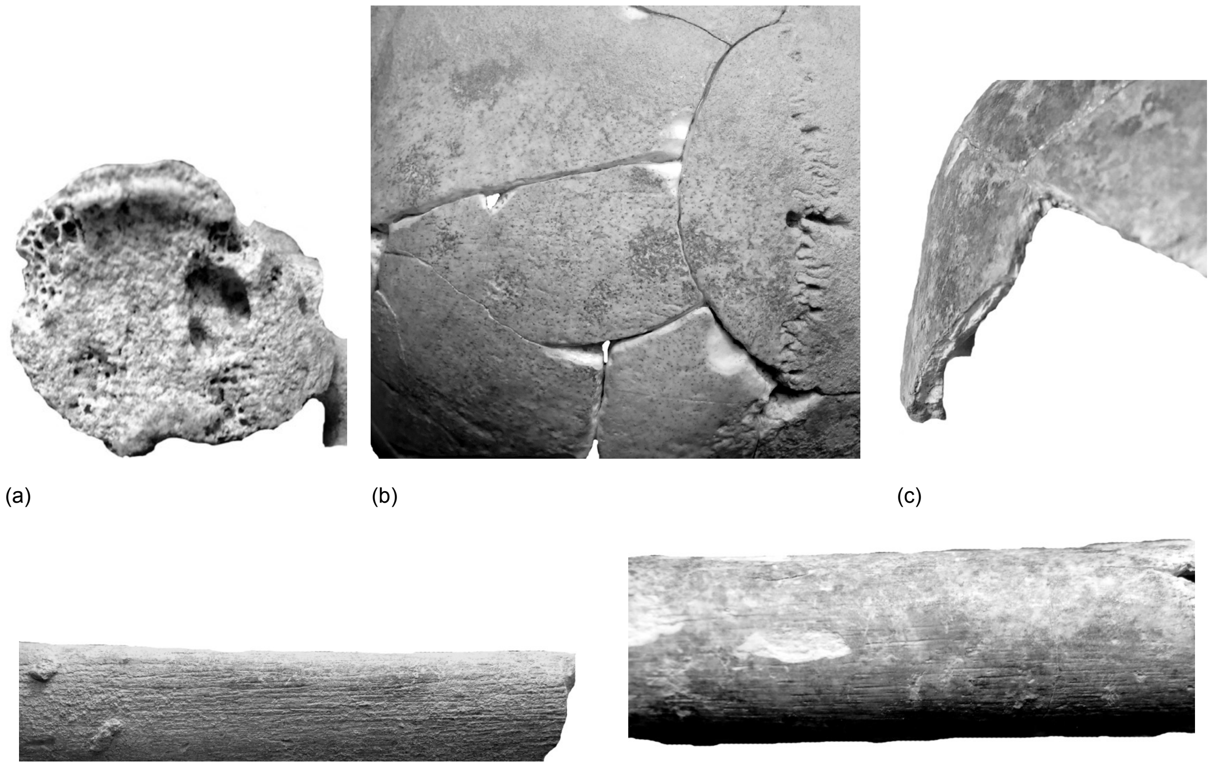
(a) (b) (c)



(d) (e)

Figure 83: Miscellaneous pathologies. Abu Tabari 02/28-3: vessel impressions on the lateral surface (*Facies lateralis*) of the right *Tibia* (a), Abu Tabari 02/28-15: vessel impressions on the lateral surface (*Facies lateralis*) of the left *Tibia* (b), Abu Tabari 02/28-21: superior articular surface (*Facies articularis superior*) of the right *Tibia* with eburnation grooves (c), Abu Tabari 02/28-21: opening in the palatine process (*Processus palatinus*) of the right *Maxilla* (d) and Abu Tabari 02/28-23: roots (*Radices*) of the left upper first and second molar (*Dens molaris superior I et II*) penetrating the maxillary sinus (*Sinus maxillaris*) (e).

Five of the discovered pathologies could not be subsumed under more inclusive categories. Abu Tabari 02/28-3 and -15 (6.25% of the sample) had *Tibiae* with impressions which were probably created by chronic varicose veins. Abu Tabari 02/28-21's remains included a superior articular surface (*Facies articularis superior*) of a right *Tibia* with eburnation grooves. Signs of faint to moderate *Spondylosis* or *Spondylarthrosis deformans* were identified in the remains of six skeletons (18.75% of the sample) (see IV.A.12.). An opening and associated porosities in the palatine process (*Processus palatinus*) of the right *Maxilla* of Abu Tabari 02/28-21 remained unexplained. Finally, at least the lingual root (*Radix lingualis*) of Abu Tabari 02/28-23's left upper first molar (*Dens molaris superior I*) had probably penetrated the individual's maxillary sinus (*Sinus maxillaris*) *intra vitam*.



(a) (b) (c)

(d) (e)

Figure 84: Observations suggestive of infectious diseases. Abu Tabari 02/1-2: inferior intervertebral surface (*Facies intervertebralis*) of a partly preserved cervical vertebra (*Vertebra cervicalis*) with osteolytic lesions (a), Abu Tabari 02/28-2: patches of small lesions on the outer surface (*Tabula externa*) of the *Cranium* (b), Abu Tabari 02/28-23: thinning of the frontal bone (*Os frontale*) (c), Abu Tabari 02/1-2: left *Tibia* with striations (d) and Abu Tabari 02/1-5: right *Tibia* with striations (e).

Pathological changes indicative of infectious diseases did not occur often. One, possibly two, of Abu Tabari 02/1-2's partially preserved cervical vertebrae (*Vertebrae cervicales*) had osteolytic lesions. They seemed to be best interpreted as the result of early stage spinal tuberculosis, brucellosis or unusually placed herniations of the adjacent intervertebral disk (*Discus intervertebralis*). Patches of small lesions on the outer surface (*Tabula externa*) of Abu Tabari 02/28-2's left parietal bone (*Os parietale*) possibly constituted traces of treponemal disease. Abu Tabari 02/28-23's frontal bone (*Os frontale*) was characterised by advanced thinning. A form of acquired hydrocephalus appeared to be the cause of this condition. More or less faint striations on *Femora* and *Tibiae* were noticed in four cases (12.50% of the members of the sample). In at least one case, these periosteal reactions were explained as the result of infections. However, they were more frequently interpreted in the context of locomotory stress.

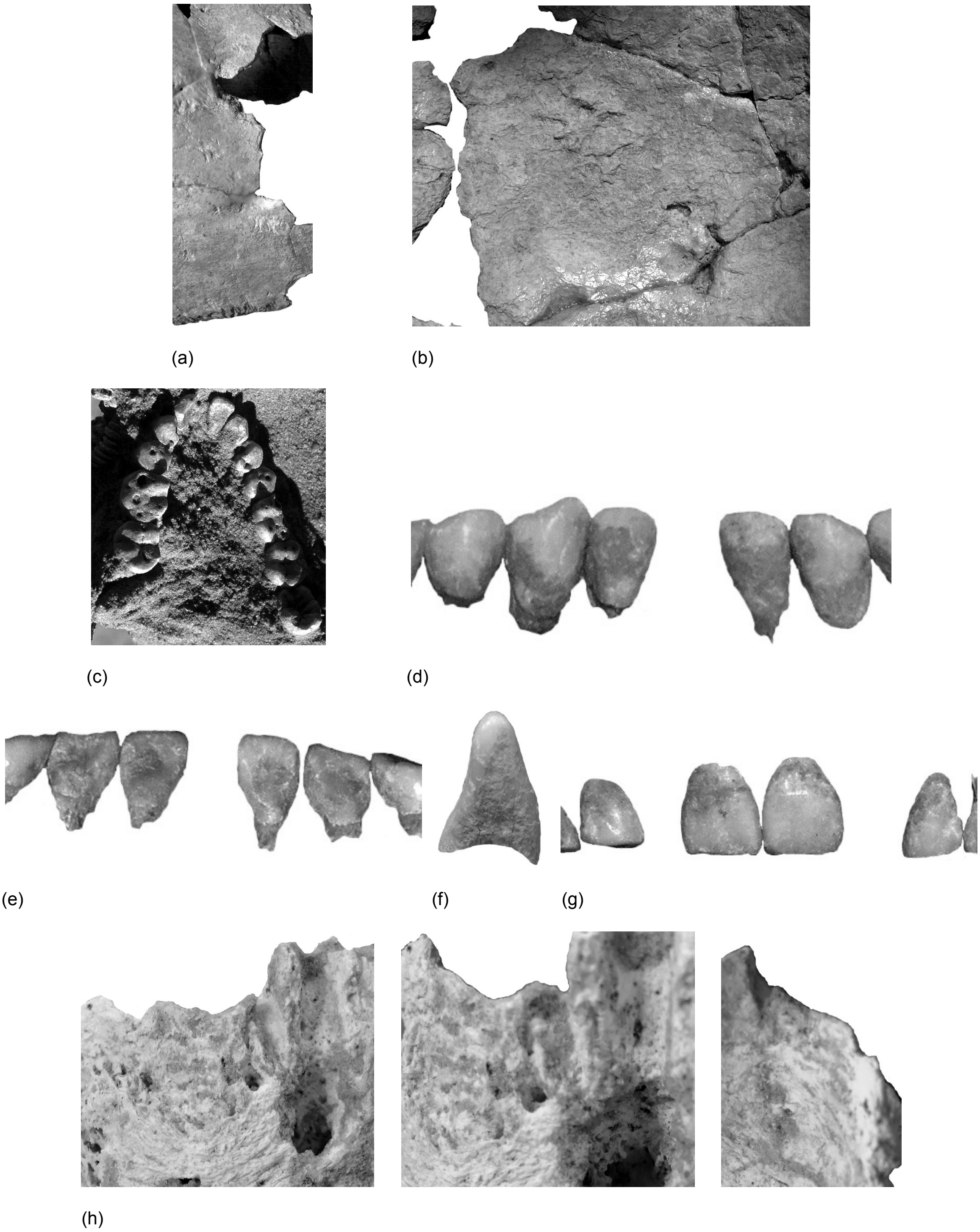
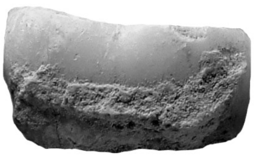


Figure 85: Signs of trauma. Abu Tabari 02/28-5: right parietal bone (*Os parietale*) with depressions (a), Abu Tabari 02/28-8: ossified structure on the inner surface (*Tabula interna*) of the left parietal bone (*Os parietale*) (b), Abu Tabari 02/28-7: traces of the artificial removal of the lower central incisors (*Dentes incisivi inferiores I*) - closing gap *in situ* (c), Abu Tabari 02/28-7: traces of the artificial removal of the lower central incisors (*Dentes incisivi inferiores I*) - distribution of calculus, inclination and abrasion angles (d), Abu Tabari 02/28-8: traces of the artificial removal of the lower central incisors (*Dentes incisivi inferiores I*) - inclination and abrasion angles (e), Abu Tabari 02/28-8: traces of the artificial removal of the lower central incisors (*Dentes incisivi inferiores I*) - mesial surface (*Facies mesialis*) of the left lower second incisor (*Dens incisivus inferior II*) with undisturbed calculus and missing pressure facets (f), Abu Tabari 02/28-8: traces of the artificial removal of the upper lateral incisors (*Dentes incisivi superiores II*) - distribution of calculus, inclination and abrasion angles (g) and Conical Hill 02/3-4: traces of the artificial removal of the lower central incisors (*Dentes incisivi inferiores I*) - alveolar remodelling (h) (c: F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Evidence of trauma was uncommon. The right parietal bone (*Os parietale*) of Abu Tabari 02/28-5 displayed three round depressions. At least the lower two seemed to be healed depressed fractures resulting from blunt force injuries. The ossification of a haematoma, maybe in connectin with an inflammation, or tuberculous meningitis were considered the most likely explanations for a bony structure on the inner surface (*Tabula interna*) of Abu Tabari 02/28-8's left parietal bone (*Os parietale*). Abu Tabari 02/28-7, -8 and Conical Hill 02/3-4 probably had teeth artificially removed. Different combinations of *in situ* observations, unusual wear angles, distributions of calculus, missing pressure facets and alveolar remodelling strongly suggested that these three individuals had their lower central incisors (*Dentes incisivi inferiores I*) avulsed. Abu Tabari 02/28-7 and -8 had possibly both lost their upper lateral incisors (*Dentes incisivi superiores II*) in this fashion as well.

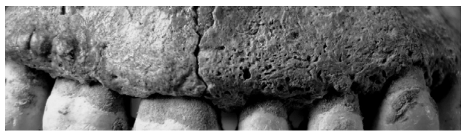

(a)


(b)


(c)


(d)


(e)


(f)


(g)

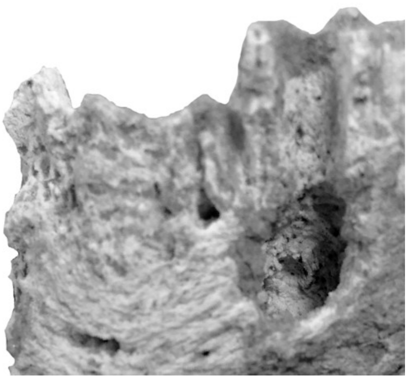
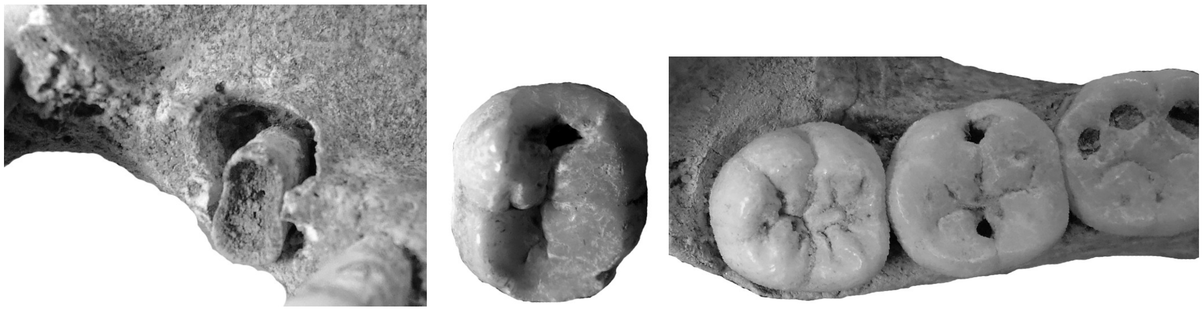
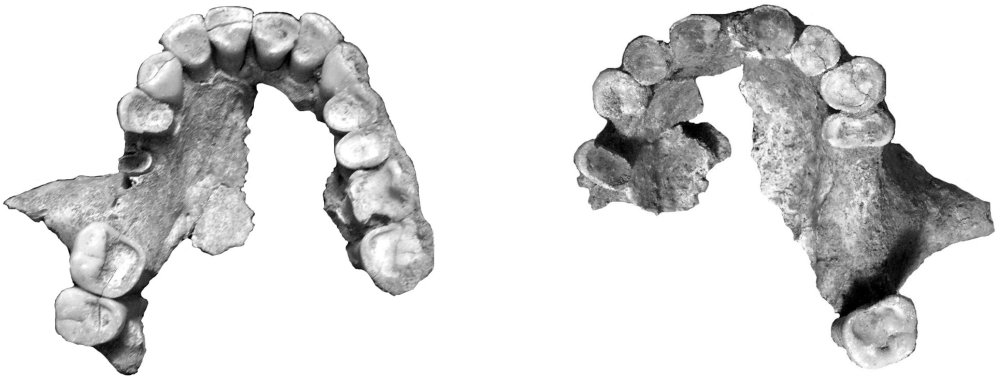

(h)

Figure 86: Examples of periodontal pathological changes. Abu Tabari 02/28-3: calculus - right upper second molar (*Dens molaris superior II*) (a), Abu Tabari 02/28-8: calculus - right upper second and third molar (*Dens molaris superior II et III*) (b), Abu Tabari 02/28-22: calculus and alveolar recession - left lower second and third molar (*Dens molaris inferior II et III*) (c), Abu Tabari 02/1-3: parodontitis - right lower second molar (*Dens molaris inferior II*) (d), Abu Tabari 02/28-15: parodontitis - right upper second and third molar (*Dens molaris superior II et III*) (e), Abu Tabari 02/28-15: parodontitis - right maxillary alveolar process (*Processus alveolaris maxillae*) (f), Abu Tabari 02/28-23: abscess drains between the left upper second premolar (*Dens praemolaris superior II*), first molar (*Dens molaris superior I*) and second molar (*Dens molaris superior II*) (g) and Conical Hill 02/3-4: apical abscess of the left canine (*Dens caninus inferior*) (h).

Although they were normally not very severe, dental and periodontal pathologies were relatively frequent (see Table 6). Generally, only traces of small to moderate amounts of dental calculus were encountered. Noteworthy traces of such amounts of dental calculus were observed in twelve specimens (37.50% of all individuals). With the exception of Abu Tabari 02/1-3, the cases of parodontitis were either mild or moderate. Parodontosis and/or parodontitis were detected seven times (i.e. in 21.88% of the skeletons). Five individuals (15.63% of the sample) had suffered from dental abscesses. Whereas the cause of Conical Hill 02/3-4's apical abscess remained unclear, caries, masticatory stress and parodontitis were most likely to blame for Abu Tabari 02/1-2's, Abu Tabari 02/1-3's and Abu Tabari 02/28-22's and -23's respective abscesses.



(a) (b) (c)



(d) (e)

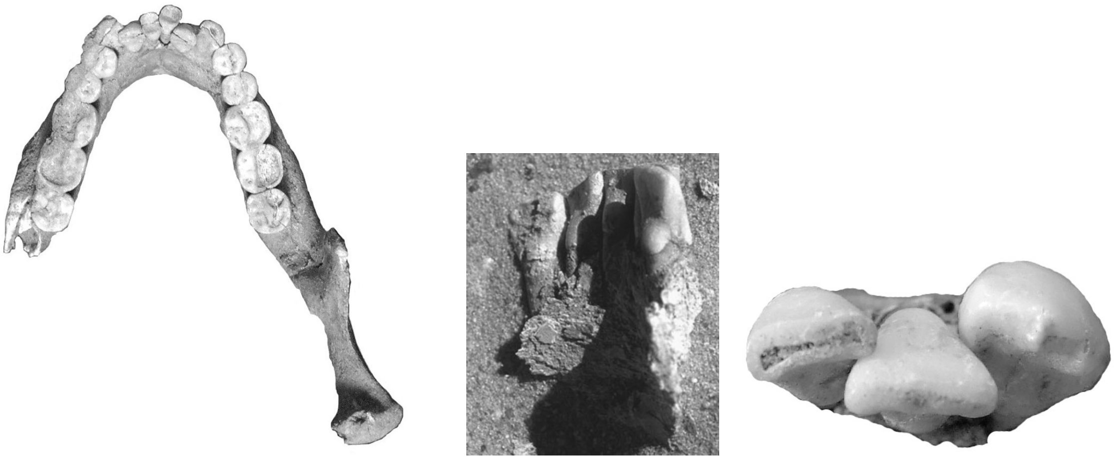
(f) (g) (h) (i)

Figure 87: Examples of systematically scored dental health and physiological stress indicators. Abu Tabari 02/1-2: caries - right upper second premolar (*Dens praemolaris superior II*) (a), Abu Tabari 02/28-8: caries - right lower third molar (*Dens molaris inferior III*) (b), Abu Tabari 02/28-23: caries - left lower second molar (*Dens molaris inferior II*) (c), Abu Tabari 02/1-2: maxillary ***ante mortem*** tooth loss (d), Abu Tabari 02/1-3: maxillary ***ante mortem*** tooth loss (e), Abu Tabari 02/1-8: enamel hypoplasia - right upper first premolar (*Dens praemolaris superior I*) (f), Abu Tabari 02/1-8: enamel hypoplasia - left upper second molar (*Dens molaris superior II*) (g), Abu Tabari 02/28-3: enamel hypoplasia - left lower second incisor (*Dens incisivus inferior II*) and canine (*Dens caninus inferior*) (h) and Abu Tabari 02/28-14: enamel hypoplasia - left lower canine (*Dens caninus inferior*) (i).

If possible, each individual was examined for dental caries, tooth loss, enamel hypoplasia and *Cribra orbitalia*. Five dentitions (15.63% of the individuals) exhibited carious lesions (see Appendix XXI.C. for all dental caries scores and the accompanying descriptive statistics). However, only Abu Tabari 02/1-2's, 02/28-8's and -23's lesions were securely diagnosed and larger than "needle point-sized". Apart from Abu Tabari 02/1-2 and -3 (6.25% of the sample members), no individual had unquestionably lost permanent teeth (*Dentes permanentes*) unintentionally *intra vitam* (see Table 6 and Appendix XXI.A.). In Abu Tabari 02/1-2's case caries and in Abu Tabari 02/1-3's case parodontitis and excessive masticatory stress were identified as the most likely causes of this tooth loss. When the scores of all permanent teeth (*Dentes permanentes*) were used to calculate the descriptive statistics, the sample's average enamel hypoplasia intensity score was 2.41 (see Appendix XXI.B. for all enamel hypoplasia scores and the accompanying descriptive statistics). Six individuals (18.75% of all skeletons) had a mean intensity score of 3.00 ("faint") or above. When the molars (*Dentes molares*) were not included in the calculations, 21.88% of the skeletons (seven out of all individuals) had mean intensity scores of 3.00 ("faint") or above. These seemingly low average scores were, however, slightly misleading. Enamel hypoplasia was widespread and often severe. Only eight (26.67%) of the examined 30 dentitions were not affected by enamel hypoplasia. Moreover, these eight unaffected dentitions either consisted of milk teeth (*Dentes decidui*) or a very small number of teeth. Finally, no less than nine members of the sample (i.e. 31.03% of the 29 specimens with teeth) had maximum intensity scores of 5 ("pronounced") or 6 ("very pronounced"). The sample's average *Cribra orbitalia* score, 1.64, was low (see Appendix XXI.D. for all *Cribra orbitalia* scores and the accompanying descriptive statistics). Four (57.1%) of the seven evaluated skeletons had a mean score of 2 ("faint"). Two other facts were also interpreted as symptoms of developmental and general physiological stress. Firstly, the degree of dental asymmetry was striking at times (see Appendix XIII.B.). Secondly, several individuals had long bones with surprisingly thin cortical bone (*Substantia compacta*) (see Appendix XII.C.).

IV.A.14. Remarks

Phenomena primarily caused by the imbalance between tooth sizes and dental arch (*Arcus dentalis*) dimensions were most frequently remarked upon (see IV.A.3. and Table 6). These phenomena included anterior tooth crowding, other malalignments and crown compression. Anterior tooth crowding was recorded in seven cases (21.88% of members of the sample). Three skeletons (9.38% of the individuals) displayed other malalignments. Crown compression was fairly common. It was especially pronounced in Abu Tabari 02/28-5's, -7's and -22's dentitions, i.e. in 10.34% of the 29 specimens with teeth.



(a) (b) (c)

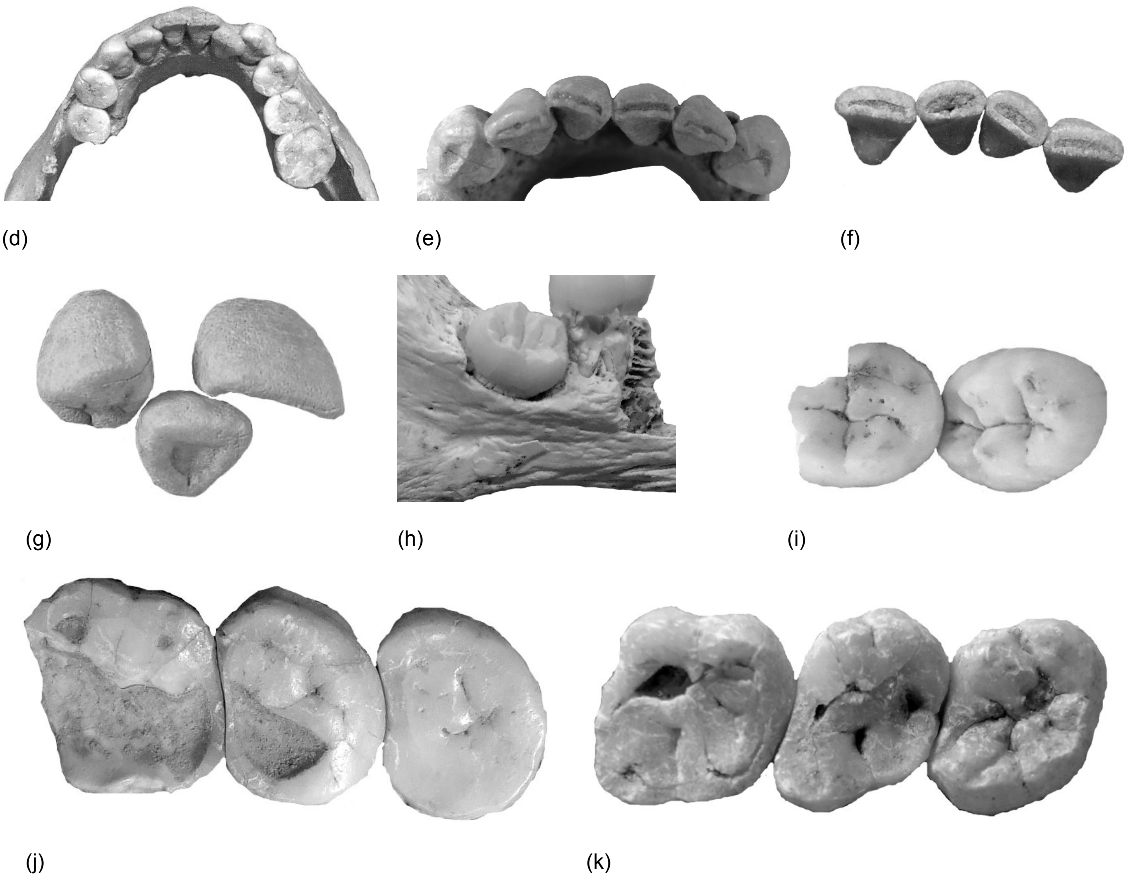


Figure 88: Examples of tooth crowding, other malalignments and crown compression. Abu Tabari 02/1-2: crowding of the anterior mandibular dentition (a), Abu Tabari 02/1-8: crowding of the anterior mandibular dentition *in situ* (b), Abu Tabari 02/1-8: crowding - left lower first incisor (*Dens incisivus inferior I*), second incisor (*Dens incisivus inferior II*) and canine (*Dens caninus inferior*) (c), Abu Tabari 02/28-5: crowding of the anterior mandibular dentition (d), Abu Tabari 02/28-15: crowding of the anterior mandibular dentition (e), Abu Tabari 02/28-21: crowding of the mandibular incisors (*Dentes incisivi inferiores*) (f), Abu Tabari 03/34-1: linguoversion of the right upper second incisor (*Dens incisivus superior II*) (g), Djabarona 96/1-1: lingual inclination of left lower third molar (*Dens molaris inferior III*) (h), Djabarona 96/1-2: right lower third molar (*Dens molaris inferior III*) impacted by the second molar (*Dens molaris inferior II*) (i), Abu Tabari 02/28-5: crown compression - left upper molars (*Dentes molares superiores*) (j) and Abu Tabari 02/28-7: crown compression - right upper molars (*Dentes molares superiores*) (k) (b: F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

IV.B. Intra-observer error

None of the tested sets of pairs contained original and control data which differed significantly or in tendency from each other (see Appendix XXII.A. for all results and the accompanying descriptive statistics). The differences between the original and the control data of 17 (i.e. 3.97%) of the 428 tested sets of pairs did, however, differ either significantly or in tendency from zero. Nevertheless, no variables were judged to be unreliable or removed on the basis of these results.

This decision was taken in view of two facts (see Table 9). Firstly, the maximum and mean absolute differences between the data pairs of eleven of the 17 sets in question were negligible. Secondly, the maximum and mean absolute differences between the data pairs of the remaining six sets were caused by the discrepancies between laboratory estimates and *in situ* measurements of long bone lengths. The maximum and the mean absolute difference between all pairs of dental measurements, for instance, were 0.15 and 0.028 mm respectively. “Cranial measurements - Abu Tabari 02/3-1”, “PM075/76 - U12. Transverse shaft diameter (m)” and “PM150/151 - T10b. Minimum shaft circumference (m)” exhibited relatively large maximum and mean differences. However, although they were relatively large, these differences were in fact still rather small in absolute terms. In addition, the more inclusive, combined sets of pairs, of which they formed subsets (i.e. “All cranial measurement pairs”, “All postcranial measurement pairs (without long bone lengths)” and “All circumference measurement pairs”), failed none of the applied statistical tests. Finally, even the maximum differences caused by the discrepancies between laboratory estimates and *in situ* measurements of long bone lengths were actually fairly moderate.

Table 9: Sets of data pairs with differences between original and control data which were either significantly or in tendency different from zero.

	Cranial metric data - Abu Tabari 02/1-3	**All dental metric data pairs**	**All crown length pairs**	**All crown width pairs**	**Dental metric data - Abu Tabari 02/1-3**	**Dental metric data - Abu Tabari 02/28-5**	**PM015/16 - H1. *Humerus* - Max. length (m)**	**PM075/76 - U12. Transv. shaft diameter (m)**	**PM130/131 - T1a. *Tibia* - Max. length (m)**
No. of pairs	34	160	81	79	18	32	6	5	6
Max. diff.	2.00	0.15	0.15	0.10	0.10	0.10	12.50	0.50	25.00
Mean diff.	0.412	0.028	0.030	0.027	0.042	0.030	5.583	0.300	11.667
Sig. (paired)	Asymp. Sig. (2-tailed): .132; Exact Sig. (2-tailed): .142; Exact Sig. (1-tailed): **.071**	Asymp. Sig. (2-tailed): **.004** Exact Sig. (2-tailed): **.003** Exact Sig. (1-tailed): **.002**	Asymp. Sig. (2-tailed): **.088** Exact Sig. (2-tailed): **.088** Exact Sig. (1-tailed): **.044**	Asymp. Sig. (2-tailed): **.015** Exact Sig. (2-tailed): **.014** Exact Sig. (1-tailed): **.007** t - Sig. (2-tailed): **.010**	Asymp. Sig. (2-tailed): **.073** Exact Sig. (2-tailed): **.094** Exact Sig. (1-tailed): **.047** t - Sig. (2-tailed): **.058**	Asymp. Sig. (2-tailed): **.027** Exact Sig. (2-tailed): **.035** Exact Sig. (1-tailed): **.017** t - Sig. (2-tailed): **.025**	Asymp. Sig. (2-tailed): **.066** Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): **.063**	Asymp. Sig. (2-tailed): **.063** Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): **.063**	Asymp. Sig. (2-tailed): **.042** Exact Sig. (2-tailed): **.063** Exact Sig. (1-tailed): **.031**

	PM150/151 - T10b. Min. shaft circum. (m)	**All postcran. metric data pairs**	**All long bone length data pairs**	**Postcran. metric data - Abu Tabari 02/1-3 (without long bone lengths)**	**Postcran. metric data - Abu Tabari 02/1-7 (without long bone lengths)**	**Postcran. metric data - Abu Tabari 02/1-3**	**Postcran. metric data - Abu Tabari 02/1-7**	**All postcran. robusticity data pairs[1]**
No. of pairs	6	190	17	27	25	30	27	27
Max. diff.	1.25	25.00	25.00	2.00	2.00	12.50	10.00	1.0
Mean diff.	0.583	0.930	7.265	0.481	0.380	1.183	1.093	0.111
Sig. (paired)	Asymp. Sig. (2-tailed): **.068** Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): **.063**	Asymp. Sig. (2-tailed): **.004** Exact Sig. (2-tailed): **.003** Exact Sig. (1-tailed): **.002**	Asymp. Sig. (2-tailed): **.002** Exact Sig. (2-tailed): **.000** Exact Sig. (1-tailed): **.000** t - Sig. (2-tailed): **.001**	Asymp. Sig. (2-tailed): .120 Exact Sig. (2-tailed): .132 Exact Sig. (1-tailed): **.066**	Asymp. Sig. (2-tailed): **.005** Exact Sig. (2-tailed): **.004** Exact Sig. (1-tailed): **.002**	Asymp. Sig. (2-tailed): **.021** Exact Sig. (2-tailed): **.019** Exact Sig. (1-tailed): **.010**	Asymp. Sig. (2-tailed): **.002** Exact Sig. (2-tailed): **.001** Exact Sig. (1-tailed): **.000**	Asymp. Sig. (2-tailed): **.034** Exact Sig. (2-tailed): **.063** Exact Sig. (1-tailed): **.031**

[1] Remarks: 4 of 27 (14.8%) pairs of scores differed by 0.5; 1 of 27 (3.7%) pairs of scores differed by 1; 5 of 27 (18.5%) pairs of scores differed from each other

IV.C. Diachronic differences

The pre-Leiterband and Leiterband values of 63 (i.e. 35.39%) of the 178 tested variables differed significantly or in tendency from each other (see Appendix XXIII.A. for all results and the accompanying descriptive statistics). The comparisons focusing on enamel hypoplasia, dental abrasion and age at death revealed the most striking differences (see Table 10). The slightly more subtle dissimilarities between expressions of certain stress and robusticity markers of the *Cranium* and bones of the upper free extremities (*Partes liberae membrorum superiorum*) were often fairly pronounced as well.

Table 10: Variables whose pre-Leiterband and Leiterband values differed significantly or in tendency from each other.

One- or two-tailed: different in tendency (≤ 0.1)	**One-tailed: significant (≤ 0.05)**	**Two-tailed: significant (≤ 0.05)**	**Two-tailed: very significant (≤ 0.01)**	**Two-tailed: highly significant (≤ 0.001)**
● CM 168 - Cranial thickness (max.) ● CM 169 - Cranial thickness (min.) ● PM063 - *Radius* - Cortical thickness (max.) ● PM065/66 - U1. *Ulna* - Maximum length (m) ● SCM 169 - Cranial thickness (min.) ● SCM 168/169 - Cranial thickness (max., min.) ● SPM035 - *Humerus* - Cortical thickness (max.) ● SPM063 - *Radius* - Cortical thickness (max.) ● SPM086 - *Ulna* - Cortical thickness (min.) ● ICM003 - *I51(1). Naso-palatal index ● ICM004 - *I54b. Palato-alveolar index ● ICM007 - *I62c. Ant. mandibular length-breadth index ● ICM013 - Cranial thickness index ● IPM005 - Humeral cortical thickness index ● IPM006 - *RI1b. Modified robusticity index ● IPM010 - *UI1b. Modified robusticity index ● IPM020 - *FI17. Subtrochanteric robusticity index ● CN032 - Ramus angle ● PE007a/8a - *Fossa hypotrochanterica* (m) - presence ● CR002 - *Inion* (*Protuberantia occipitalis externa*) ● PR001/2 - Humeral shaft bowing (m) ● PR005/6 - Radial *Margo interosseus* size (m) ● CS012/13 - *M. pterygoideus medialis* (*Insertio*) (m) ● Age at death (with sub-adults) ● Body mass index	● CM129/130 - 79. Mandibular ramus angle (m) ● SPM036 - *Humerus* - Cortical thickness (min.) ● ICM011 - *I66c. Symphyseal index ● IDM - Asymmetry index (molars) ● IPM007 - RI2. Diaphyseal index ● IPM024 - TI1. Mid-shaft diameter index ● IPM - Radio-humeral index (brachial index) ● PR007/8 - Ulnar shaft bowing (m) ● PR009/10 - Ulnar *Margo interosseus* size (m) ● PR011b/12b - Femoral shaft bowing (m) - degree ● CPS - *Cranium* and postcranium (CS001, 4/5, 10/11, 12/13, PS001/2, 3/4, 5/6, 7/8, 11/12, 15/16) ● DA - pre-Leiterband - Ant.-post. abrasion comparison	● CM 168/169 - Cranial thickness (max., min.) ● PM015/16 - H1. *Humerus* - Maximum length (m) ● SPM035/36 - *Humerus* - Cortical thickness (max., min.) ● ICM012 - *I66d. Symphyseal height index ● IPM001 - HI1 Robusticity index ● IPM002 - *HI1b. Modified robusticity index ● IPM003 - *IH1c. Pearson's robusticity index ● CR - Occipital robusticity (CR001, 2) ● CS - *Cranium* (CS001, 4/5, 10/11, 12/13) ● CS - *Mandibula* (CS010/11, 12/13) ● DS - Hypoplasia - presence (UM1, 2, 3, LM1, 2, 3) ● DS - Hypoplasia - intensity (all teeth) ● DS - Hypoplasia - intensity (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)	● PR - Radial & ulnar *Margo* size (PR005/6, 9/10) ● DC - Caries - presence (all teeth) ● DC - Caries - severity (all teeth) ● Age at death (without sub-adults)	● DL - Tooth loss (all teeth) ● DS - Hypoplasia - presence (all teeth) ● DS - Hypoplasia - presence (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2) ● DS - Hypoplasia - frequency (all teeth) ● DS - Hypoplasia - frequency (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2) ● DA - Abrasion (all teeth) ● DA - Ant. abrasion (UI1, 2, C, LI1, 2, C) ● DA - Post. abrasion (UM1, 2, 3, LM1, 2, 3) ● DC - Caries - severity (all lesions)

Several of the discovered diachronic differences related to the sub-samples' health. Although the disparity between the overall pre-Leiterband (32.2 years) and Leiterband average age at death (24.2 years) was considerable, it was not statistically significant. However, the difference between the mean age at death of the pre-Leiterband (38.8 years) and the Leiterband adults (26.4 years) was very significant. That the two sub-samples' frequencies of sub-adults did not differ significantly added further weight to this finding. Given the Leiterband sub-sample's lower average age at death, it was not surprising that its members were significantly more often affected by enamel hypoplasia. This sub-sample's enamel hypoplasia lesions were also significantly more severe. The analysis of the dental caries variables yielded comparable results. Whereas the carious lesions of the Leiterband dentitions were smaller, Leiterband individuals exhibited such lesions significantly more often. Lastly, in this context, it could be noted that antimeric molars of the Leiterband sub-sample were less symmetrical.

The remaining findings highlighted differences in robusticity and occupational stress levels. The pre-Leiterband individuals were characterised by more abraded teeth. They had relatively and absolutely more worn anterior teeth as well. Two other sets of differences appeared to be at least partly related to this phenomenon. Firstly, the pre-Leiterband mandibles (*Mandibulae*) had sharper ramus angles, higher symphyses (*Symphyses mandibularum*) and more prominent muscle attachment sites. Secondly, the occipital regions (*Regiones occipitales*) of the members of the pre-Leiterband sub-sample were more robust and had more developed musculoskeletal stress markers. On the other hand, that the Leiterband *Crania* were thinner and that, in relative terms, the average Leiterband palate (*Palatum osseum*) was somewhat wider did not seem to be related to this complex of differences. The bones of the pre-Leiterband individuals' upper free extremities (*Partes liberae membrorum superiorum*) were more slender. Nevertheless, they still had thicker cortical bone (*Substantia compacta*). Their *Radii* and *Ulnae* were also characterised by stronger shaft bowing and greater interosseous border (*Margo interosseus*) sizes. Similarly, although the expressions of their musculoskeletal stress traits were more pronounced in general, their body mass index values suggested that the members of the pre-Leiterband sub-sample had a slightly leaner build. Only one meaningful diachronic difference could be uncovered by examining the variables dedicated to the bones of the lower free extremities (*Partes liberae membrorum inferiorum*). The shafts (*Corpora*) of the pre-Leiterband *Femora* were somewhat more bowed.

Although it was clear that the small sub-sample sizes, the samples' differing age and sex ratios, the degree of population discontinuity separating the two sub-samples and the limited power of the applied statistical tests meant that they would have to be treated with caution, the results were considered to be reasonably reliable. These limiting factors were therefore usually not regarded as the underlying cause of the lack or presence of diachronic differences.

IV.D. Metric and non-metric affinities

A total of 234 core discriminant function analyses were performed (see Appendix XXV.A. for the detailed reports of all discriminant function analyses, analysis by analysis overviews of all classifications, overviews of the classification frequencies and overviews of all classification accuracies). These analyses produced unambiguous, mutually supporting results.

180	**Separate core analyses - Wadi Howar individuals**			
		92	Prehistoric comparative samples	
			11	Combined metric and non-metric data
		88	Modern comparative samples	
			11	Combined metric and non-metric data
36	**Separate core analyses - Wadi Howar mean individuals**			
		18	Prehistoric comparative samples	
		18	Modern comparative samples	
18	**Group core analyses - Wadi Howar sites, occupation phases and sample as a whole**			
		9	Prehistoric comparative samples	
		9	Modern comparative samples	
234	**Total**			

(a)

28 analysable Wadi Howar individuals

Prehistoric comparative samples			
All classifications		Reliable classifications	
71.43% (20:28)	**Malian Sahara**	**93.75% (15:16)**	**Malian Sahara**
28.57% (8:28)	Jebel Sahaba/Tushka	6.25% (1:16)	Jebel Sahaba/Tushka
Modern comparative samples			
All classifications		Reliable classifications	
42.86% (12:28)	**Southern Sudan**	**56.25% (9:16)**	**Southern Sudan**
35.71% (10:28)	Chad	43.75% (7:16)	Chad
21.43% (6:28)	Haya		

7 Wadi Howar mean individuals

Prehistoric comparative samples			
All classifications		Reliable classifications	
100.00% (7:7)	**Malian Sahara**	**100.00% (5:5)**	**Malian Sahara**
Modern comparative samples			
All classifications		Reliable classifications	
57.14% (4:7)	**Southern Sudan**	**80.00% (4:5)**	**Southern Sudan**
28.57% (2:7)	Haya	20.99% (1:5)	Chad
14.29% (1:7)	Chad		

7 Wadi Howar groups (6 sub-samples and the sample as a whole)

Prehistoric comparative samples			
All classifications		Reliable classifications	
71.43% (5:7)	**Malian Sahara**	**100.00% (5:5)**	**Malian Sahara**
14.29% (1:7)	02/28		
14.29% (1:7)	Leiterband		
Modern comparative samples			
All classifications		Reliable classifications	
85.71% (6:7)	**Southern Sudan**	**100.00% (4:4)**	**Southern Sudan**
14.29% (1:7)	Chad		

(b)

Wadi Howar - Individuals (separate analyses)

		All analyses	Reliable analyses
Prehistoric comparative samples	classification	**84.07%**	**97.30%**
	leave-one-out	**77.93%**	**90.98%**
Modern comparative samples	classification	**76.46%**	**92.34%**
	leave-one-out	**65.86%**	**79.72%**

Wadi Howar - Mean individuals (separate analyses)

		All analyses	Reliable analyses
Prehistoric comparative samples	classification	**90.85%**	**99.50%**
	leave-one-out	**87.25%**	**97.12%**
Modern comparative samples	classification	**88.10%**	**99.28%**
	leave-one-out	**78.82%**	**90.47%**

Wadi Howar - Sub-samples and the sample as a whole (group analyses)

Prehistoric comparative samples	classification	**98.93%**
	leave-one-out	**94.09%**
Modern comparative samples	classification	**98.29%**
	leave-one-out	**88.22%**

(c)

Figure 89: Overview of the discriminant function analyses performed to determine the Wadi Howar sample's metric and non-metric affinities. Number of analyses (a), overall assignment frequencies (b) and mean classification accuracies (c). The averages of the classification accuracies were based on the results of each analysis, not the overall individual classification accuracies. The term classification was used to refer to the accepted result, i.e. the within-groups covariance matrix classification, if the Box's M test had been passed, or the separate-groups covariance matrix classification, if the Box's M test had been failed.

The affinities the results revealed were apparent in both the separate individual and the various group analyses. The classification patterns were remarkably uniform. This was particularly noteworthy since each individual and each mean individual was associated with a different set of variables. Additionally, each set of core analyses included one analysis using cranial and dental metric data, one using cranial and dental scaled metric data and one using cranial and dental non-metric data.

	Prehistoric comparative samples	Modern comparative samples
Abu Tabari 95/2-3	[***Jebel Sahaba/Tushka*** *41.50%; 21.50%*]	[***Haya*** *29.60%; 25.90%*]
Abu Tabari 02/1-2	***Malian Sahara*** *96.93%; 92.30%*	***Chad*** *93.80%; 83.97%*
Abu Tabari 02/1-3	***Malian Sahara*** *94.87%; 88.20%*	***Chad*** *90.43%; 79.93%*
Abu Tabari 02/1-5	(***Malian Sahara*** *71.65%; 68.48%*)	(***Haya*** *63.27%; 56.93%*)
Abu Tabari 02/1-6	-	-
Abu Tabari 02/1-7	(***Malian Sahara*** *63.45%; 60.38%*)	(***Southern Sudan*** *63.83%; 50.83%*)
Abu Tabari 02/1-8	***Malian Sahara*** *95.37%; 86.13%*	***Southern Sudan*** *87.97%; 76.23%*
Abu Tabari 02/28-2	***Malian Sahara*** *93.33%; 86.67%*	***Southern Sudan*** *91.63%; 75.93%*
Abu Tabari 02/28-3	***Malian Sahara*** *97.93%; 89.77%*	***Chad*** *87.33%; 78.40%*
Abu Tabari 02/28-4	-	-
Abu Tabari 02/28-5	***Malian Sahara*** *98.47%; 94.33%*	***Southern Sudan*** *95.07%; 82.10%*
Abu Tabari 02/28-7	***Malian Sahara*** *93.87%; 82.03%*	***Southern Sudan*** *83.23%; 65.60%*
Abu Tabari 02/28-8	***Malian Sahara*** *97.43%; 89.77%*	***Southern Sudan*** *84.23%; 68.53%*
Abu Tabari 02/28-11	(***Jebel Sahaba/Tushka*** *65.05%; 62.75%*)	(***Haya*** *43.33%; 39.10%*)
Abu Tabari 02/28-13	(***Jebel Sahaba/Tushka*** *66.93%; 61.30%*)	[***Southern Sudan*** *53.70%; 42.15%*]
Abu Tabari 02/28-14	***Malian Sahara*** *97.93%; 89.20%*	***Southern Sudan*** *89.50%; 75.93%*
Abu Tabari 02/28-15	***Malian Sahara*** *98.97%; 94.87%*	***Southern Sudan*** *96.30%; 84.57%*
Abu Tabari 02/28-20	[***Malian Sahara*** *83.95%; 78.95%*]	(***Chad*** *61.45%; 59.33%*)
Abu Tabari 02/28-21	***Malian Sahara*** *99.00%; 95.40%*	***Chad*** *96.60%; 86.10%*
Abu Tabari 02/28-22	***Malian Sahara*** *99.50%; 94.37%*	***Chad*** *94.13%; 78.10%*
Abu Tabari 02/28-23	***Jebel Sahaba/Tushka*** *99.50%; 93.83%*	***Chad*** *94.43%; 84.57%*
Abu Tabari 03/31	-	-
Abu Tabari 03/34-1	***Malian Sahara*** *97.97%; 90.77%*	***Southern Sudan*** *89.50%; 77.77%*
Conical Hill 95/4	***Malian Sahara*** *99.00%; 95.87%*	***Southern Sudan*** *95.37%; 83.03%*
Conical Hill 95/4-1	(***Jebel Sahaba/Tushka*** *58.68%; 56.00%*)	(***Chad*** *53.05%; 55.95%*)
Conical Hill 02/3-4	(***Jebel Sahaba/Tushka*** *81.93%; 71.53%*)	(***Southern Sudan*** *73.85%; 58.58%*)
Djabarona 96/1-1	***Malian Sahara*** *100.00%; 95.40%*	***Chad*** *95.37%; 82.10%*
Djabarona 96/1-2	(***Malian Sahara*** *68.28%; 62.95%*)	(***Haya*** *56.83%; 49.58%*)
Djabarona 96-4	(***Jebel Sahaba/Tushka*** *70.35%; 67.25%*)	(***Chad*** *49.90%; 48.25%*)
Djabarona 96/120-3	-	-
Djabarona 96/120-4	(***Jebel Sahaba/Tushka*** *57.83%; 59.33%*)	[***Haya*** *46.50%; 39.55%*]
Djabarona 96/120-5	(***Malian Sahara*** *70.35%; 59.23%*)	(***Haya*** *61.28%; 50.13%*)

(a)

	Prehistoric comparative samples	Modern comparative samples
Abu Tabari 02/1	***Malian Sahara*** *99.5%; 96.40%*	***Chad*** *98.5%; 91.03%*
Abu Tabari 02/28	***Malian Sahara*** *99.5%; 97.43%*	***Southern Sudan*** *99.4%; 90.70%*
Djabarona 96/120	(***Malian Sahara*** *69.2%; 62.57%*)	(***Haya*** *60.2%; 49.70%*)
pre-Leiterband	***Malian Sahara*** *99.5%; 96.90%*	***Southern Sudan*** *99.1%; 91.03%*
Leiterband	***Malian Sahara*** *99.5%; 97.43%*	***Southern Sudan*** *99.7%; 89.80%*
Handessi	(***Malian Sahara*** *69.2%; 62.57%*)	(***Haya*** *60.2%; 49.70%*)
Wadi Howar	***Malian Sahara*** *99.5%; 97.43%*	***Southern Sudan*** *99.7%; 89.80%*

(b)

	Prehistoric comparative samples	Modern comparative samples
Abu Tabari 02/1	***Malian Sahara*** *98.50%; 97.70%*	***Southern Sudan*** *93.57%; 87.03%*
Abu Tabari 02/28	***Malian Sahara*** *98.50%; 97.70%*	(***Southern Sudan*** *93.57%; 87.03%*)
Djabarona 96/120	[***02/28*** *98.50%; 97.70%*]	[***Chad*** *93.57%; 87.03%*]
pre-Leiterband	***Malian Sahara*** *98.63%; 98.83%*	***Southern Sudan*** *94.17%; 90.00%*
Leiterband	***Malian Sahara*** *98.63%; 98.83%*	***Southern Sudan*** *94.17%; 90.00%*
Handessi	[***Leiterband*** *98.63%; 98.83%*]	[***Southern Sudan*** *94.17%; 90.00%*]
Wadi Howar	***Malian Sahara*** *99.67%; 98.33%*	***Southern Sudan*** *94.53%; 87.63%*

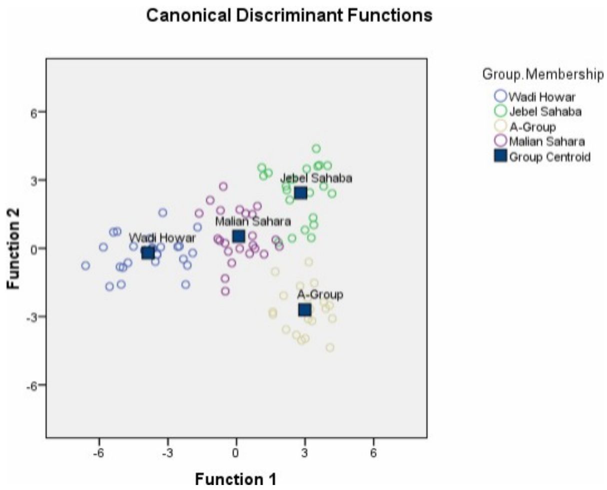
(c)

Figure 90: Final overall individual, mean individual, sub-sample and sample classifications. Wadi Howar individuals (a), Wadi Howar mean individuals (b) and Wadi Howar sub-samples and sample as a whole (c) (bold: classification; normal: mean classification accuracy; fine: mean leave-one-out accuracy; whole result in square brackets: unreliable; whole result in round brackets: reliability uncertain) (see Appendix XXV.A.2.a.2. for complete analysis by analysis overviews of the classifications of all individuals, all mean individuals, all sub-samples and the sample as a whole).

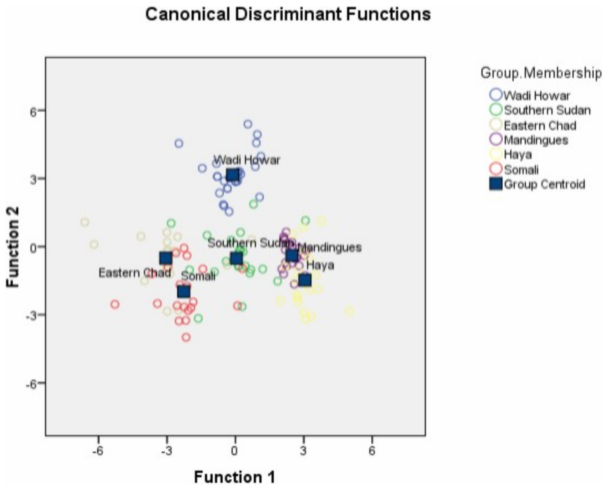
Moreover, the classification accuracies were rather high. On average, they ranged from 65.86 to 84.07%, when the means were based on the separate analyses of all individuals, and from 79.72 to 97.30%, when only the separate analyses of the individuals with sufficient data to produce reliable results were taken into account. In view of these facts, the findings were deemed highly reliable.

The prehistoric comparative sample the Wadi Howar material shared most affinities with came from the Malian Sahara (Hassi el Abiod, Kobadi, Erg Ine Sakane, etc.). The material was thus, unexpectedly, found to be morphologically closer to a sample from a part of the Sahara from which the prehistoric inhabitants of the Wadi Howar were separated by present-day Chad and Niger than to the samples from the nearby Nile Valley (i.e. the A-Group and the Jebel Sahaba/Tushka sample). The Wadi Howar series was also considerably more similar to the Jebel Sahaba/Tushka material than it was to the A-Group sample, despite all temporal, geographic and cultural links.

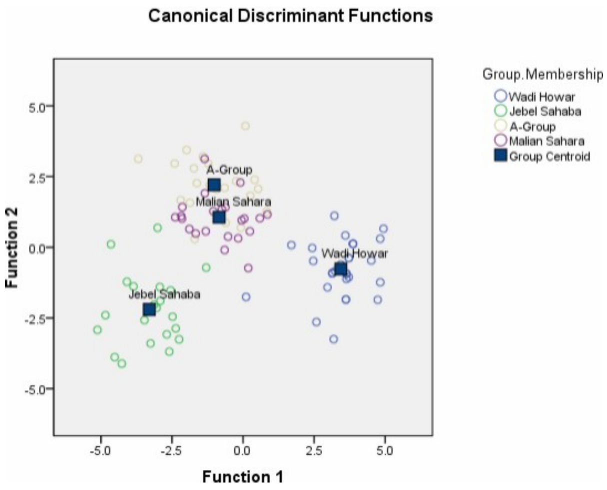
Another result was seen as further evidence of an apparently fairly pronounced morphological distance between the prehistoric inhabitants of the Wadi Howar and most of their Nile Valley contemporaries. The additional discriminant function analyses which included the "Sudanese Hotchpotch" sample failed to uncover any meaningful connections between this material and the Wadi Howar series (see Appendix XXV.A.2.a.3. for all relevant details).



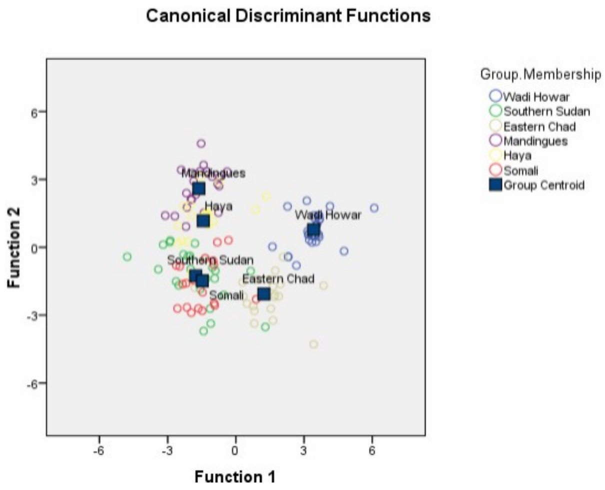
(a)



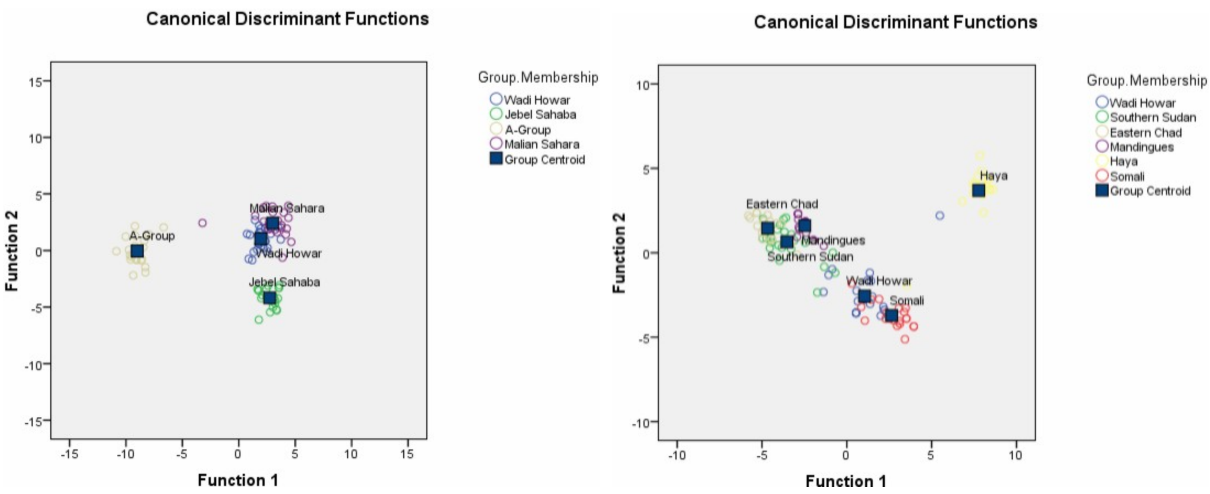
(d)



(b)



(e)



(c) (f)

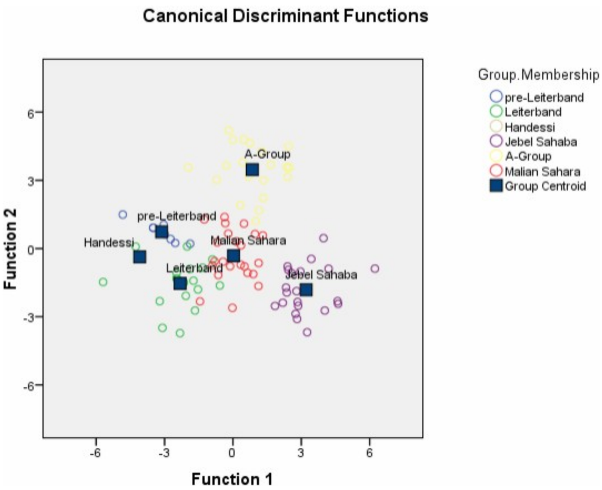
Figure 91: Results scatter plots for the Wadi Howar sample as a whole (separate-groups covariance matrices). Prehistoric comparative samples: metric data (a), scaled metric data (b) and non-metric data (c) and modern comparative samples: metric data (d), scaled metric data (e) and non-metric data (f).

Only Abu Tabari 02/28-8 and -15 were assigned to the "Sudanese Hotchpotch" sample based on two different data types (i.e. scaled metric and non-metric data) in one or more of the additional analyses associated with core analyses with results which were considered reliable. Eight more individuals were grouped with the "Sudanese Hotchpotch" sample in the context of reliable analyses using one, but no other, data type. The additional analyses associated with results which were not considered reliable produced four "Sudanese Hotchpotch" classifications on the basis of one data type, three on the basis of two data types and one, Djabarona 96/120-4, on the basis of all three data types.

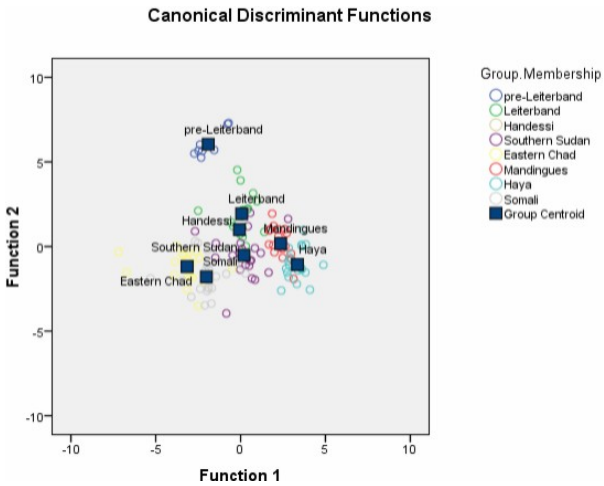
As far as the modern comparative series were concerned, the Wadi Howar sample was, as expected, most similar to the material form Southern Sudan and, to a lesser extent, the material from Chad. This split was perhaps not too surprising, since both samples mostly comprised members of closely related ethnic groups. Although none of these classifications were considered to be reliable, it was still interesting that six individuals and two mean individuals were assigned to the East African Haya sample.

32 χ^2 tests were carried out to determine if any occupation phase-specific classification frequencies differed significantly from each other (see Appendix XXV.B. for the detailed reports and all results). No χ^2 test comparing the frequencies of reliable classifications exposed any significant differences. Three of the tests which analysed the frequencies of both reliable and unreliable classifications did, however, yield significant results. All three highlighted differences between the Leiterband and the Handessi sub-sample. Although the test results themselves were not questioned, there was little doubt that the deviant classifications which underlay these differences had mainly been caused by the severe lack of data which characterised the Handessi sub-sample.

Nevertheless, evidence suggestive of at least a certain degree of discontinuity did surface as well. The group analyses involving the site- and occupation phase-specific sub-samples demonstrated that the Wadi Howar sub-samples were generally closer to the Malian Sahara and the Southern Sudan sample than they were to each other. At times, the sub-samples were also clearly separated. The pre-Leiterband and the Abu Tabari 02/1 sub-sample were positioned near the Jebel Sahaba/Tushka sample in the non-metric group analyses. The Leiterband and the Abu Tabari 02/28 sub-sample, on the other hand, remained very close to the Malian Sahara sample in these analyses.



(a)



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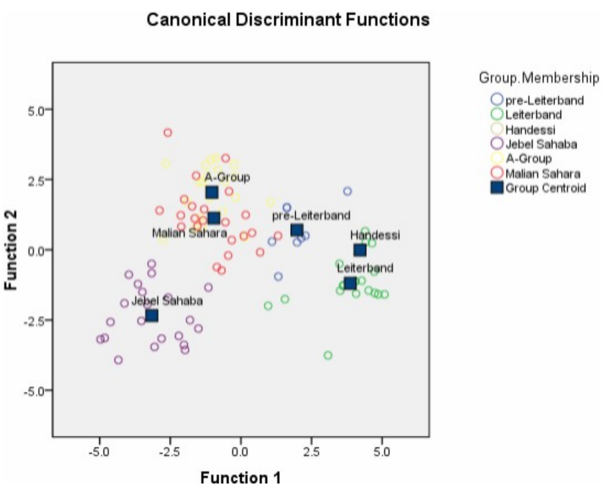
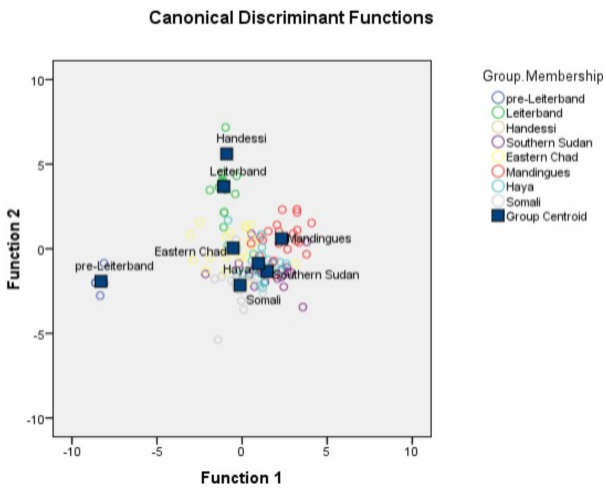
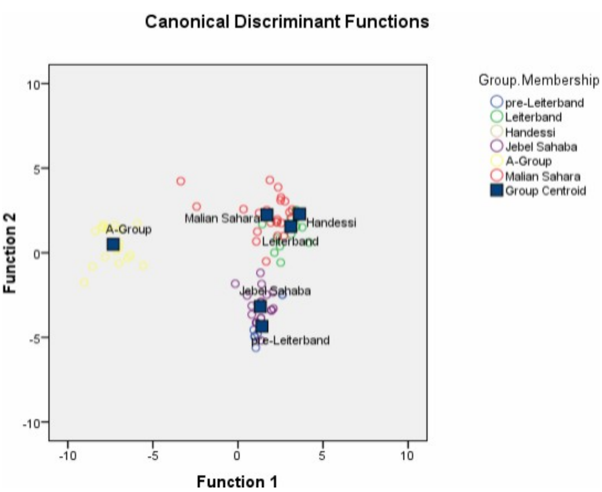


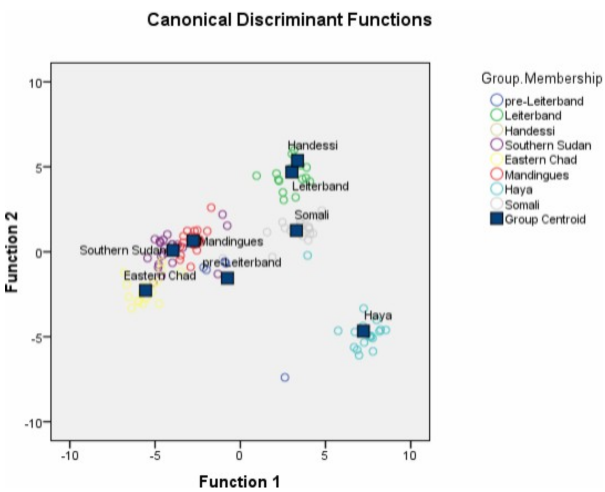
(b)



(e)



(c)



(f)

Figure 92: Results scatter plots for the occupation phase-specific sub-samples (separate-groups covariance matrices). Prehistoric comparative samples: metric data (a), scaled metric data (b) and non-metric data (c) and modern comparative samples: metric data (d), scaled metric data (e) and non-metric data (f).

Lastly, the constructed mean individuals provided a simple means of directly comparing all samples and sub-samples variable by variable (see Appendix XXIV. for all data sets of all constructed mean individuals). Furthermore, similar to the site- and occupation phase-specific Wadi Howar mean individuals, the mean individuals of the prehistoric comparative samples were entered into sets of separate individualised discriminant function analyses. Altogether 24 of these analyses with the prehistoric comparative samples' mean individuals as ungrouped cases were performed. Half of which relied on the prehistoric samples, including the Wadi Howar material. The other half relied on the modern comparative samples (see Appendix XXV.A.1.b.2., XXV.A.2.a.2.b.2., XXV.A.2.b.1.b.2. and XXV.A.2.b.2.b.2. for all detailed reports of the discriminant function analyses, the resulting classifications and the classification accuracies). These analyses were intended to provide an additional starting point for the discussion of the Wadi Howar material's affinities. Unfortunately, their results were not entirely unambiguous.

Table 11: Overall classifications of the prehistoric comparative samples' mean individuals (bold: classification; normal: mean classification accuracy; fine: mean leave-one-out accuracy; whole result in round brackets: reliability uncertain) (see Appendix XXV.A.2.a.2.b.2. for the analysis by analysis overview of the classifications of the prehistoric comparative samples' mean individuals).

	Prehistoric comparative samples	Modern comparative samples
Jebel Sahaba/Tushka	***Malian Sahara*** *97.8%; 93.4%*	***Southern Sudan*** *97.8%; 89.8%*
A-Group	***Malian Sahara*** *99.1%; 94.3%*	***Somalis*** *97.8%; 89.8%*
Malian Sahara	*(**A-Group** 100.0%; 97.3%)*	*(**Southern Sudan** 97.8%; 89.8%)*
"Sudanese Hotchpotch"	***A-Group*** *99.0%; 89.4%*	*(**Somalis** 89.8%; 76.0%)*

V. Discussion

Chapter synopsis

The final chapter served a number of purposes. Explanations for the osteological diagnoses were given here. The interpretations for all results were also offered in this chapter. Most importantly, the material, methods, results and interpretations were discussed in this part of the thesis.

The quality of both the Wadi Howar and the comparative material was critically evaluated (see V.A.). The Wadi Howar series comprised all available human skeletal remains from a very important prehistoric African cross-roads area (see V.A.1.). Furthermore, the material's archaeological context had been established in great detail. The sample was also characterised by a phenomenally high internal temporal resolution. The material's scientific value was only partly diminished by its extraordinarily poor state of preservation. The most appropriate, accessible comparative samples were used in the study (see V.A.2.). The composition of some of these samples was problematic. Yet, all actual and possible flaws of the comparative material were tolerable.

The research strategy was discussed (see V.B.1.). Firstly, several general issues were addressed (see V.B.1.a.). Methods should be valid and as objective, reliable and time- as well as cost-efficient as possible. They should not impede future attempts to falsify results. Extra-scientific factors should have no influence on the choice of methods. Secondly, the rationale behind specific methodological decisions was explained (see V.B.1.b.). In the context of this study, geometric morphometrics and related techniques, aDNA and DNA analyses, isotope analyses and the use of imaging techniques to analyse robusticity, stress and health traits were invalid, unusable or uneconomical. Well-established, robust, reliable and highly effective osteological, metric and morphological techniques were far superior alternatives.

The individual osteological analyses were complicated by the sample's poor preservation and the lack of suitable population-specific methods (see V.B.2.). As a result, seriation and internal comparisons were of utmost importance. The basic reconstruction techniques were so rigorously applied that they produced excellent results (see V.B.2.a.). Since a detailed documentation of the material's state of preservation was not a major objective of the study, the combination of general verbal as well as photographic descriptions and preservation indices was sufficient. However, it was concluded that the preservation index values need to be treated with a certain caution. That determining the sex of the members of the Wadi Howar series could be particularly challenging was emphasised (see V.B.2.b.). Using the sexually dimorphic traits and measurements of the seven confidently sexed individuals as benchmarks proved to be the most constructive approach. There was no realistic alternative to morphological assessments and internal morphological as well as metric comparisons. Since other structures which could have been used in this context were rarely present, age at death diagnoses had to be mainly based on dental markers (see V.B.2.c.). The accuracy of the dental age estimates was increased by adjusting developmental ages and seriating observed degrees of wear. Moreover, the age at death estimates which were not based on the evaluation of degrees of tooth wear and the dental abrasion of a comparative individual of known age at death from the Chadian Sahara could be used to cautiously calibrate the assigned abrasion ages. Although estimating height, weight and physique was fairly straightforward, it was not without problems (see V.B.2.d.). With the exception of Allbrook's (1961) formulae for the reconstruction of the living height of male "Nilotes", there were no applicable equations which had been developed for groups whose ancestors probably belonged to the same population complex as the prehistoric inhabitants of the Wadi Howar. Most results the other utilised formulae produced had to be adjusted. Like the equations themselves, the adjustments, which were made, *possibly distorted the results. That height and, to a lesser extent, weight reconstructions were often calculated on the basis of* in situ *or partly estimated measurements was a further cause for concern. Any inaccuracies of the height and weight estimates were almost certainly amplified by computing height-weight indices. Despite all associated methodological and conceptual problems, diagnosing physique was a thoroughly worthwhile undertaking. Since the reliability of the diagnostic features which were employed has been repeatedly demonstrated in systematic studies, there were no methodological reasons to assume that the morphological estimates of biological ancestry were appreciably less dependable than the morphological sex diagnoses (see V.B.2.e.). Describing the commonly occurring or otherwise remarkable stress markers and identifying the underlying patterns of movement was the most appropriate way of analysing the observed traces of occupational stress (see V.B.2.f.). Whereas markers of physiological stress and pathological changes were evaluated, it was not attempted to make definitive palaeopathological diagnoses (see V.B.2.g.). Any such attempts would have fallen far outside the scope of the study. This cautious approach therefore constituted the only workable solution.*

The systematic search for diachronic differences and inter-group affinities could not have merely relied on the results of the individual osteological analyses (see V.B.3.a.). Collecting additional data was an essential prerequisite for this search. The traits and measurements had to be carefully selected. They had to be collectable and either likely to be informative or widely used. Traits and measurements relevant to the estimation of biological ancestry had to be conscientiously separated from those relevant to the analysis of robusticity and stress levels. That the distinction between robusticity and stress traits was often blurry was a related complication. Adopting very time-consuming measuring and scoring techniques to ensure that the collected data were as representative and reliable as possible was an indispensable step. There was a need to add newly defined measurements and indices to the catalogue of standardised measurements and indices (see V.B.3.a.1.). These variables made it possible to quantify additional dimensions of the badly preserved material. This, in turn, made it possible to utilise these additional data in the intra- and inter-group analyses. Many measurements had to be obtained from incomplete or damaged structures. Due to the state of the remains, such structures had to be measured regardless. The assessment of non-metric traits made a huge body of highly informative data available which could not have been gathered metrically (see V.B.3.a.2.). Relying on both metric and non-metric data made the study decidedly more conclusive. The evaluation of the trait expressions was usually unproblematic and even badly damaged traits could often still be scored. Certain unexpected phenomena and difficulties were, however, sometimes encountered. It was necessary to modify a number of classification schemes and to develop several new ones. These measures and the seriation procedures ensured that the variability of the sample could be adequately represented.

The manner in which the description of the sample was handled and presented was appropriate (see V.B.3.b.1.). Since the individual osteological and sample specific metric and non-metric findings were not only summarised in the results chapter but also dealt with in greater detail in the discussion chapter, it was not necessary to provide additional, more elaborate individual osteological reports. Similarly, advanced demographic or epidemiological approaches were not needed. The desired information was extracted by calculating suitable sets of descriptive statistics and by verbally summarising all relevant results.

Only eight individuals were reprocessed for the intra-observer error analyses (see V.B.3.b.2.). Fortunately, the measures which were taken to minimise the effects of this shortcoming, such as employing large numbers of variables, merging single variables to create combined variables and comparing the original and control data variable by variable and individual by individual, were in all probability successful. Whereas the calculated descriptive statistics and the performed un-paired and paired statistical tests were basic, they were without doubt valid, objective and reliable.

The attempts to unveil diachronic differences in robusticity, occupational stress and health within the Wadi Howar sample were assessed (see V.B.3.b.3.). The division of the sample was a possible source of distortions, particularly the composition of the pre-Leiterband sub-sample. The small sub-sample sizes, the unequal sex and age ratios, the degree of population discontinuity and the limited power of the applied statistical tests were problematic as well. Conversely, testing as many and as many different types of potentially informative variables as possible had obvious advantages. Like merging single variables to create larger, combined variables, it helped to offset the impact of the aforementioned distorting factors. It was assumed that a particular difference was less likely to be an artefact, if it could be detected in more than one group of variables. The sub-sample-specific sets of descriptive statistics and the Mann-Whitney U as well as χ^2 tests were fully adequate analytical tools.

An appraisal of the approach which was adopted to determine the Wadi Howar material's metric and non-metric affinities was presented (see V.B.3.b.4.a.). The approach was simple. It produced unambiguous, readily understandable results. Used together as parts of an integrated method, the individualisation of the discriminant function analyses, the individual by individual classifications, the additional group analyses and the interpretation of the classification patterns were highly efficient. Consequently, there was no need for additional or more complicated methods. Various steps had to be taken to prepare the data for the discriminant function analyses (see V.B.3.b.4.b.). The mean individuals played crucial roles (see V.B.3.b.4.b.1.). They formed the basis of the replacement of missing values. In addition, the various samples' and sub-samples' mean individuals could be directly compared and classified. Nonetheless, using mean individuals also led to negative theoretical and practical side effects. Filling the gaps in the data matrices with sub-sample- or sample-specific modes and means was at best a minimal solution (see V.B.3.b.4.b.2.). Unlike other possible methods, it was, however, very economical. It was stressed that applying the chosen scaling technique was the only reasonable size correction option (see V.B.3.b.4.b.3.). Furthermore, the usefulness of size corrected data was questioned for a number of reasons. Firstly, size is a biologically relevant and informative variable. Secondly, the discriminant function analyses which relied on scaled metric data produced less reliable results than those using unscaled data. Thirdly, the results of the non-metric analyses were largely unaffected by size anyway. To ensure that the non-metric data could be used for the discriminant function analyses they needed to be dichotomised (see V.B.3.b.4.b.4.). That the sectioning points could be chosen in accordance with the expressions typically encountered in the Wadi Howar sample was a positive side effect of the procedure. The removal of variables and cases was an unavoidable part of the individualisation and performance of the discriminant function analyses (see V.B.3.b.4.b.5.).

Discriminant function analysis is the multivariate statistical method which is best suited to assigning ungrouped cases to predefined samples (see V.B.3.b.4.c.). Discriminant function analyses are robust and reliable. The discriminant function analyses of this study could be performed with relative ease. The reported classification accuracies provided an immediate measure of the success of the discriminant function analyses and indicated how reliable the classifications of the ungrouped cases probably were. It was right to present the secondary individual classifications, rather than the distances between group centroids, as the results of the group analyses. Optimising the classification accuracies manually was very time-consuming but definitely worth the effort. The strict core analysis protocol was a necessity. The individual analyses in which metric and non-metric data were used together performed very well. Assigning individuals separately and basing each set of analyses on a different combination of variables possibly had deleterious effects as well. The manner in which the overall individual classifications were determined and the classification frequencies were analysed was simple and effective (see V.B.3.b.4.d.). The interpretations could be based on a large number of analyses which involved three *different types of data, numerous different individuals and different groups. As a result, they were deemed highly likely to be reliable.*

The results of the individual osteological analyses and the examination of the additional data were discussed together (see V.C.1.). Using simple graves within settlements to inter dead in contracted positions was and still is a common practice in the Sahara, Southern Sudan and Eastern Africa (see V.C.1.a.). The other encountered in situ *positions can either still be observed in Southern Sudan or could be easily explained as the result of normal taphonomic processes. Considering the environmental conditions and the medium in which the individuals were buried, the Wadi Howar skeletons' extraordinarily poor state of preservation was not surprising (see V.C.1.b.). Still, some of the* post mortem *damage was quite interesting. Even when all possible distortions were factored in, the comparisons of the preservation indices of the Wadi Howar series and the comparative samples still clearly underlined the Wadi Howar material's poor preservation. Since males often outnumber females in skeletal series, the sample's well-balanced sex distribution was not necessarily to be expected (see V.C.1.c.). The slight relative lack of males, particularly adult or older males, was probably due to sampling error, sex-specific risks during childhood or violence-related burial customs. Interestingly, except for the possibly sex-specific* in situ *positions at Abu Tabari 02/1, no cultural sex indicators were detected. The overall mean age at death and the average adult age at death were fairly low but comparable to those reported for various Meso- and Neolithic series (see V.C.1.d.). They were not entirely dissimilar to the life expectancies of modern East African foragers or arid zone pastoralists either. Sampling error was probably to blame for the under-representation of sub- and post-adults. The Wadi Howar sample's comparatively low mean age at death, on the other hand, could have had other reasons as well. For instance, the population could have been growing or its members could have actually had a rather low life expectancy. Especially in the context of relevant prehistoric samples, the average living height estimates of the Wadi Howar series appeared to be rather low (see V.C.1.e.). However, when mean maximum* Femur *and* Tibia *lengths were compared, the Wadi Howar material blended in with other prehistoric and modern Saharan, Sudanese and East African samples. Moreover, the published living heights of several prominent Saharan and circum-Saharan prehistoric specimens and some highly pertinent modern Sudanese, Saharan and East African groups were very similar to the calculated Wadi Howar averages. The means of the Wadi Howar individuals' reconstructed living weights were low. Yet, provided differences in body height were factored in, they did not differ appreciably from those of various relevant pastoralists and hunter-gatherers (see V.C.1.f.). The in general leptosome members of the Wadi Howar sample exhibited height-weight index values and tropically adapted body proportions highly reminiscent of those of certain modern Saharan, Southern Sudanese and East African pastoralists (see V.C.1.g.). The view was adopted that the fact that typically sub-Saharan and "Nilotic" expressions of relevant traits recurred consistently and that others only occurred at characteristically low frequencies spoke for itself (see V.C.1.h.). It was demonstrated that the members of the comparative samples, which were morphologically closest to the Wadi Howar series, displayed virtually all of the most noteworthy epigenetic traits as often as the Wadi Howar individuals, even the otherwise rare ones (see V.C.1.i.). Moreover, the occurrence of paranasal (*Foramina paranasalia*) and intertrochlear foramina (*Foramina intertrochlearia*) was given further attention. The Wadi Howar remains' peculiar robusticity patterns were interpreted (see V.C.1.j.). Some features were evidently primarily manifestations of the Saharo-Nilotic nature of the material. Others were probably largely the results of habitually high occupational stress levels. The large teeth, certain mandibular traits and the, in a few cases, considerable cranial thickness, on the other hand, appeared to be genuine robust characteristics of the prehistoric inhabitants of the Wadi Howar. Various osteological, medical, ethnographic, archaeological and historical sources suggested that the most* *commonly observed occupational stress markers were best explained as traces of frequently performed activities like carrying loads on the head, consuming foods with a high grit content, processing fibres with the teeth, using the anterior dentition like a vice, throwing, digging, using grinding and pounding tools, processing milk, using axes, fishing, milking and making strings, ropes, nets, baskets, leather objects and pots (see V.C.1.k.). Most of the others were probably symptomatic of fairly high levels of locomotory stress. That the Wadi Howar and Jebel Sahaba/Tushka individuals' average musculoskeletal stress and postcranial robusticity scores exhibited only few differences suggested that, perhaps, the physical demands of the two populations' everyday lives were comparable. General issues relating to the interpretation of occupational stress markers were also discussed. Several factors have to be borne in mind when occupational stress markers are evaluated. Nevertheless, the large body of unequivocal medical, osteological and ethnographic evidence leaves little doubt that there is absolutely no need to question the validity of the basic assumptions underlying their interpretation. Individual pathologies and systematically scored health indicators were examined more closely (see V.C.1.l.). Chronic varicose veins, age-related phenomena exacerbated by regularly performed activities, early stage spinal tuberculosis, brucellosis or a herniation of an intervertebral disk (*Discus intervertebralis*), treponemal disease, a form of acquired hydrocephalus, non-specific infections or locomotory stress, a haematoma or tuberculous meningitis, depressed fractures, the artificial removal of incisors (*Dentes incisivi*), caries, masticatory stress or parodontitis and the consumption of sticky fruits or ground, carbohydrate-rich seeds were discussed as conceivable causes of the encountered pathologies. These encountered pathological changes and the systematically assessed health traits were put into an osteological, ethno-epidemiological and medical context. The rarity of traces of trauma appeared to be a side effect of either the small size of the sample or violence-related burial customs. The comparatively high incidence of enamel hypoplasia was probably partly due to methodological reasons. Nonetheless, it seemed to reflect truly high physiological stress levels as well.*

The results of the intra-observer error analyses were relativised (see V.C.2.). The paired tests which revealed significant differences were, without question, much less meaningful than their un-paired counterparts and the very low associated average and maximum absolute differences. The accuracy of the measurements and the reliability of the non-metric scores were high. The low intra-observer error indicated that the newly defined or modified measurements and traits were fully usable and that the elaborate data collection procedures had worked. The effect the extensive post mortem *damage had on all performed metric and non-metric analyses did, however, remain unquantifiable.*

Likely explanations for the differences between the pre-Leiterband and the Leiterband sub-sample as well as pertinent anthropological, archaeological and ethnographic evidence were presented (see V.C.3.). Both the summary of the relevant individual osteological diagnoses and the statistical comparisons suggested that the members of the pre-Leiterband sub-sample were physically more active and healthier than their Leiterband successors (see V.C.3.a.). The evidence did not imply that the more flexible pre-Leiterband subsistence strategies were abandoned in response to worsening circumstances. It did, however, indicate that the inhabitants of the Wadi Howar experienced a rise in morbidity and nutritional deficiencies during the Leiterband phase. Although most were compatible with both typical hunter-gatherer-fisher activities and typical Neolithic tasks, the pre-Leiterband sub-sample's relevant characteristics were more consistent with a forager or fairly forager-like lifestyle. That there were no further or more pronounced diachronic differences could have been due to similarities between the lifestyles of foragers and pastoralists. The germane anthropological literature showed that the situation in the Wadi Howar was to be expected (see V.C.3.b.1.). In most studied cases, the transition from an extractive to a productive subsistence economy was accompanied by adverse effects. The results of the isotope analyses seemed to lend further support to the interpretation of the revealed *diachronic differences. The archaeological evidence made it appear rather unlikely that the adoption of cattle herding and its intensification were reactions to environmental changes (see V.C.3.b.2.). It also showed which developments evidently brought about the revealed diachronic differences. The relevant ethnographic sources provided the interpretative framework within which the anthropological and archaeological findings made full sense (see V.C.3.b.3.). They illustrated the advantages and disadvantages of hunter-gatherer life, the often precarious situation of herders, the role livestock plays in pastoralist societies and the, at times, blurry boundary between foragers and pastoralists.*

The Wadi Howar sample's metric and non-metric affinities were interpreted and contextualised (see V.C.4.). A theory explaining the observed classification patterns was put forward (see V.C.4.a.). The prehistoric inhabitants of the Wadi Howar were members of a biologically sub-Saharan population complex which occupied an area stretching, at least, from the southern part of the Central Sahara to the Sudanese Nile Valley. The pre-Leiterband groups originally came from the east and reached the Wadi Howar during or soon after the initial expansion of this Saharo-Nilotic population complex. The Leiterband herder-gatherers came from the west. They entered the Wadi Howar in the course of a later, secondary Saharo-Nilotic expansion and absorbed large parts of the pre-Leiterband population. Eventually, the increasing aridification led to an exodus from the Southeastern Sahara. Most of the Wadi Howar's prehistoric inhabitants migrated south and west during this period. They, or groups closely related to them, were the ancestors of the majority of the Nilo-Saharan-speaking pastoralists of today's Southern Sudan and Eastern Chad. The positions the analyses assigned to the A-Group, Jebel Sahaba/Tushka and Malian Sahara sample were also interpreted in the context of this theory. Just like the prehistoric inhabitants of the Wadi Howar, the Early and Middle Holocene population of the Malian Sahara and the Late Pleistocene Jebel Sahaba/Tushka population belonged to the Saharo-Nilotic population complex. None of these biologically sub-Saharan groups shared any direct ancestors with prehistoric North Africans. The A-Group, on the other hand, was not part of the Saharo-Nilotic population complex. Substantial gene flow and migrations from the north entered the Northern Sudanese Nile Valley after its original Saharo-Nilotic inhabitants had adopted Neolithic subsistence strategies. The incomers partly replaced and interbred with the Saharo-Nilotes of the region. The people of the A-Group and the inhabitants of sites like Kadruka were representatives of the resulting non-Saharo-Nilotic population. Conversely, the Saharo-Nilotic groups further south, both in the Nile Valley and in the adjacent areas of the Sahara, remained largely unaffected by the northern influence. Biologically fully or partly North African groups did ultimately enter the northern parts of the Saharan territory of the Saharo-Nilotes as well. These new arrivals took the place of the Saharo-Nilotes in this region or founded new populations together with them. It was stressed that the majority of the anthropological studies focusing on relevant human skeletal remains provided support for the suggested theory (see V.C.4.b.1.). Various authors have already presented results or models which imply the existence of a Saharo-Nilotic population complex, describe Late Pleistocene Nubians as biologically sub-Saharan groups, rely on Neolithic migrations and gene flow from the north to explain changes in the Sudanese Nile Valley or assume that biologically partly or wholly North African groups only entered the more southerly parts of the Sahara relatively late. The fact that two models were not in agreement with the proposed theory was discussed. The view that the Early and Middle Holocene inhabitants of the Malian Sahara should be considered Saharan "Mechtoids" was rejected. Whereas it was accepted that the Nubian Nile Valley witnessed a fair amount of gracilisation, it seemed to be clear that not all morphological changes could have been caused by in situ *evolution. The results of DNA analyses of the populations of the Nile Valley and Sudan were fully compatible with the developed scenario. The same could not be said for some conclusions based on genetic data from the Chad Basin. Nevertheless, these data could be easily re-interpreted.*

Although it had to be admitted that some interpretations of the archaeological record were at odds with the assumptions of the outlined theory, most of the relevant data appeared to corroborate them (see V.C.4.b.2.). The importance of widespread Saharan traditions was emphasised. Evidence of large Saharan population sizes and Eastern Saharan population growth was discussed. Regionalisation phenomena and the affinities of the material culture of the Wadi Howar's prehistoric inhabitants were put into perspective. The cultural continuities and changes associated with the Middle and the Late Holocene transition in the Wadi Howar were highlighted. Attention was drawn to Late Holocene southward migrations of Saharan pastoralists. The reconstructions of the history of Nilo-Saharan and the geographic distribution of this phylum's northern languages were consistent with a recolonisation of the Sahara by the Saharo-Nilotic population complex and a later, secondary Saharo-Nilotic expansion (see V.C.4.b.3.). The results of the inter-sample analyses made the scenario Blench (1999) developed for his "Inter-Saharan Hypothesis" appear highly unlikely. They were, however, compatible with Ehret's (2006(b)) model of the origins of Chadic languages. Moreover, the same results were in complete agreement with Rilly's (2004) theory and Dimmendaal's (2007(a)) "Wadi Howar Diaspora" model. It was pointed out that the biologically partly or wholly North African groups which evidently entered the Northern Sudanese Nile Valley during the Neolithic could have been speakers of Afro-Asiatic languages. The geographic and temporal distribution of Saharan rock art featuring figures with a biologically sub-Saharan appearance could be added to the list of evidence compatible with the proposed theory (see V.C.4.b.4.). The results of the inter-sample comparisons and their interpretation were discussed in the light of Ancient Egyptian and later historical descriptions of the physical features of various populations and the interactions between them (see V.C.4.b.5.). Especially, the evidence which implies that the Nubians were a biologically heterogeneous group and that their southern and western neighbours were biologically sub-Saharan was highlighted. Ethnographic accounts were primarily employed to demonstrate that migration, expansion and integration patterns of the same kind the proposed theory assumes could still be observed in the Eastern Sahel, in Southern Sudan and in East Africa in the 19th and early 20th century (see V.C.4.b.6.). Relevant accounts of the history of certain tribes were mentioned. Obvious cultural similarities between several prehistoric and modern groups were pointed out.

V.A. Material

V.A.1. The Wadi Howar sample

The Wadi Howar probably played a key role in the population history of the Sahara, the Nile Valley and East Africa (see I.A., I.C.1.a., I.C.3., I.D.1. and I.D.2.a.3.). The results of the pertinent palaeoclimatological, archaeological and linguistic research indicate that this former connection between the Nile Valley and the Chad Basin constituted an important migration route and refugial area in which intense inter-population contact was commonplace. Any human skeletal remains from this region are therefore of enormous scientific value. Due to far-reaching logistical restrictions, such remains are, however, immensely difficult to obtain (see I.C.1.c.). Since it seems highly unlikely that any pertinent research will be carried out in the Wadi Howar any time soon, the Wadi Howar series will almost certainly remain the only relevant material from the area for the foreseeable future (see I.C.2.).

The sample included material from all three of the Wadi Howar's main prehistoric occupation phases (see I.C.4.). In addition, its internal temporal resolution was phenomenally high. The site where most of the pre-Leiterband individuals were excavated, Abu Tabari 02/1, is only about 600 years older than its Leiterband counterpart, Abu Tabari 02/28 (see I.C.3.b.). Moreover, both the sample's archaeological and environmental context had been meticulously reconstructed (see I.C.2. and I.C.3.). Finally, neither its comparatively small size nor its extraordinarily poor state of preservation appeared to seriously diminish the Wadi Howar sample's scientific value (see IV.A.2.). After all, a very large amount of information could still be extracted from the material (see IV.A., IV.C. and IV.D.).

V.A.2. Comparative samples

In many ways, the comparative samples were far from perfect. However, taking everything into account, all of the comparative samples' possible and actual flaws were undoubtedly tolerable. Being able to use further Saharan remains, especially from closer Wavy Line and Ténéréan sites, material from Early Khartoum and early or southern "Khartoum Neolithic" sites, Early and Middle Holocene skeletons from Ethiopia and Hausa, Songhai, Berber and Beja skeletons as additional comparative samples would have been very desirable (see I.D.1. and I.D.2.a.). The inclusion of these samples would have made it possible to draw more detailed conclusions about the Wadi Howar material's prehistoric and modern affinities with populations from North Africa, the Sahara, the Nile Valley and areas east of the Nile. As already mentioned, unfortunately, it was impossible to incorporate any such additional samples into the analyses (see II.B.1. and II.B.2.). Sometimes, the author was denied access to specific series. Often, visits to the institutions curating the material would have been too expensive, for example because of the bench fees some European collections charge, the manner in which other European institutions have restricted access to their collections or the cost of travelling to African countries. In certain cases, it would have been necessary to visit many different collections to process all the specimens needed to build up a large enough comparative sample of a particular type. Moreover, the comparative data had to be collected within a reasonable time frame. Yet, despite all difficulties associated with locating and accessing relevant comparative series, all employed samples were highly relevant and the final selection of material was fully sufficient. In sum, the most appropriate, available comparative samples were used. Losing the Kadruka data was not too serious a setback. The material was clearly not biologically sub-Saharan and could therefore not have shared many affinities with the Wadi Howar series (see I.C.4.a., I.D.1.a.3. and II.B.1.e.).

The composition of a number of samples was deemed to be problematic. The Southern Sudan and the Chad sample were quite varied ethnically. The former sample contained specimens from at least six different populations (see II.B.2.a.). The latter was made up of individuals from seven different ethnic groups (see II.B.2.b.). The temporal and spatial heterogeneity of the Malian Sahara sample was considerable as well (see II.B.1.c.). Still, all main comparative samples could be easily separated in the performed discriminant function analyses, even in the analyses which could only be based on a few rather uninformative variables. It was unquestionably a good idea to attempt to create a substitute for an actual Early Khartoum or "Khartoum Neolithic" sample. Regrettably, the "Sudanese Hotchpotch" sample had to be excluded from the core discriminant function analyses (see I.D.1.a.3. and II.B.1.d.). Jebel Shaqadud, El Kadada and Saggai are sites which are located in quite different areas of Sudan. They have also been dated to different periods. Furthermore, the sample partly consisted of data which was not collected by the author. For instance, the Saggai data was almost completely taken from Coppa/Macchiarelli (1983). The archaeological associations of the Jebel Shaqadud specimens were unclear (see II.B.1.d.1. and Lange, M., 2008: personal communication). Some were believed to be Neolithic. Others were assumed to be younger. Not surprisingly, the sample comprised both fairly robust biologically sub-Saharan specimens and rather gracile remains, often with traits whose expressions were indicative of biologically North African influences. The morphology of the inspected El Kadada material had a noticeable biologically North African component as well. Doubts about whether all specimens of a specific comparative sample actually belonged to the population they were supposed to represent occurred fairly frequently. As far as the A-Group sample was concerned, such uncertainties arose when sites had not only yielded A-Group individuals, A-Group remains were exceptionally well preserved or A-Group *Crania* exhibited unexpected morphological traits (see II.B.1.b.). Site 25 was the most conspicuous case. Three A-Group, 54 Meroïtic, 93 X-Group, 22 Christian period and 132 undated individuals were excavated at this site. Although they were the oldest specimens, the three A-Group skeletons were in good or remarkably good condition. Moreover, the A-Group individual 22a was characterised by an atypically unambiguous biologically sub-Saharan appearance. Five specimens of the Malian Sahara sample also deserve special mention (see II.B.1.c.). Many aspects of the morphology of Kesert el Gani MT32-H2 and Tagnout Chaggeret MK42-H1 could be described as decidedly biologically North African. Erg Ine Sakane AZ56-H6, -H8 and -H9 displayed similar but less pronounced biologically North African expressions of certain traits. Some of the Chad sub-samples were also characterised by a remarkable degree of internal heterogeneity (see II.B.2.b.). The morphology of some Tubu *Crania* was fully biologically sub-Saharan. Others displayed combinations of biologically sub-Saharan and North African expressions of the scored traits. The Kanembu and Kanuri specimens were characterised by a similar degree of variability. The presence of individuals with more or less pronounced biologically sub-Saharan or North African morphological characteristics in these prehistoric and modern comparative samples was assumed to simply reflect the composition of the populations they were drawn from. The Tubu, for instance, can be described as a predominantly biologically sub-Saharan population with varying amounts of biologically North African admixture (see I.D.2.d. and for example: Charpin 1961; Fuchs 1961, 1978; Hassanein Bey 1924; Nachtigal 1879: 420-464; Peel 1942; Thesiger 1939). Consequently, that the Tubu *Crania* were morphologically quite varied was not at all unexpected. The same was true for the inspected Kanembu, Kanuri and A-Group specimens (see I.D.1.a.3. and I.D.2.d.). The isolated occurrence of morphological features typically associated with biologically North African groups in the Malian Sahara sample, on the other hand, was slightly surprising (see I.D.1.a.2.). Yet, since the sample was generally morphologically rather homogeneous, these surprising expressions of certain traits were not considered to be a problem.

Unrepresentative sex and age ratios are both well-known and common deficiencies of samples which, like the comparative prehistoric samples used in this study, have been drawn from archaeological sites (e.g. Bello *et al*. 2006; Drenhaus 1988; Herrmann *et al*. 1990: 301-344; Hoppa/Vaupel 2002; Larsen 2002: 141-142; Wood *et al*. 1992). Often, such samples are also unreliably dated. Occasionally, they have been excavated at sites with uncertain archaeological affinities as well. For example, the antiquity of the Jebel Sahaba material has been questioned at times (e.g. Edwards 2009: written communication; Lange, M., 2008; Reinold 2006). The presence of bucrania, the standardised *in situ* positions and the fact that the only ^{14}C date could not be reproduced have been mentioned in this context. Given the material's considerable craniofacial robusticity, there were, however, no morphological reasons to assume that the sample did not date from the Late Pleistocene (see I.D.1.a.3. and II.B.1.a.).

Museum collections of modern human remains usually reflect their founders' preferences for "typical", male and "remarkable" specimens. In many cases, it is unclear where and how the material was acquired. That the origins of remains are frequently only documented with vague ethnic labels is a related problem. Furthermore, whether or not ethnic labels, precise or not, are correct is normally impossible to ascertain (e.g. Dayal *et al*. 2009; Duuren *et al*. 2007; Eickstedt 1934; Eliopoulos *et al*. 2007; Ericksen 1982; Giraudi *et al*. 1984; Kasten 1992(a), 1992(b); Komar/Grivas 2008; Usher 2002). The term "*Mandingue*", for instance, could have meant different things to different collectors (see II.B.2.c.). Similarly, 14 Southern Sudan individuals were merely identified as being from Darfur (see II.B.2.a.). There were also concerns about the effects of *post mortem* damage, unbalanced sex ratios and the age of some individuals. Some modern *Crania* had been damaged by taphonomic processes or sawed open. Such specimens were only measured and scored if the damage was not considered too severe. With the exception of the Haya sample, all modern comparative samples contained considerably more males than females (see Table 3). Unfortunately, there was nothing which could be done to balance these samples' sex ratios. Although several modern sub-adult individuals were processed, only the resulting data which was not affected by their age was entered into the comparative matrices (see Table 2 and 3).

V.B. Methods

V.B.1. Research strategy

V.B.1.a. General considerations

Several general considerations led to the adoption of the research strategy outlined in chapter I.B.2.. The methodological aspects of a research project should be true to the principles of scientific investigation (e.g. Dorit *et al*. 1991: 6-9; Gauch 2003; Godfrey-Smith 2003; Lienert/Raatz 1998; Losee 2001; Madrigal 1998: 1-4, 77-95; Myers 1999: 13-14, 543-544; Popper 1935; Quine/Ullian 1970; Rhoades/Pflanzer 1996: 11-13; Vogel/Angermann 1995: 1, 4-7; Wilson 1952). Investigative techniques should be chosen according to a study's research questions and not vice versa. Chosen methods should be able to answer the research questions posed by the study in which they are employed. In other words, they should be valid. In addition, methods should be as objective, reliable and time- as well as cost-efficient as possible. The use of methods which will at best confirm facts that have already been established should be avoided. Methods which generate more relevant information than others should be given preference. If there are different methodological approaches which produce more or less the same results, the simplest, most parsimonious and most robust of these approaches should be adopted. A method should not impede future attempts to falsify the results which it has produced. It should enhance the transparency of an analysis by producing readily understandable and easily reproducible data.

A conscious effort was made to minimise the influence of extra-scientific factors on decisions for or against specific methods. Countless sociological analyses have shown that social, cultural, political and economic factors have a major impact on the choice of methods and the scientific process in general (e.g. AG gegen Rassenkunde 1998; Bernal 1986; Bloor 1976; Bloor *et al*. 1996; Bucchi 2004; Collins 1992; David 2005; Fleck 1980; Gilbert/Mulkay 1984; Goodstein 2002; Harding 1999; Henke 2007; Hoßfeld 2005; Kattmann 1999; Knorr-Cetina 1984; Latour/Woolgar 1979; Merton 1985; Porter 1996; Postman 1986; Stichweh 1994). The interplay between the pressures inside the scientific community, the common acceptance of socially constructed “scientific facts” and the personalities, socio-economic histories and educational backgrounds of researchers often hampers the critical assessment of methodological choices. In-vogue methods which emit an aura of modernity increase a project’s chances of attracting funding, make results easier to publish and enhance a researcher’s prestige. Consequently, whether or not more reliable and more informative results could be produced with well-established, cheaper and simpler methods can easily become just as irrelevant as whether or not the use of an unnecessarily complicated, time-consuming and expensive technique could make the evaluation and falsification of one’s findings virtually impossible.

V.B.1.b. Specific methodological choices

The study had three primary aims (see I.B.1.). Extracting as much relevant biological information from each individual as possible was the first major objective. Revealing diachronic differences in robusticity, occupational stress levels and health within the Wadi Howar sample constituted the second main goal. Exposing biological connections between different parts of the series and between the Wadi Howar material and other relevant prehistoric as well as modern African populations was the third and final principal aim. Accordingly, only methods which were deemed to be able to help accomplish these objectives were taken into consideration. Moreover, only methods which were also judged to be valid, objective, reliable, simple, robust, well-established, economical and able to extract a maximum of relevant, new, readily understandable as well as easily reproducible data from the small and poorly preserved sample had a chance of being selected (see V.B.1.a.). Many theoretically appropriate methods failed to satisfy these conditions. The in-vogue high-tech methods were found to be particularly ill-suited to the study. Whenever they were not altogether inapplicable or unable to answer the questions posed by the study, they were outcompeted by simpler, faster and cheaper well-established techniques. The nature of the project itself had obvious methodological implications as well. It was a very ambitious “material-based” project with a number of objectives rather than a more manageable “one method” or “one question” study. This meant that it was imperative to take full advantage of all the available evidence and to use methods which are able to deliver more than just one piece of useful information at a time. Therefore, even if a specific laboratory, computer-aided or complex statistical method had both been applicable and offered unique advantages, employing it would have still been logistically and financially unfeasible. At best, such a time-consuming technique would have answered one of the study’s various research questions.

V.B.1.b.1. Osteological techniques

Human osteology is a vast and rapidly evolving field of research (e.g. Cattaneo 2007; Dirkmaat *et al*. 2008; Hens/Godde 2008; Knußmann 1988(b); Larsen 2002; Mays 1997, 2010; Meindl/Russel 1998; Schiwy-Bochat *et al*. 2004). One aspect of the ongoing development of this anthropological sub-discipline is that the already large number of methods, specific to certain parts of the skeleton, males, females, particular age groups and narrowly defined populations, is growing at an ever-increasing speed. Whereas this methodological progress is unquestionably an advantage, it can make selecting the best available techniques a daunting task. In addition, the osteological analysis of skeletal remains and the collection of metric, morphological and epigenetic data from a skeleton are highly complex procedures, particularly when the material is badly preserved. Any sex, age, biological ancestry, occupational stress and palaeopathological diagnosis, for instance, should be based on the evaluation of as many different traits and measurements as possible. In this context, being able to identify the relevant structures and the most appropriate methods is as important as knowing how expressions of traits and dimensions are affected by an individual's preservation, age, sex, biological ancestry, occupational background and health (e.g. Bass 1987; Buikstra/Ubelaker 1994; Byers 2002; Ferembach *et al*. 1979; Herrmann *et al*. 1990; Krogman/İşcan 1986; Rösing *et al*. 2007; White 2000). As a result, not only the choice of methods but also the training and the experience of researchers directly affect the quality of osteological analyses and osteological data (e.g. Cardoso/Saunders 2008; Hillson 1996: 71-72; Kimmerle *et al*. 2008(b); Miller *et al*. 1996; Teschler-Nicola/Prossinger 1998: 484; Utermohle/Zegura 1982; Wheat 2009; Williams/Rogers 2006; Wittwer-Backofen *et al*. 2008). These intrinsic problems must not be underestimated. Nevertheless, there was simply no alternative to relying on osteological techniques. Neither the wealth of individual information nor the large body of additional data could have been generated using other methods. Furthermore, not taking full advantage of the parts of the material which could only be evaluated osteologically would have meant leaving an invaluable source of information untapped. Only by taking a wide variety of macroscopic evidence into consideration and by applying many different osteological techniques could this challenging sample be properly analysed.

V.B.1.b.2. Systematic robusticity, occupational stress and health analyses

Several time- and cost-intensive methods rely on special equipment to examine or analyse robusticity, occupational stress and health markers. For example, microscopy or computer-aided imaging techniques can be employed to score, count or take width measurements of enamel hypoplasia lesions. Entheses can be scanned to quantify their surface area and complexity. Photographs, computed tomographic scans, silicone moulds and biplanar radiographs of cross-sections can form the basis of the evaluation of the robusticity of long bones. Harris lines can be detected radiographically. The degree of long bone shaft bowing can be determined by taking standardised measurements in the laboratory or by processing digital photographs with a special software package (for methods which rely on special equipment to examine hypoplastic enamel defects see for example: Berbesque/Doran 2008; Cunha *et al*. 2004; Griffin/Donlon 2007; Hillson/Bond 1997; Hubbard *et al*. 2009; King *et al*. 2005; Ritzman *et al*. 2008; Witzel *et al*. 2008; for methods which rely on special equipment to examine and analyse entheses see for example: Zumwalt 2005, 2006; for methods which rely on special equipment to analyse the cross-sectional geometry of long bones see for example: Brock/Ruff 1988; Holt 2003; Maggiano *et al*. 2008; Marchi 2008; Ruff *et al*. 1984; Ruff *et al*. 1994; Stock/Shaw 2007; Trinkaus 1997; for information on Harris lines see for example: Garn *et al*. 1968; Harris 1931; Herrmann *et al*. 1990: 140-141; Larsen 2002: 128; Lewis/Roberts 1997: 582-583; Pechenkina/Delgado 2006: 220-222; Suter *et al*. 2008; for methods which rely on special equipment or metric techniques to quantify the curvature of long bones see for example: Bräuer 1988; Bruns *et al*. 2002; Galtés *et al*. 2009; Parsons 1914).

The application of a high-tech approach of this kind makes most logistic and economical sense if it is intended to be used as the main or only method. In such a case, suitable research questions and sufficiently large amounts of appropriate material can be selected according to the requirements of the chosen method. However, if a study's material basis, its original research questions and limited research funds dictate the methodological choices, these techniques do usually not constitute realistic options. Furthermore, most of them do not necessarily need to be taken into consideration either. There are, for instance, equally valid and reliable, well-established, cheap and straightforward osteoscopic and osteometric techniques with which enamel hypoplasia lesions can be scored, the state of entheses can be assessed and the robusticity of long bones can be measured (for methods to evaluate enamel defects visually see for example: Buikstra/Ubelaker 1994: 56-57; FDI 1982; Hillson 1996: 172, 174-175; Littleton 2005; Lovell/Whyte 1999; Mosothwane/Steyn 2009; Palubeckaitė *et al*. 2002; Schultz 1988: 494-495; Starling/Stock 2007; for the osteometric assessment of long bone robusticity see for example: Bräuer 1988; Bridges *et al*. 2000; Carlson *et al*. 2007; Pearson 2000; Pomeroy/Zakrzewski 2009; Wanner *et al*. 2007; Wescott 2006(a); for techniques to score musculoskeletal stress traits see for example: Churchill/Morris 1998; Eshed *et al*. 2004(a); Galtés *et al*. 2009: 287-288; Hawkey 1998; Hawkey/Merbs 1995; Lieverse *et al*. 2009; Munson Chapman 1997; Oumaoui *et al*. 2004; Peterson 1998; Robb 1998; Steen/Lane 1998; Stirland 1998). The presence of Harris lines, on the other hand, can only be determined radiographically. Consequently, unlike enamel hypoplasia, Harris lines are not part of the catalogue of widely used indicators of physiological stress (e.g. Beckett/Lovell 1994; Belcastro *et al*. 2007; Blau 2001; Buzon 2006(b); Buzon/Judd 2008; Holt/Formicola 2008: 83; Judd 2008(a): 96-104; Klaus/Tam 2009; L'Abbé *et al*. 2008(b); L'Abbé/Steyn 2007; Larsen 1995: 187-189, 198-201, 2002: 123, 126-128; Lewis/Roberts 1997; Lieverse *et al*. 2007(a); Mosothwane/Steyn 2009; Ortner 1979; Ortner/Frohlich 2007; Paine *et al*. 2007; Pechenkina *et al*. 2002; Šlaus 2008; Ubelaker/Pap 1998, 2009). Sometimes, more elaborate methods simply cannot be employed. For example, due to the Wadi Howar material's state of preservation, long bone shaft bowing could only be graded visually in this study (see III.B.1.b.2.b.2.).

Some of the above-mentioned complicated approaches might be slightly more accurate or have somewhat greater analytical power than their simpler, low-tech visual and metric alternatives. The decision in favour of the latter was nevertheless right for this study. The sample's robusticity, occupational stress patterns and health could be described and the related intra-sample differences could be exposed with simple techniques. Consequently, there was no need to invest any of the time and money which was required to achieve these and the other research objectives of the study in unnecessary methodological endeavours (see IV.A. and C.).

V.B.1.b.3. Geometric morphometric and virtual anthropological approaches

Geometric morphometric and virtual anthropological techniques offer clear advantages. That rare specimens can be digitally reconstructed, landmark configurations can be effectively size corrected and highly sophisticated analyses of shapes can be performed are perhaps the most obvious of these advantages. However, the application of geometric morphometric and virtual anthropological techniques is also connected with severe economical and logistical disadvantages. Unless two-dimensional data are gathered from photographs, the data collection requires expensive equipment, such as three-dimensional digitisers, surface scanners or computed tomography scanners. Access to special software and high-performance computers is a prerequisite to processing and preparing the data which are produced by equipment of this type. The acquisition and treatment of the landmark data are complicated and extremely time-consuming. Digital reconstruction is so work-intensive that it simply does not even constitute a feasible option for normal skeletal remains (e.g. Bookstein 1991; Bruner *et al*. 2002; Dayal *et al*. 2008; Franklin *et al*. 2007; Franklin *et al*. 2008; Franklin *et al*. 2009; González-José *et al*. 2008: 179; Gunz *et al*. 2009; Hennessy/Stringer 2002: 37; Rosas/Bastir 2002: 238; Slice 2007; Weber/Bookstein 2007; Wood 2008: 122; Zelditch *et al*. 2004).

Particularly in view of the relentless efforts to market geometric morphometrics as revolutionary, it needs to be pointed out that the principle underlying the approach is hardly new. Just like traditional morphometrics, geometric morphometrics provide and analyse metric representations of partial or entire objects. The only fundamental difference is that the metric representations are landmark configurations, not sets of linear measurements. It is therefore not surprising that, in addition to their economical and logistical disadvantages, geometric morphometric techniques are also plagued by many of the same problems as traditional morphometric methods. The rarely addressed intra- and inter-observer error issues are just two of these problems (e.g. Cramon-Taubadel *et al*. 2007; Kragh *et al*. 2010; Ross/Williams 2008). More importantly, the basic similarities between traditional and geometric morphometric approaches are the main reason why geometric morphometric analyses normally either produce results virtually identical to those of traditional morphometric studies or merely confirm metric and morphological findings which have already been shown to be valid and reliable. Ryan/Kidd (2009) analysed 131 *Crania* from Southern African Bantu, European and "Khoikhoi" samples with traditional metric and geometric morphometric techniques. The traditional metric analysis was based on 15 standard measurements, its geometric morphometric counterpart on 38 landmarks. Summarising their findings, Ryan/Kidd (2009: 258) stated that: "*It cannot be concluded from this study that either technique is better at producing biologically significant results because both showed similar amounts of morphological variation.*" In response to Franklin *et al*.'s (2005(a)) landmark data-based study, Dayal *et al*. (2008) devised a method relying on traditional metric techniques to diagnose the sex of biologically sub-Saharan skulls from South Africa. They achieved higher classification accuracies than Franklin *et al*. (2005(a)) and came to the conclusion that their study "shows that traditional methods provide average accuracies that are comparable to those obtained using more complex techniques" (Dayal *et al*. 2008: 209-210). The results of Franklin *et al*.'s (2005(b)) and Franklin *et al*.'s (2007) geometric morphometric research on Southern African Bantu- and Khoisan-speaking groups were very similar to those of De Villiers (1968). Furthermore, their studies did not yield any new insights into the well-documented history of these populations or their well-known

biological inter-group relationships (e.g. Barnard 1992; Brues 1977: 286-291; Cavalli-Sforza *et al*. 1994: 160, 174-177, 180-185; Eickstedt 1934; Hemmer 1982: 323-334; Knußmann 1996: 431-437; Kurth 1975: 175-181; Schwidetzky 1979: 97-98; Szalay 1995; Tobias 1978(a), 1978(b); Wolpoff 1980: 332-338, 1999). Bruner/Manzi (2004) and Viðarsdóttir *et al*. (2002) conducted geometric morphometric studies which examined the morphological differences between the *Viscerocrania* of biologically North African and biologically sub-Saharan groups and ten different populations respectively. Predictably, the studies were unable to do more than simply underline long-established facts relating to these differences and their ontogenetic development (e.g. Bass 1987: 83-87; Gill 1998; Gill/Rhine 1990; Heberer *et al*. 1959: 338-339; İşcan *et al*. 2000; Knußmann 1996: 409-410; 429; Ousley *et al*. 2009: 71; Schultz 1926; Strouhal 1975: 34-35; Weinberg *et al*. 2005; White 2000: 375-376; Winkler/Wilfing 1991: 19). Geometric morphometric and virtual anthropological approaches fare even worse when single morphological traits, instead of the general shape of objects, are analysed (e.g. Bernal 2007; Gonzalez *et al*. 2009; Kranioti *et al*. 2009; Liu *et al*. 2004; Oettlé *et al*. 2009; Stevens/Viðarsdóttir 2008; Zumwalt 2005, 2006). In these cases, they do not compete with in most aspects comparable traditional morphometric techniques. Instead, they compete with simple, cheap, quick, very well-established, valid and reliable morphognostic techniques like the Arizona State University Dental Anthropology System or the numerous morphological age and sex diagnosis methods (e.g. Acsádi/Nemeskéri 1970; Bass 1987; Buikstra/Ubelaker 1994; Ferembach *et al*. 1979; Herrmann *et al*. 1990; Irish 1997, 2005; Loth/Henneberg 1996; Rösing *et al*. 2007; Szilvássy 1977, 1988; Turner *et al*. 1991; Walker 2005, 2008; White 2000).
The comparison with different traditional morphometric and morphognostic approaches makes it obvious how hopelessly outcompeted the high-tech techniques actually still are. Presumably, this is will change as the geometric morphometric and virtual anthropological techniques are being further developed and made more user-friendly. Nonetheless, the situation is unlikely to change appreciably in the foreseeable future. Whereas the economical, logistical and technical difficulties associated with the use of high-tech equipment will most likely be eventually overcome, several problems are intrinsic to geometric morphometrics. The complex theoretical background of the method and the barrage of complicated statistical procedures necessary to prepare and process landmark data will undoubtedly only continue to reduce the transparency of geometric morphometric studies. It will clearly also keep affecting attempts to falsify theories based on geometric morphometric results. Despite all their temporary and intrinsic shortcomings, these methods are the future of morphometric and morphological research. However, at the moment, they are far too complicated, time-consuming and expensive to be used in a project such as this one. Accordingly, valid, reliable, simple and robust traditional metric and morphognostic alternatives were used instead.

V.B.1.b.4. DNA analyses

Given its age and state of preservation as well as the daily, seasonal and long-term fluctuations in temperature and humidity in the Wadi Howar region, it was not to be expected that the material would still contain DNA. Later inspections and analyses supported the view that any attempts to extract DNA from the Wadi Howar remains would have been futile (see I.C.4.b.1. and I.C.4.b.2.). Ancient DNA analyses were therefore not considered viable alternatives to the osteological techniques which were

used to make sex, biological ancestry and palaeopathological diagnoses. Research which tries to reconstruct the population history of an area by studying the genetic variability of its contemporary inhabitants is not able to contribute to the biological positioning of prehistoric groups whose remains have only been found in long uninhabited regions and whose descendants are unknown. Consequently, carrying out analyses of the DNA of modern populations with the aim to draw conclusions about the biological relationships between the Wadi Howar sample and other prehistoric and modern groups would have been as pointless as conducting aDNA analyses (see I.D.1.c.2.).
Of course, if applicable, DNA analyses offer many advantages. In many cases, they constitute the only valid methodological approach. Studies focusing on lactase persistence associated alleles in early Neolithic Europeans, the complexion of Neanderthals or the age and spread of lactase persistence associated SNPs in Africa are particularly salient examples of such cases (e.g. Burger *et al*. 2007; Lalueza-Fox *et al*. 2007; Tishkoff *et al*. 2007). Sometimes, material which does not lend itself to osteological assessments can still be subjected to DNA analyses (e.g. Hofreiter *et al*. 2001; Jobling *et al*. 2004; Krause *et al*. 2010; Pääbo *et al*. 2004). DNA analyses can also be used to test osteological results, for instance diagnoses of ambiguous pathological changes which may have been caused by infectious diseases or sex estimates of sub-adult specimens (e.g. Hershkovitz *et al*. 2008; Mays/Faerman 2001; Mays *et al*. 2002; Pääbo *et al*. 2004: 667; Roberts/Ingham 2008; Żądzińska *et al*. 2008).
Nonetheless, contrary to popular belief, both the use of DNA analyses and the value attributed to their results are often debatable. When reliable sex, biological ancestry and palaeopathological diagnoses can be made osteologically, there is usually no need to perform expensive and time-consuming aDNA analyses (e.g. Götherström *et al*. 1997; Rösing *et al*. 2007: 81-82; Townsend 2004). This point can be illustrated by taking a closer look at Babalini *et al*.'s (2002) aDNA analyses of ten individuals from four prehistoric sites in the Libyan Fezzan's Wadi Tanezzuft Valley (see I.D.1.c.1.a.). Considering that long-term DNA preservation at Saharan sites is unlikely, that the samples could have easily been contaminated, that the extracted DNA sequences were not systematically replicated and that a later attempt to extract DNA from specimens of similar age from the same region failed, the authenticity of Babalini *et al*.'s (2002) results may be questioned (e.g. Burger *et al*. 1999; Fox 1997; Gilbert *et al*. 2003; Gilbert *et al*. 2005; Hofreiter *et al*. 2001; Jobling *et al*. 2004; Krings *et al*. 1999: 1175; Marota *et al*. 2002; Ottoni 2007: 69-72, 107-112; Pääbo 1985; Roberts/Ingham 2008; Rösing *et al*. 2007: 81-82; Wall/Kim 2007; Zink/Nerlich 2005). Furthermore, it is not clear why the decision to employ aDNA analyses to diagnose sex and biological ancestry was taken in the first place. The genetic sex determinations relied solely on Mannucci *et al*.'s (1994) amelogenin A/B primer system. They can thus not be deemed overly reliable (e.g. Brinkmann 2002; Faerman *et al*. 1995; Faerman *et al*. 1998; Götherström *et al*. 1997; Jobling *et al*. 2004; Mays/Faerman 2001; Townsend 2004; Żądzińska *et al*. 2008). A fact the authors actually acknowledged themselves (Babalini *et al*. 2002: 277). In addition, the sex of the five successfully tested individuals had already been estimated osteologically (Babalini *et al*. 2002: 272-273, 277; Ricci *et al*. 2002). The biological affinities of the material had already been analysed by traditional and geometric morphometric means as well (Bruner *et al*. 2002; Ricci *et al*. 2002). The performed genetic analyses were not able to provide any new insights in this respect either. The sub-samples could merely be characterised as more or less biologically sub-Saharan or

North African (Babalini *et al*. 2002: 277-280). An inspection of the photographs of the material in Di Lernia/Manzi (2002) leaves little doubt that a biological ancestry estimation of this type of resolution could have been achieved on the basis of a quick morphognostic evaluation of the better preserved cranial remains alone.

Even if a particular geographic region has been continually occupied and its modern population can be assumed to be wholly or partly descended from the area's prehistoric inhabitants, reconstructions of population histories which rely entirely on analyses of modern DNA can be highly misleading. This situation has been underlined by the results published by Haak *et al*. (2005) and Bramanti *et al*. (2009). Haak *et al*. (2005) successfully extracted mtDNA sequences from 24 Central European Neolithic skeletons. 25% of the individuals were characterised by an mtDNA type that is only present at a frequency of 0.2% in modern Europeans. Bramanti *et al*. (2009) examined homologous mtDNA sequences from 20 Central and Northern European Late Upper Palaeolithic, Mesolithic and "Neolithic" hunter-gatherers, 25 early Central European farmers and 484 modern Europeans. Like Haak *et al*. (2005), they found considerable genetic differences between the Neolithic and the modern sample. Moreover, they detected striking differences between the Late Upper Pleistocene, Mesolithic and "Neolithic" hunter-gatherer sample and both the Neolithic farmer and modern sequences. For example, 82% of the hunter-gatherers displayed mtDNA types which are rather rare in present-day Central Europeans. Neither Haak *et al*.'s (2005) nor Bramanti *et al*.'s (2009) results could have been predicted by studies of modern DNA (e.g. Chaix *et al*. 2008; Richards *et al*. 1998; Semino *et al*. 2000; Torroni *et al*. 1998; Torroni *et al*. 2000). Evidence of this type suggests that the modern frequencies of the commonly used mtDNA and Y-chromosomal markers have been strongly effected drift, gene flow and differing rates of population growth. As a result, studies focusing on aDNA in general and on non-Y-chromosomal modern and ancient nuclear DNA are much more likely to make reliable contributions to the reconstruction of events of the distant past (e.g. Cann *et al*. 1987; Cavalli-Sforza *et al*. 1994: 63-65, 204, 316; Culotta 2005; Eswaran *et al*. 2005; Evans *et al*. 2006; Garrigan *et al*. 2005; Garrigan/Kingan 2007; Green *et al*. 2010; Harding *et al*. 2000; Hawks *et al*. 2000(a); Henke/Rothe 1994: 512-518; Knußmann 1996: 420-421; Lewin 1998: 413-426; Liang/Nielsen 2010; Noonan *et al*. 2006; Reich *et al*. 2010; Relethford 1998, 2001; Relethford/Harpending 1995; Renfrew/Bahn 1996: 437; Serre *et al*. 2004; Sherry *et al*. 1998; Templeton 2002; Wall *et al*. 2009; Wolpoff 2009: 96-98; Wolpoff/Caspari 1996: 36-47, 257-269; Zhao *et al*. 2000).

This field of genetic research is also noteworthy for its extra-scientific dimension (see V.B.1.a.). The severe limitations of analyses of modern and ancient mtDNA have been repeatedly pointed out. Still, countless authors of studies of mtDNA proclaimed their support for the "Recent African Origin Model" on the basis of results which were as inconclusive in this respect as the ones presented by Cann *et al*. (1987) (e.g. Hawks *et al*. 2000(a); Hemmer 1998; Henke/Rothe 1994: 512-518; Knußmann 1996: 420-421; Lewin 1998: 413-426; Relethford 1998, 2001; Relethford/Harpending 1995; Serre *et al*. 2004; Sherry *et al*. 1998; Templeton 2002; Wolpoff/Caspari 1996: 36-47, 257-269; Zilhão 2006). These studies of modern DNA and the early analyses of Neanderthal mtDNA are widely perceived as progressive and able to provide definitive answers. Not least because of this, the "Recent African Origin Model" has become an in-vogue theory. It undeniably also receives much more and much more favourable scientific and popular science coverage than its competitor, the "Multiregional Model". The morphological studies carried out by prominent supporters of the "Multiregional Model", on the other hand, are usually portrayed as antiquated and unable to produce anything but ambiguous results (e.g. Bräuer 1994; Bräuer/Meister 1998; Cavalli-Sforza *et al*. 1994: 19, 62-65, 155, 316; Engeln 1998; Henke/Rothe 1994: 501-518, 1998: 281-288; Lewin 1998: 385-428; McKie 2000; Meister 1998; Stringer/Gamble 1994; Tattersall 2000(a), 2000(b), 2001; Wolpoff *et al*. 2000; Wolpoff/Caspari 1996; Thorne/Wolpoff 2003). However, unlike the majority of the geneticists and most other anthropologists involved in this debate, these supporters of the "Multiregional Model" have consistently only focused on the relevant evidence and have contextualised their findings properly. Over the years, they have compiled a large body of evidence which clearly indicates that anatomically modern humans and their archaic contemporaries could not have belonged to different species and must have interbred. It is therefore hardly surprising that the results of the more recent studies of nuclear DNA of modern humans and Neanderthals fully support the "Multiregional Model" (e.g. Curnoe 2007; Duarte *et al*. 1999; Evans *et al*. 2006; Garrigan *et al*. 2005; Garrigan/Kingan 2007; Green *et al*. 2010; Harding *et al*. 2000; Hawks *et al*. 2000(a); Hawks *et al*. 2000(b); Liang/Nielsen 2010; Reich *et al*. 2010; Shang *et al*. 2007; Sherry *et al*. 1998; Templeton 2002; Trinkaus 2005, 2006, 2007; Wall *et al*. 2009; Wolpoff 2009; Wolpoff *et al*. 2001; Wolpoff/Caspari 1996; Zhao *et al*. 2000).

V.B.1.b.5. Isotope analyses

The isotope analyses to which the material was subjected made two very important contributions to the research on the Wadi Howar's prehistory (see I.C.4.b.1.). Firstly, they provided direct and independent proof of a change in dietary habits which had already been assumed on the basis of the pertinent archaeological evidence. Secondly, they gave an entirely new insight into the likely geographic origin of the individual members of the Wadi Howar sample. Thus, the isotope analyses could be used to focus on two issues closely related, but not identical, to two of the main research questions of this study (see I.B.1.). This methodological approach could, however, simply not have been employed to answer these two research questions. Whereas isotope analyses can draw attention to dietary changes, they cannot uncover diachronic differences in robusticity, occupational stress and health. Similarly, although isotope analyses are able to shed light on an individual's geographic origin or the mobility patterns of prehistoric populations, they are not able to determine an individual's biological ancestry or the metric and non-metric affinities between different groups (e.g. Bentley *et al*. 2002; Borrero *et al*. 2009; Ehleringer *et al*. 2008; Grupe *et al*. 1997; Grupe *et al*. 2005: 124-133; Herrmann *et al*. 1990: 231-247; Jay *et al*. 2008; Knudson/Torres-Rouff 2009; Lambert/Grupe 1993; Larsen 2002: 120-122; Llano 2009; Lösch *et al*. 2006; Prowse *et al*. 2008; Richards *et al*. 2000).
As in the case of the Wadi Howar, there often are archaeological data which, more or less clearly, suggest certain prehistoric diets and mobility patterns (see I.D.1.b.). Nevertheless, only isotope analyses can produce the relevant direct evidence. In spite of this unique advantage, isotope analyses also have disadvantages. They are fairly expensive and require access to special laboratory equipment. Moreover, at times, the interpretation of their results can be quite challenging (e.g. Ambrose/Katzenberg 2000; Borić *et al*. 2004; Grupe *et al*. 2005: 124-133; Hedges 2004; Herrmann *et al*. 1990: 231-247; Kellner/Schoeninger 2007; Lambert/Grupe 1993; Passey *et al*. 2005; Tykot *et al*. 2009).

V.B.2. Individual osteological analyses

V.B.2.a. Preservation

Reconstructing the remains was an essential prerequisite for all analyses (e.g. Adams/Byrd 2006; Adams/Konigsberg 2004; Bass 1987: 300-309; Grévin *et al*. 1998; Gunz *et al*. 2009; Herrmann *et al*. 1990: 48-51; Kunter 1988: 563-568; L'Abbé 2005; Ubelaker 2009; White 2000: 281, 290-296). Therefore, not reconstructing the material or minimising the reconstruction efforts were not realistic options. The employed reconstruction techniques were basic (see III.A.2.). However, they were very rigorously applied. That many minute fragments of bones and teeth could not be incorporated into the reconstructions of larger structures was regrettable (see IV.A.2.). Still, particularly considering the material's appalling original state of preservation, it is not an overstatement to say that the painstaking reassembly process produced very satisfactory results. It was right to adopt a conservative reconstruction policy. Replacing missing fragments with plaster or resin would have introduced a further unquantifiable source of error.

Finding ways to overcome the limitations imposed by the material's extremely poor state of preservation was absolutely crucial. Otherwise, the study's aims could not have been achieved (see I.B.1.a.). Documenting the material's state of preservation in detail, on the other hand, was not a main objective. Data on the size and number of fragments, the state of their surfaces or similar details, often featured in descriptions of burnt or cremated skeletal remains and studies with a taphonomic focus, were thus not systematically collected (e.g. Behrensmeyer 1978; Boddington *et al*. 1987; Calce/Rogers 2007; Großkopf 2004; Haglund/Sorg 1997; Hughes/White 2009; Janjua/Rogers 2008; Kjorlien *et al*. 2009; Littleton 2000; Munson 2000; Nielsen-Marsh *et al*. 2007; Quatrehomme/İşcan 1997; Smith *et al*. 2007; Thompson 2004; Ubelaker 2009; Willey *et al*. 1997). Providing a measure of the amount of biologically relevant information which could still be extracted from the material after its reconstruction was deemed to be far more important (see III.A.2.). Nevertheless, it was clear from the outset that some sort of inventory of the series and an, at least, basic description of the material's taphonomic features would be necessary as well. Consequently, combining general verbal as well as photographic descriptions with preservation indices constituted an appropriate minimal solution. That both the photographic documentation and the preservation indices made use of data which had to be collected anyway was a major advantage of this solution. Moreover, the preservation indices did not only provide a measure of the material's post-reconstruction information content. The indices which were calculated on the basis of the non-metric, robusticity, occupational stress and health variables also contained information pertaining to the preservation of the material's surfaces. Most of these traits could only be scored when the surfaces of the structures in question were reasonably well preserved.

The specially devised sets of indices were judged to be best suited to describing the sample. As a result, previously developed approaches which also rely on preservation indices or similar quantitative tools were not used. Some of these approaches were unsuitable because of the lists of variables they employ (e.g. Bello *et al*. 2006; Boddington *et al*. 1987; Buikstra/Ubelaker 1994: 6-8; Dutour 1989; Gordon/Buikstra 1981; Nawrocki 1995; Stojanowski *et al*. 2002; Ullrich 1996; Walker *et al*. 1988).

Others were rejected because they are too elaborate or place undue emphasis on particular types of osteological information (e.g. Bello *et al*. 2006; Judd 2001: 458-459, 2002(a), 2008(a): 83, 86; Lovejoy/Heiple 1981; Stojanowski *et al*. 2002). Using custom-designed sets of indices also had negative side effects. The structures which were most commonly preserved were over-represented on the data collection lists on which the indices were based. Accordingly, it was concluded that the preservation index values should be treated with a certain amount of caution (see IV.A.2.).

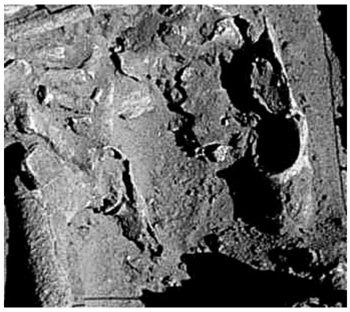
V.B.2.b. Sex

Determining the sex of the members of the Wadi Howar sample was often challenging (see III.A.3.). Many of the difficulties which were encountered are anything but peculiar to this study. At times, there were not enough well-preserved sexually dimorphic structures present. The size and shape of sufficiently well-preserved sexually dimorphic structures could frequently only be described as indifferent. Numerous individuals exhibited inconsistent expression patterns (e.g. Bass 1987; Baraybar 2008; Ferembach *et al*. 1979; Herrmann *et al*. 1990; Kemkes-Grottenthaler 2001; Krogman/İşcan 1986; Rösing *et al*. 2007; Sjøvold 1988; Ubelaker 2009; White 2000). Most of the other problems which had to be solved are common to all osteological investigations which focus on samples from unknown or little studied populations. The overall robusticity, the general degree of sexual dimorphism, the overlap between male and female expressions of traits and the diagnostic value of measurements and traits differ from population to population. Sexing members of unknown or little studied populations can therefore be particularly problematic. Unfortunately, the variability of the sexually dimorphic traits of the population from which the small and heterogeneous Wadi Howar sample was drawn was unknown (e.g. Byers 2002: 161; Đurića *et al.* 2005; Ferembach *et al*. 1979: 1-2; İşcan *et al*. 2000: 234; Knußmann 1996: 221-232, 407, 409-410; Martin 1928: 843; Meindl/Russel 1998: 378-379; Patriquin *et al*. 2002, 2005; Patriquin *et al*. 2003: 256; Reimers 1994: 18-58; Ricci *et al*. 2002: 217-218, 240-241; Rösing *et al*. 2007: 79-81; Tague 2007: 399-400; Walker 2005, 2008; Williams/Rogers 2006; Winkler/Wilfing 1991: 19). The remaining complications were created by the distorting effects of the Wadi Howar sample's unique robusticity and occupational stress patterns (see IV.A.4., 11. and 12.). As already explained, morphological assessments and extensive internal morphological as well as metric comparisons constituted the only techniques with which these difficulties could be overcome (see III.A.3.). Only by using the expressions and dimensions of the sexually dimorphic traits of the seven securely sexed individuals as benchmarks could the sex of the majority of the other skeletons be reasonably confidently diagnosed.

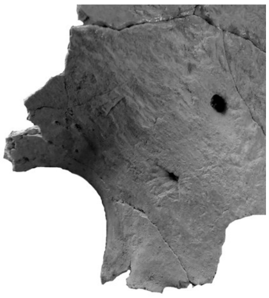
The individual analyses were usually complicated by different combinations of the above-mentioned problems. Abu Tabari 02/28-5's case, for example, was rather complex. Although this skeleton was fairly well preserved, its sex proved difficult to estimate. Originally, the individual was diagnosed as "female" *in situ*. Features typical of female body proportions, such as narrow shoulders, broad hips, a long vertebral column (*Columna vertebralis*) and relatively short legs, were identified as hallmarks of Abu Tabari 02/28-5. More importantly, the individual's subpubic angle (*Angulus subpubicus*), greater pelvis (*Pelvis major*) and pelvic inlet (*Apertura pelvis superior*) appeared to be wide (e.g. Bass 2000: 197; Ferembach *et al*. 1980: 518; Grammer 1995: 108-111; İşcan *et al*. 2000: 229; Knußmann 1996: 225-227, 407, 409-410; Kunter 1988: 561-562; Loth/İşcan 2000(b): 257; Reimers 1994: 18-58; White

2000: 365-371). Nevertheless, the results of the later examination of the specimen in the laboratory did not necessarily support this initial diagnosis. The only informative pelvic structure which could be reconstructed was the left greater sciatic notch (*Incisura ischiadica major*). Unfortunately, it could not be unequivocally assessed. Due to *post mortem* damage, it was not clear whether or not the posterior part of its superior border would have sloped downwards (e.g. Acsádi/Nemeskéri 1970; Bass 1987: 200-206; Bruzek 2002; Buikstra/Ubelaker 1994; Ferembach *et al*. 1979: 3-5; Herrmann *et al*. 1990: 75-76; Patriquin *et al*. 2003; Rösing *et al*. 2007: 79-81; Sjøvold 1988; Steyn/İşcan 2008; Walker 2005: 386).

(a)



(b)



(c)

(d)

Figure 93: Comparison of pelvic traits. Abu Tabari 02/28-5: *Pelvis in situ* (a), Abu Tabari 02/28-11 (male): *Pelvis in situ* (b), Abu Tabari 02/28-5: left greater sciatic notch (*Incisura ischiadica major*) in medial view (*Norma medialis*) (c) and Abu Tabari 02/1-2 (female): left hip bone (*Os coxae*) *in situ* (d) (a: E. Becker; b: E. Fäder; d: Godhoff/Lange; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The evaluation of the preserved sexually dimorphic traits of Abu Tabari 02/28-5's *Cranium* was also inconclusive. Some traits exhibited more or less pronounced male expressions. The left parietal tuberosity (*Tuber parietale*) was small. The supraorbital margins (*Margines supraorbitales*) were rather blunt. The mastoid processes (*Processus mastoidei*) were exceptionally large. The *Gonia*, finally, must have been decidedly everted. However, other traits were rather gracile. The superciliary arches (*Arcus superciliares*) and the *Glabella* were "hyper-feminine". The surfaces of the zygomatic bones (*Ossa zygomatica*) were smooth. There was no discernible rearward angulation of the posterior border of the left mandibular ramus (*Ramus mandibulae*) at the level of the occlusal surfaces (*Facies occlusales*) of the molars (*Dentes molares*). Moreover, the bony chin (*Mentum osseum*) and the inferior margin (*Margo inferior*) of the mandible (*Mandibula*) were more or less "feminine" (e.g. Acsádi/Nemeskéri 1970; Balci *et al*. 2005; Đurića *et al.* 2005; Ferembach *et al*. 1979: 6-8, 1980: 523; Herrmann *et al*.

1990: 78-80; Kemkes-Grottenthaler *et al*. 2002; Loth/Henneberg 1996; Loth/İşcan 2000(b): 255-256; Novotný *et al.* 1993: 82, 84-85; Rösing *et al*. 2007: 79-81; Sjøvold 1988: 449-451, 458; Walker 2008; Walrath *et al*. 2004; White 2000: 363-365; Williams/Rogers 2006). The equation developed by Langenscheidt (1983) which relies on dimensions of lower central incisors (*Dentes incisivi inferiores I*) and canines (*Dentes canini inferiores*) classified Abu Tabari 02/28-5 as a female (see Table 8). Nonetheless, Langenscheidt's (1983) formula which only uses measurements of lower canines (*Dentes canini inferiores*) classified Abu Tabari 02/28-5 as a male (e.g. Ferembach *et al*. 1979: 10; Herrmann *et al*. 1990: 87, 89; Mays/Cox 2000: 123-124; Sjøvold 1988: 454-455; Teschler-Nicola/Prossinger 1998: 480, 483-484). A comparison of a number of cranial and postcranial measurements, such as mastoid process (*Processus mastoideus*) width (13a.), mandibular symphysis (*Symphysis mandibulae*) height (69.), minimum mandibular ramus (*Ramus mandibulae*) breadth (71.), maximum clavicle (*Clavicula*) length (C1.) and *Tibia* circumference at the nutrient foramen (*Foramen nutritium*) (T10a.), with data from various biologically sub-Saharan skeletal samples also failed to produce clear results (e.g. Asala *et al*. 2004: 26; Bass 1987: 151, 238; DiBennardo/Taylor 1979, 1982; Franklin *et al*. 2008; Giles 1964; Giles/Elliot 1963; Howells 1989; İşcan 2000: 286-287; İşcan/Miller-Shaivitz 1984(a); Loth/İşcan 2000(b): 253, 258-259; Seidemann *et al*. 1998: 308; Sjøvold 1988: 466, 468, 472-473; Steyn/İşcan 1999: 80; Thieme 1957). This time, not even the comparisons with the unambiguously sexed members of the Wadi Howar sample were very informative. They underlined how robust many parts of Abu Tabari 02/28-5's overall rather small skeleton actually were (see IV.A.11. and IV.A.12.). That the specimen's comparatively short and thick long bones were characterised by a pronounced hypertrophy of many muscle attachment sites was especially intriguing. Yet, the various *in situ* photographs seemed to lend support to the initial sex estimation (see Figure 93). In the end, taking the different diagnostic values of the examined structures, the likely effects of occupational stress and the peculiarities of the sample into account, it was concluded that Abu Tabari 02/28-5 was "probably female" (see Table 6).

V.B.2.c. Age

Of course, the age at death estimates were always based on the evaluation of all available age markers (see III.A.4.). Still, age at death diagnoses had to be mainly based on dental markers. Unfortunately, other structures which could have been used in this context were rarely preserved. The state of cranial sutures (*Suturae cranii*), spheno-occipital synchondroses (*Synchondroses spheno-occipitales*), postcranial metaphyses, surfaces (*Facies articulares*) of synovial joints (*Articulationes synoviales*) and surfaces (*Facies articulares*) of sternocostal (*Articulationes sternocostales*) as well as sacroiliac joints (*Articulationes sacroiliacae*) could only be assessed occasionally.

Two approaches were adopted to increase the accuracy of the dental age estimates. Firstly, it was attempted to adjust the dental formation and eruption ages of sub-adult individuals. Secondly, the observed degrees of wear were seriated and calibrated. Age estimates based on comparisons with the charts compiled by Ubelaker (1978) in order to illustrate the phases of dental development were deliberately lowered (e.g. Ferembach *et al*. 1979: 13-14, 1980: 528-529; Herrmann *et al*. 1990: 54; Meindl/Russel 1998: 382-389; Szilvássy 1988: 422-423; Ubelaker 1978, 1987; White 2000: 338, 342-343). Although this seems to be anything but a uniform phenomenon, generally speaking, the dental development of biologically sub-Saharan populations is accelerated. For instance, the eruption of wisdom teeth (*Dentes serotini*) has reportedly been observed in biologically sub-Saharan individuals as young as thirteen years. In comparison with biologically European populations, the eruption of wisdom teeth (*Dentes serotini*) occurs about two to five and a half years earlier in biologically sub-Saharan groups. High levels of occupational stress, nutritional deficiencies and diseases, on the other hand, slow down both the tempo of growth in general and the speed of dental development. Therefore, developmental delays had to be anticipated as well, especially in view of the situation of the children of African pastoralists. It goes without saying that population-specific genetic and environmental factors as well as sex differences were also borne in mind when non-dental age markers were analysed. There are, for example, indications that biologically sub-Saharan populations are not only characterised by advanced skeletal maturation but also by decelerated articular degeneration and bone loss. Again, the effects of high activity levels, mal- and undernutrition and pathological conditions had to be taken into account in this context as well (for differing tempos of dental development see for example: Chagula 1960; Folayan *et al*. 2007; Garn 1972; Garn *et al*. 1972; Garn/Clark 1976; Harvey 1976: 38; Hassanali 1985; Heuzé/Cardoso 2008; Littleton 2005: 297-298; Loth/İşcan 2000(a): 242-243; Martin-de las Heras *et al*. 2008; Novotný *et al*. 1993: 72; Olze *et al*. 2006; Otuyemi *et al*. 1997; Reid/Dean 2000: 136, 2006; Tompkins 1996; for skeletal maturation and ageing patterns in biologically sub-Saharan populations see for example: Cho *et al*. 2006; Ferembach *et al*. 1979: 12; Garn *et al*. 1972; Garn/Clark 1976; Heberer *et al*. 1959: 338-339; Hoppa 2000; Hui *et al*. 2003; Martin 1928: 728; Martrille *et al*. 2007; Schmeling *et al*. 2003; Tanner 1992: 105; Walker *et al*. 2006; for environmental factors with adverse effects on growth and ageing see for example: Baten 1996, Bénéfice *et al*. 2001; Blackhurst 2000; Cameron 2007; Cardoso 2008(a), 2008(b); Cardoso/Garcia 2009; Crooks *et al*. 2007; Gray *et al*. 2004; Gray *et al*. 2008, 2009; Grimsrud *et al*. 2008; Harris *et al*. 2001; Hermanussen 1997; Herrmann *et al*. 1990: 54; Heuzé/Cardoso 2008; Jones *et al*. 2009; Klaus/Tam 2009; Knußmann 1996: 205-209; Larsen 2002: 126-128; Lewis 2002; Malina *et al*. 2008; Martin-de las Heras *et al*. 2008; May *et al*. 1993; Molleson/Cox 1993; Monyeki *et al*. 2000; Olivieri *et al*. 2008; Pawloski 2002; Pendergast Moore *et al*. 1986: 324; Sellen 1999; Semproli/Gualdi-Russo 2007; Tanner 1986: 132-133; Wood *et al*. 1992).

Seriating the observed degrees of dental wear ensured that the assigned abrasion ages were accurate in relation to each other. These abrasion series could then be cautiously calibrated. This calibration relied on the dental abrasion of a comparative individual of known age at death from the Chadian Sahara and the age at death estimates which were not based on the evaluation of degrees of tooth wear (e.g. Judd 2008(a): 92-93; Mays 2002; Meindl/Russel 1998: 382-389; Miles 1963; Oliveira *et al*. 2006; White 2000: 338, 343-346). The skull of a male Teda named Yasco (No.: Hamy 17 804) could be inspected at the *Musée de l'Homme* in Paris. This individual died at the age of 25 years in Chad at the beginning of the 20th century. The Teda are nomadic pastoralists who speak a Saharan language and used to inhabit large parts of the Sahara (see I.D.2.a., c. and d.). One can probably safely assume that Yasco's diet must have contained at least as much stone dust and sand as that of the Neolithic inhabitants of the Wadi Howar. Yet, the wear of his preserved molars (*Dentes molares*) matched the sub-class of least abrasion in the "25 to 35 years" category of Brothwell's scheme (1963(a)). Lovejoy's (1985) technique slightly underestimated this individual's age at death. Yasco's molar wear took an intermediate position between Lovejoy's (1985) "16 to 20 years" and "18 to 24 years" category. It was, however, closer to the "18 to 24 years" category. All age at death diagnoses which could be made examining non-dental age markers or dental development patterns were in agreement with the dental ages which were assigned after the abrasion series had been calibrated using Yasco's degree of wear as a benchmark.

(a) (b)

Figure 94: Abu Tabari 02/28-2 *in situ*. Left posterior dentition (a) and the proximal end of the right *Tibia* (b) (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The success with which age at death could be estimated using dental abrasion as the main diagnostic feature was noteworthy. Grit is omnipresent in the Wadi Howar region. Moreover, it is also introduced into the diet by certain food processing techniques, such as grinding or pounding seeds with stone tools. The ingestion of grit leads to advanced tooth wear (e.g. Alt/Pichler 1998: 398; Eshed *et al*. 2006; Houghton 1978, 1996; Leek 1972, 1984; Lev-Tov Chattah/Smith 2006; Watson 2008). Therefore, the techniques developed by Brothwell (1963(a)) and Lovejoy (1985) should have overestimated the age at death of both Yasco and the members of the Wadi Howar series. Furthermore, for a number of reasons, the dependability of dental abrasion as an indicator of age at death is generally deemed to be low. Several authors have, however, also pointed out that tooth wear can be used as a reliable age marker if the dentitions of a sufficiently large sample are seriated and the resulting abrasion series is calibrated (e.g. Bass 1987: 17, 286-287; Brothwell 1963(a), 1981; Deter 2009; Hillson 1996: 231-242; Hinton 1981; Judd 2008(a): 92-93; Kim *et al*. 2000; Loth/İşcan 2000(a): 250; Lovejoy 1985; Mays 2002; Meindl/Russel 1998: 382-389; Miles 1963, 2001; Novotný *et al*. 1993: 73; Oliveira *et al*. 2006; Rösing *et al*. 2007: 83-85; Smith 1984; Szilvássy 1988: 422-424; Walker *et al*. 1991: 176; White 2000: 338, 343-346; Yun *et al*. 2007).

In sum, the dental and overall age at death estimates were considered reliable for four reasons. Firstly, dentitions were seriated according to their developmental state and degree of abrasion. Secondly, the resulting series were calibrated with the abrasion of a suitable comparative individual of known age at death and multiple independent age at death diagnoses. Thirdly, all final age at death diagnoses were accurate in relation to each other and relied on many separate, individual evaluations. Fourthly, distorting genetic and environmental factors were always taken into account.

V.B.2.d. Height, weight and physique

Estimating height, weight and physique involved fairly straightforward procedures (see III.A.5., 6. and 7.). Yet, it was not entirely unproblematic. The material's state of preservation ruled out the application of many techniques from the start. Moreover, the only applicable equations developed for groups whose ancestors probably belonged to the same population complex as the prehistoric inhabitants of the Wadi Howar were Allbrook's (1961) formulae for the reconstruction of the living height of male "Nilotes". As a consequence, other, less appropriate, formulae had to be used.

Generally speaking, children and adults, men and women as well as different populations exhibit different body shapes and sizes (e.g. Allen 1877; Bergmann 1847; Eveleth/Tanner 1990; Gallagher *et al*. 2009; Gilligan/Bulbeck 2007; Grupe *et al*. 2005: 271-299; Himes 1988; Holliday 1997; İşcan 2005; Ivanhoe *et al.* 1998; Katzmarzyk/Leonard 1998; Knußmann 1996: 167-209, 221-235, 408-417; Lewin 1998: 137-148; Reimers 1994: 18-58; Smith 2007; Tanner 1986, 1992; Vogel/Angermann 1995: 231; Walter 1978, 1994: 105-107; Zakrzewski 2003). The use of inappropriate equations can therefore lead to fairly large estimation errors. Rösing (1988: 596), for example, reported that Trotter/Gleser's (1952, 1958, 1977) formulae for African Americans overestimate the stature of "Nilotes" and "Bantus" by, on average, 4 to 5 and 10 to 12 cm respectively. It is clear that Trotter/Gleser's (1952, 1958, 1977) formulae for European Americans would overestimate the stature of members of these two groups even more. Not surprisingly, the differences between the living heights which were calculated on the basis of the equations developed by Allbrook (1961), Raxter *et al*. (2008), Trotter/Gleser (1952, 1977) and Didia *et al*. (2009) were in agreement with Rösing's (1988) predictions (see Appendix XVI.B.2. and 3.). Similarly, most living weight estimation techniques are likely to overestimate the body mass of rather short and slender individuals with tropically adapted body proportions (e.g. Auerbach/Ruff 2004: 339-340; El-Meligy *et al*. 2006; Hartwig-Scherer 1993; Hemmer 2007; McHenry 1992; Ruff 2000(a), 2002, 2007; Ruff *et al*. 2005; Sciulli/Blatt 2008; Visser 1998). Due to this age, sex and population specificity of living height and weight estimation formulae, most of the calculated results had to be adjusted (see III.A.5. and 6.). It was logistically impossible to conduct larger studies for this purpose. Instead, simple approaches were adopted which relied on inferences from relevant publications, common sense and the data which could be generated in the course of the osteological analyses. Whenever it was deemed necessary, results computed on the basis of formulae which were developed for different bones or by different researchers were averaged, estimates produced by better-suited equations were given more weight and mean differences between results calculated with formulae for different populations or sexes were used to correct estimates. How much these systematically applied adjustments improved the accuracy of the living height and weight reconstructions was impossible to assess. Nonetheless, it was clear that making these adjustments constituted an appropriate measure.

Both the equations themselves, even the in principle suitable ones, and the usually recommended adjustments could have distorted the estimates as well. For instance, various authors have described situations, mainly in forensic contexts, in which stature estimates were lower than the reported *ante mortem* heights. In these published cases, it was assumed that the reported *ante mortem* heights were inaccurate (e.g. Cardoso 2009: 14; Giles/Hutchinson 1991; Himes/Roche 1982; Jantz *et al*. 2008; Ousley 1995). Still, it is not entirely inconceivable that such discrepancies could sometimes also be caused by methodological shortcomings. In the author's experience, equations which are appropriate in terms of an individual's age at death, sex, biological ancestry and likely degree of ontogenetic acceleration do occasionally produce improbably low living height estimates. Working with biologically European remains, the author has encountered adult male specimens whose estimated stature fell noticeably short of his own height, although their *Femura* or *Tibiae* were longer than those of the author. Underestimates could also be a consequence of bone shrinkage. Ingalls (1927) found that bones are affected by 1.5 to 1.8% of shrinkage when they dry out. This phenomenon is rarely factored in when living height and weight are reconstructed on the basis of dry bone measurements. Both Behnke (1959) and Visser (1998) did, however, modify their formulae accordingly. Dupertuis/Hadden (1951) and Cardoso (2009) drew attention to another fact. It is in all probability not necessary to subtract the generally recommended 2.0 to 2.5 cm from an estimate, unless the formula employed to make the estimate was developed using hanging cadavers (e.g. Bass 1987: 25-27; Krogman/İşcan 1986: 302-349, 306-310; Rösing 1988: 589, 593, 596; Sjøvold 2000: 278, 283-284; White 2000: 372-373).

Height and, to a lesser extent, weight were often reconstructed on the basis of *in situ* measurements or laboratory estimates (see III.A.5., III.B.1.b.1. and III.B.1.b.1.c.). In addition, at times, substitute measurements had to be entered into the equations. For example, maximum tibial length (T1a.) had to be substituted for physiological tibial length (T2.) because the latter was usually impossible to determine. The results of the intra-observer error tests suggested that especially the use of laboratory estimates most likely introduced a considerable amount of error (see IV.B.). This unquantifiable error was a cause for concern. Laboratory estimates were used all the same, since not making use of these data would have meant that neither height nor weight could have been reconstructed in several cases. There was also not much doubt that any of the factors which had probably affected the accuracy of the height and weight estimates were amplified by computing height-weight indices.

Biologically, body weight is a highly relevant variable. Nevertheless, unlike the estimation of living height, the reconstruction of living weight is often neglected. This neglect is coupled with a relative lack of body mass estimation techniques (e.g. Auerbach/Ruff 2004; Hartwig-Scherer 1993; Hemmer 2007; McHenry 1992; Ruff 2000(a), 2002, 2007; Ruff *et al*. 2005; Sciulli/Blatt 2008; Visser 1998). Physique receives even less attention in osteological studies (e.g. El-Meligy *et al*. 2006; Katzmarzyk/Leonard 1998; Porter 1999, 2002; Ullrich 1966; Zakrzewski 2003). Although diagnosing physique is associated with a number of methodological and conceptual problems, the description of an individual's build remains a worthwhile undertaking. The classificatory scheme which was employed was based on Kretschmer's (1921, 1977) typology. This typology is old-fashioned but it provides a simple means of capturing an essential part of an individual's biological identity. Like other, similar schemata, it divides the continuous variation in body shapes more or less arbitrarily and was originally a central part of a theory consisting of erroneous assumptions about psychosomatic correlations. This does, however, not mean that it cannot be useful as a descriptive tool (e.g. Conrad 1963; Heath/Carter 1967; Himes 1988; Knußmann 1988(c): 280-282, 1996: 218-248; Kretschmer 1977; Lindegård 1953; Özenera/Duyarb 2008; Porter 1999, 2002; Roberts 1953; Roberts/Bainbridge 1963; Sheldon 1940; Tanner 1992: 104-105). Estimating a Wadi Howar individual's physique involved the evaluation of height-weight, limb length and robusticity indices, the application of Schneider's

(1944) technique based on Ullrich's (1966) summary as well as a general visual assessment. Thus the resulting classifications did not primarily rely on Schneider's (1944) rarely used and largely untested method. On the contrary, the calculated indices were considered far more informative and the final diagnoses were based on all relevant findings.

V.B.2.e. Biological ancestry

Many researchers have successfully drawn conclusions about the population history of the Sahara and the Sudanese Nile Valley by distinguishing between individuals of biologically sub-Saharan and biologically European or, more precisely, biologically North African ancestry (see I.D.1.a.). In view of this, the decision was taken that the osteological estimations of biological ancestry should, more or less entirely, focus on this distinction (see III.A.8.).

Which traits are most useful in making a morphological differential diagnosis between "biologically sub-Saharan" and "biologically European"? This, in this context, highly pertinent question has been repeatedly addressed in systematic studies. These studies have been able to identify several particularly informative traits. Utilising six sinometer measurements, Gill *et al*. (1988) identified 88.8% of the biologically European, 87.0% of the biologically sub-Saharan and 87.9% of the biologically North American individuals of their sample of 398 specimens correctly. Gill/Gilbert (1990) presented a purely visual version of Gill *et al*.'s (1988) metric method. Angel/Kelly (1990) found that 70% of 428 biologically European and only 5% of 353 biologically sub-Saharan mandibles (*Mandibulae*) did not display ramus inversion. İşcan *et al*. (2000: 232) reported that 90.41% of 67 male and 98.48% of 62 female European American and African American *Crania* could be accurately assigned with a discriminant function analysis which relied on cranial length, cranial breadth, maximum frontal breadth, bizygomatic breadth, *Basion-Nasion* length, *Basion-Bregma* height, *Basion-Prosthion* length, mastoid height, biasteronic breadth and nasal breadth measurements. Lease/Sciulli (2005) presented five logistic regression equations developed to discriminate between European American and African American deciduous dentitions. Their formulae employed one non-metric and three metric traits. They allocated 90.1 to 92.6% of the cases correctly. Weinberg *et al*. (2005) were able to classify 79.1% of their sample of 70 biologically sub-Saharan and biologically European perinates correctly on the basis of five visually scored traits. 67.5% of the members of an independent sample of another 39 perinates were also correctly classified with the same technique. The traits Weinberg *et al*. (2005) employed were subnasal margin definition, temporal squamous shape, occipital squamous shape, *Vomer* shape and anterior nasal spine projection. That these results were achieved using perinates, not infants or adults, makes them especially remarkable. Ousley *et al*. (2009: 71) reported that discriminant function analyses based on seven metric variables allocated 95% of African American and biologically European individuals of their sample correctly. They also pointed out that the metric variables in question (*Basion-Nasion* length (BNL), *Basion-Prosthion* length (BPL), *Basion-Bregma* height (BBH), biauricular breadth (AUB), nasal breadth (NLB), palate breadth (MAB), orbital height (OBH)) quantify morphological traits which can be used to estimate biological ancestry visually.

As could be expected, these and similar studies have also highlighted three other important facts. Firstly, there are varying degrees of overlap between the frequency distributions of trait expressions observed in biologically sub-Saharan and biologically European samples. Secondly, different biologically sub-Saharan samples are characterised by slightly different frequencies of "typically biologically sub-Saharan" trait expressions. Thirdly, some traits are less sensitive to assessment error than others (see V.C.1.h. and for example: Angel/Kelley 1990; Brooks *et al*. 1990; Brues 1990; Byers 2002: 151-168; Gill 1998; Gill/Gilbert 1990; Hefner 2003, 2007, 2009; İşcan *et al*. 2000: 228-234; Mayr 1993: 159; Parr 2005; Rhine 1990; Rooyen 2010; Weinberg *et al*. 2005; Wheat 2009).

	Nasal root form				
	Quonset hut	oval	tented	vaulted	steepled
Hefner (2003)					
"African"	59%	16%	10%	10%	5%
"European"	4%	15%	18%	28%	34%
"Asian"	23%	24%	40%	12%	1%
Rhine (1990)					
"Black"	33%		67%		0%
"Anglo"	4%		38%		58%
"Indian"	33%		67%		0%
Rooyen (2010)					
"Black"	44%	34%	15%	4%	3%
"White"	5%	3%	19%	36%	37%
"Coloured"	39%	36%	16%	5%	4%

(a)

	Inferior nasal margin				
	guttered	incipient guttering	straight/ blurred	partial sill/ shallow	sill/ deep
Hefner (2003)					
"African"	36%	33%	18%	10%	3%
"European"	1%	3%	22%	41%	33%
"Asian"	12%	17%	64%	4%	3%
Rhine (1990)					
"Black"	33%		33%	33%	0%
"Anglo"	2%		21%	64%	13%
"Indian"	0%		100%	0%	0%
Rooyen (2010)					
"Black"	40%	15%	5%	22%	18%
"White"	8%	2%	3%	7%	80%
"Coloured"	28%	17%	4%	32%	19%

(b)

	Alveolar prognathism	
	projecting/ slight to moderate	orthognathic/ none
Rhine (1990)		
"Black"	100%	0%
"Anglo"	62%	38%
"Indian"	100%	0%
Rooyen (2010)		
"Black"	57%	43%
"White"	13%	87%
"Coloured"	38%	62%

(c)

		Sciatic notch				
		1	2	3	4	5
African American	males	5.4%	44.6%	25.0%	17.9%	7.1%
	females	59.6%	36.2%	0.0%	4.3%	0.0%
European American	males	5.2%	34.5%	29.3%	22.4%	8.6%
	females	56.0%	32.0%	10.0%	0.0%	2.0%
English	males	11.8%	51.0%	29.4%	7.8%	0.0%
	females	85.3%	11.8%	2.9%	0.0%	0.0%

(d)

		Glabellar area				
		1	2	3	4	5
African American	males	3.3%	18.3%	46.7%	26.7%	5.0%
	females	47.2%	37.7%	13.2%	1.9%	0.0%
European American	males	3.3%	3.3%	32.8%	36.1%	24.6%
	females	40.4%	25.0%	30.8%	3.8%	0.0%

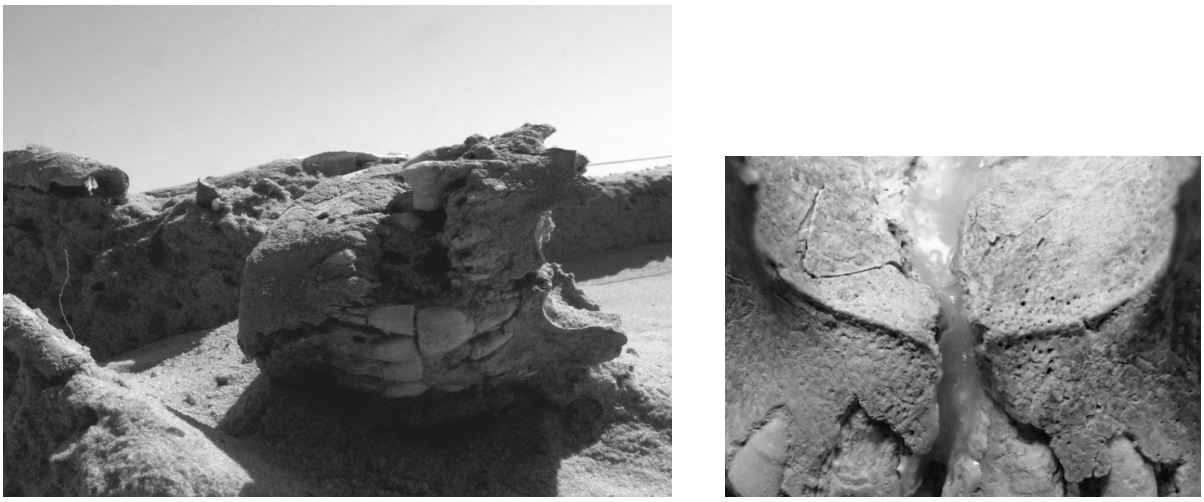
		Mastoid process				
		1	2	3	4	5
African American	males	1.7%	15.0%	48.3%	25.0%	10.0%
	females	35.8%	32.1%	28.3%	3.8%	0.0%
European American	males	4.9%	16.4%	49.2%	27.9%	1.6%
	females	26.9%	51.9%	19.2%	1.9%	0.0%
		Mental eminence				
		1	2	3	4	5
African American	males	0.0%	18.3%	43.3%	26.7%	11.7%
	females	18.9%	45.3%	35.8%	0.0%	0.0%
European American	males	0.0%	26.2%	60.7%	11.5%	1.6%
	females	19.2%	61.5%	17.3%	1.9%	0.0%

(e)

Figure 95: Selected frequency distributions of expressions of morphological traits widely used to estimate biological ancestry and sex. After Rhine 1990: 14 and Rooyen 2010: 113 (a), Rhine 1990: 14 and Rooyen 2010: 115 (b), Rhine 1990: 14 and Rooyen 2010: 116 (c), Walker 2005: 387 (d) and Walker 2008: 44 (e).

The traits which are relevant to the determination of biological ancestry share these characteristics with the morphological traits commonly employed to determine sex from the skeleton. Indeed, both sets of traits are very similar in terms of between-group overlap, within-group variability and sensitivity to assessment error (e.g. Akansel *et al*. 2008; Balci *et al*. 2005; Dar/Hershkovitz 2006; Đurića *et al.* 2005; Ferembach *et al*. 1979; Graw *et al*. 2005; Herrmann *et al*. 1990: 75-85; Houghton 1974: 387-389; Kemkes-Grottenthaler *et al*. 2002; Listi/Bassett 2006; Loth/Henneberg 1996; Maat *et al*. 1997; Norén *et al*. 2005; Oettlé *et al*. 2009; Patriquin *et al*. 2003; Rösing *et al*. 2007: 79-81; Schiwy-Bochat 2001; Sjøvold 1988: 444; Walrath *et al*. 2004). This fact becomes especially obvious when relevant results are directly compared. For instance, the between- and within-group variability of trait expressions reported by Hefner (2003), Rhine (1990), Rooyen (2010) and Walker (2005, 2008) are similar in most respects (see Figure 95). Moreover, the inter-observer error studies which analysed scores assigned to traits relevant to the morphological estimation biological ancestry and sex conducted by Wheat (2009) and Williams/Rogers (2006) respectively also produced comparable results. Thus, it appears safe to assume that the two sets of traits have similar values as diagnostic tools. Of course, in either case, it is imperative that the expressions of as many informative traits as possible are appropriately evaluated and contextualised. Furthermore, the schemata used to score trait expressions have to provide sufficient resolution. As long as both conditions are met, there are, however, no methodological reasons to assume that morphological estimates of biological ancestry are appreciably less dependable than morphological sex diagnoses.

A dolicho- to mesocranic skull (*Cranium*), large and broad orbits (*Orbitae*) divided by a considerable interorbital space, a relatively flat and rounded nasal saddle (*Sella nasi*), comparatively prominent zygomatic bones (*Ossa zygomatica*), a substantial bizygomatic breadth, a low and broad nasal aperture (*Apertura piriformis*) with a poorly defined inferior margin (*Margo infranasalis*), pronounced alveolar prognathism, a low and broad ascending ramus (*Ramus mandibulae*) with an inversion of the middle third of its posterior edge, large and morphologically complex teeth and tropically adapted body proportions are perhaps the best known osteological traits of biologically sub-Saharan populations in general. A dolichocranic skull (*Cranium*), a high mandibular symphysis (*Symphysis mandibulae*), a relatively prominent chin (*Mentum osseum*), a particularly tall and slender build, exceptionally long forearms (*Antebrachia*) and a great relative tibial length seem to be more or less peculiar to biologically sub-Saharan populations associated with Nilo-Saharan languages (e.g. Anderson 1968: 1016; Angel/Kelley 1990; Bass 1987: 83-87; Brace *et al*. 1991: 38-39; Bräuer 1983: 35-38, 119; Brues 1990; Byers 2002: 151-168; Clark 1989: 395; Derry 1914: 101, 103-105, 1949: 32-33; Dzierżykray-Rogalski 1977, 1978; Gallagher *et al*. 2009; Gill 1998; Gill/Gilbert 1990; Greene/Armelagos 1972: 28; Irish 1997, 2000, 2005; İşcan *et al*. 2000: 228-234; Keita 2004; Knußmann 1996: 408-410, 415, 429, 431-432, 438-439; Krogman/İşcan 1986: 294-295; Martin 1928: 688-689, 772, 939-940, 949, 967; Novotný *et al.* 1993: 76-78; Ousley *et al*. 2009: 71-72; Reuer/Winkler 1980: 200; Rhine 1990; Roberts/Bainbridge 1963; Weinberg *et al*. 2005; White 2000: 375-376; Winkler/Wilfing 1991: 19). Like the tropically adapted body proportions, the mentioned nasal traits and the marked prognathism are already taking shape during prenatal development. The importance of mid-facial characteristics was also underlined by the above-mentioned studies. Accordingly, these traits are generally thought of as particularly diagnostically valuable (e.g. Bass 1987: 83-87; Gill 1998; Gill/Rhine 1990; Hauschild 1937; Heberer *et al*. 1959: 338-339; İşcan *et al*. 2000: 228; Knußmann 1996: 429; Limson 1932; Rooyen 2010; Schultz 1926; Weinberg *et al*. 2005; White 2000: 375-376). That not only these highly diagnostic features but also many of the other enumerated traits consistently recurred in the Wadi Howar material undoubtedly constituted a dependable basis for convincing osteological estimations of biological ancestry. The relevant characteristics of an entire series, not just the traits of one or two isolated individuals, could be taken into account when the final diagnoses were made. Finally, it was also striking that expressions of traits which are less common in biologically sub-Saharan populations were either not present or only encountered at typically low frequencies (see IV.A.9.).



(a) (b)

Figure 96: Abu Tabari 02/28-23's inferior nasal margin (*Margo infranasalis*) *in situ* (a) and in the laboratory (b). No other member of the Wadi Howar sample displayed a *Crista infranasalis* (a: E. Becker; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

V.B.2.f. Occupational stress

Commonly occurring or otherwise remarkable stress markers were described and interpreted (see III.A.10). Using an approach which involved two steps appeared to be the most appropriate way of analysing the encountered traces of occupational stress. There are virtually no traces of occupational stress which could be caused by one specific movement alone. In addition, any movement is inevitably compatible with a range of possible activities. Therefore, interpreting occupational stress markers directly would not have made much sense. The movements which could have induced the observed changes had to be identified first. Only then could sensible attempts be made to match the identified movements to activities. Naturally, age and sex differences were borne in mind as well when observations suggestive of elevated habitual stress levels were evaluated. Furthermore, it is self-evident that care was taken not to confuse normal age-related changes or pathologies with traces of occupational stress (for ambiguity of occupational stress markers see for example: Arrighetti *et al*. 2002; Binder *et al*. 2005; Binder/Uerpmann 2004; Cope *et al*. 2005: 397; Dutour 1986; Kennedy 1989; Lieverse *et al*. 2007(b); Lieverse *et al*. 2009; Mensforth *et al*. 1978; Miles 1996; Peterson 1998; Weiss/Jurmain 2007; Weston 2008; Wilczak/Kennedy 1998; for factors influencing occupational stress trait expressions and interpretative difficulties see for example: Aufderheide/Rodríguez-Martín 1998: 22, 26-27, 93-94, 96-97, 105-106; Brown *et al*. 2008; Hildebrandt 1998: 122-125, 126-127, 506; 791, 830, 1059, 1060, 1168, 1171-1172, 1073, 1220, 1425, 1487, 1489; Jurmain 1991; Kalichman *et al*. 2007; Robb 1998; Stirland 1998; Weiss 2003, 2004, 2005, 2007; Weston 2008; Zumwalt 2006).

Taking full advantage of germane archaeological, ethnographic, osteological and medical sources when coming up with possible interpretations for previously identified underlying patterns of movements was deemed especially important. Finding out which activities have been archaeologically documented at the sites which are associated with a particular sample or sub-sample is generally not an overly complicated undertaking. It is usually also obvious which osteological publications are likely to be useful in interpreting specific occupational stress markers directly. Making sure that only suitable ethnographic and medical sources are consulted, on the other hand, can sometimes prove difficult. Ethnographic models should not be chosen arbitrarily (see I.D.2.d.1.). Environmental, economic and biological factors should be taken into account when selecting such models. Prudent ethnographic interpretations, in turn, should only suggest connections between occupational stress markers and activities which have been described for, in this sense, appropriate ethnic groups (e.g. Alt/Pichler 1998: 395-399; Carlson *et al*. 2007; Churchill/Morris 1998; Deter 2009; Erdal 2008; Hawkey/Merbs 1995; Hinton 1981; Houghton 1978, 1996; Kaneda *et al*. 1999; Lai/Lovell 1992; Lovell/Dublenko 1999; Martin 1928: 1161-1164; Roberts-Thomson/Roberts-Thomson 1999; Steen/Lane 1998). There is little doubt that the majority of the more noteworthy expressions of occupational stress traits represent responses to stresses induced by lengthy and strenuous activities which were performed daily or very frequently for many years. Consequently, it appears likely that, in many cases, publications from the field of occupational medicine are decidedly more informative than their sports medicine counterparts (e.g. Aittomäki *et al*. 2006; Arndt *et al*. 2005; Barb/Barr 2006; Boyle *et al*. 1997; Bronner *et al*. 2003; Carruth *et al*. 2002; Ciranni/Fornaciari 2003; Croft *et al*. 1992; Davis/Kotowski 2007; Drawer/Fuller 2001; Gallis 2006; Grieco *et al*. 1998; Gutin/Kasper 1992; Hadler *et al*. 1978; Hales/Bernard 1996; Holte *et al*. 2000; Jäger *et al*. 1997; Jensen *et al*. 2000; Kucera *et al*. 2008(a); Kucera *et al*. 2008(b); Kujala *et al*. 1995; Kujala *et al*. 2003; Lawrence 1961; Lemasters *et al*. 1998; Levy 1968; Lievense *et al*. 2001; Lipscomb *et al*. 2004; Maetzel *et al*. 1997; Marshall *et al*. 2004; Punnett/Wegman 2004; Rempel *et al*. 1992; Rijn *et al*. 2009; Rossignol *et al*. 2005; Salminen 2004; Scher 1978; Schmitt *et al*. 2004; Solomonow 2004; Solovieva *et al*. 2005; Stocks *et al*. 2010; Yassi 2000).

V.B.2.g. Health

All identified manifestations of physiological stress and pathologies were macroscopically examined, verbally described, photographically documented and tentatively interpreted on the basis of the information presented in relevant publications (see III.A.11.). Attempts to make definitive medical diagnoses would have fallen far outside the scope of this anthropological study. Neither does the author have any medical training nor would it have been logistically possible to conduct in depth literature reviews or necessary radiological, histological and genetic analyses. Adopting this cautious approach therefore constituted the only workable solution. Fortunately, in most instances, it produced satisfactory results. Expert advice and support were sought for ambiguous cases. All interpretations were discussed with Prof. Dr. D. Brothwell of the University of York after he had inspected the material in February 2009. In addition, Abu Tabari 02/28-23's extraordinarily thin frontal bone (*Os frontale*) and a number of possible neoplasms were histologically analysed by Prof. Dr. Dr. M. Schultz at the University of Göttingen (see IV.A.13.).

The decision not to engage in attempts to make definitive palaeopathological diagnoses was not only taken for practical reasons. Anthropology is a long-established, independent academic discipline. In Germany, as in many other countries, it can be defined as the comparative biological science of the variability of man in space and time (see footnote 1). It does, however, not concern itself with the pathological variability of man. The study of human pathologies and their variability is a part of medicine. Nevertheless, anthropologists traditionally offer diagnoses for pathological changes they encounter while examining human skeletal remains (e.g. Brothwell 1981; Ferembach *et al.* 1986; Grupe *et al*. 2005; Henke/Tattersall 2007; Herrmann *et al.* 1990; Hildebrandt 1998; Hoßfeld 2005; Jobling *et al*. 2004; Knußmann 1988(a), 1996; Renfrew/Bahn 1996: 11-16; Schwidetzky 1988; Stinson *et al.* 2000; Susanne 1987). Not surprisingly, there is ample evidence which indicates that researchers without medical training who conduct osteological analyses, anthropologists or not, would be well-advised to leave such diagnoses, particularly the more challenging ones, to fully qualified pathologists (e.g. Aufderheide/Rodríguez-Martín 1998; Brothwell/Sandison 1967; De Melo *et al*. 2010; Flohr/Schultz 2009(a), 2009(b); Klümper 1982; Lefort/Bennike 2007; Lewis 2004; Marks/Hamilton 2007; Mays/Dungworth 2009; Mitchell 2003; O'Brien *et al*. 2009; Ortner/Putschar 1981; Perry *et al*. 2008; Phillips 2007; Roberts/Ingham 2008; Rothschild *et al*. 1999; Schultz 2001; Steinbock 1976; Wapler *et al*. 2004; Weston 2008). For instance, the results Miller *et al*. (1996) reported do not seem to be unrepresentative. They tested the ability of participants of two Paleopathology Association dry bone diagnosis workshops to recognise various diseases. Six of 21 groups of two to four participants recognised the specific conditions exhibited by 20 specimens. Nine of the 21 groups diagnosed the types of the diseases the 20 specimens displayed correctly. Thus, the overall diagnostic accuracy was 28.6 and 42.9% respectively. Discussing their results, Miller *et al*. (1996) drew attention to two factors which influence diagnostic accuracy, namely the training and experience of observers and the commonly occurring morphological overlap between skeletal manifestations of different diseases. Rothschild (2005) highlighted the same problems. On page 1454 of his review article on the "*History of syphilis*" he wrote: "*Recognizing periosteal reaction and distinguishing it from postmortem bone damage (taphonomy) is an art with a learning curve that has confounded many "seasoned" anthropologists. When examination of the same set of skeletons results in reports of 0%-100%*

involvement, it is obvious that there is a severe problem with technique standardization and reproducibility". Three pages later, he went on to make the following remark: "*Kenya National Museum 1808 was a* Homo erectus *whose cause of death was originally diagnosed as a vitamin A overdose. However, the distinguished scientists who made the original report had actually never seen a case of bone afflicted by hypervitaminosis A*" (Rothschild 2005: 1457). Like Herrmann *et al*. (1990: 115-116, 132) and countless other authors, Mays (2007: 115) also pointed out that palaeopathology is fraught with intrinsic difficulties. He stated: "*It is a truism that very different pathological processes may culminate in the production of very similar osteological lesions, and that this is a source of difficulty in palaeopathological diagnosis*".

V.B.3. Group analyses

V.B.3.a. Additional data

The results of the individual osteological analyses alone would not have constituted a sufficient basis for the systematic search for diachronic differences and inter-group affinities (see III.B.1.a. and Table 6). Collecting both additional data from the Wadi Howar specimens and comparative data was therefore a prerequisite for this search (see III.B.1.b.). Virtually all potentially informative and routinely reported data which could have been systematically gathered from the Wadi Howar material were systematically gathered. The objective to extract as much information as possible from the Wadi Howar sample was only one reason why so many additional data were collected. The other reason was the intention to counterbalance the effects of the sample's appalling state of preservation by using a wide range of different types of data. In other words, since the material's poor state of preservation made it impossible to adopt a "many data for a few selected variables approach", a "however few data for as many variables as possible strategy" had to be pursued instead. It was assumed that implementing this strategy would make it possible to draw reliable conclusion on the basis of mutually supporting results produced by a large number of analyses of many different types of data (see V.B.3.b.3. and 4.a.). The results of the intra- and inter-group analyses later showed that this assumption was right. Most of the insights these analyses yielded could unquestionably not have been gained relying on any other approach (see IV.C. and D.). The selection of traits and measurements was of crucial importance (see III.B.1.b.). Not only the success of the search for diachronic differences in robusticity, occupational stress and health but also the success of the analyses performed to uncover the Wadi Howar sample's biological affinities depended on using the most informative, appropriate data. A very wide range of measurements and traits which were considered potentially informative in the context of the search for diachronic differences in robusticity, occupational stress and health formed one large group of additional variables (see III.B.1.b.1. and III.B.1.b.2.b.). The other group of additional variables consisted of traits and measurements relevant to the estimation of biological ancestry (see III.B.1.b.1. and III.B.1.b.2.c.). Some of these measurements and traits were deliberately given preference. The dental epigenetic traits of the Arizona State University Dental Anthropology System (ASUDAS) and the standard tooth crown (*Corona dentis*) length and breadth measurements were more or less scored and taken without exception. The catalogue of cranial morphological traits and measurements, however, was carefully compiled. Most of the traits which are generally considered to be useful in the estimation of biological ancestry were incorporated into the data collection list. Additionally, numerous viscerocranial measurements were put on the list. Because their diagnostic value was assumed to be comparatively low, neurocranial measurements, on the other hand, were, for the most part, intentionally neglected. It almost goes without saying that separating the two groups of variables as conscientiously as possible was absolutely imperative. Unfortunately, some of the employed biological ancestry traits could have also been regarded as robusticity markers. The distinction between robusticity and occupational stress traits was not always clear either. Occipital bunning or sagittal keeling, for instance, might as well have been defined as cranial robusticity traits. Similarly, gonial eversion or long bone shaft bowing and mastoid process (*Processus mastoideus*) or interosseous border (*Margo interosseus*) size could have also been scored as occupational stress traits.

Grine *et al.*'s (2007) study of the Hofmeyr skull, for example, demonstrates how severely the use of inappropriate data can affect the outcome of a craniometric analysis. The authors compared this male Late Pleistocene specimen from South Africa with Neanderthals (La Chapelle-aux-Saints, Gibraltar 1), Skhul 5, Upper Palaeolithic Europeans (Abri Pataud, Chancelade, Cro-Magnon I, Dolní Věstonice III, IX, Grotte des Enfants 2, Mladeč 2, Oberkassel 9), Epipalaeolithic North Africans (Afalou, Taforalt), sub-Saharan Africans (various samples), South African "Khoe-San", "Oceanians" (Australia, Melanesia, Andaman Islands), "Western Eurasians" (Austria, Czech Republic, Germany, Greece, Italy, Sinai, Syria) and a sample consisting of individuals from East Asia (North China, Thailand) and Greenland. They chose 19 landmarks (*Asterion*, *Lambda*, stylomastoid foramen, lateral origin of the petrotympanic crest, most medial point of the petrotympanic crest at the level of the carotid canal, *Porion*, *Auriculare*, parietal notch, *Mastoidale*, deepest point of the lateral margin of the articular eminence, suture between the temporal and zygomatic bones on the inferior aspect of the zygomatic process, suture between the temporal and zygomatic bones on the superior aspect of the zygomatic process, *Frontomalare posterior*, most inferior point on the entoglenoid process, point of contact between the petrous and the root of the pterygoid process of the sphenoid, suture between palatine pyramidal process and pterygoid plate of the sphenoid, *Bregma*, *Glabella*, *Nasion*). Grine *et al.* (2007) subjected the landmark coordinate configurations to a generalised procrustes analysis and entered the resulting superimposed coordinates into a principal component analysis. The first 21 principal components identified in this analysis constituted the variables used in the subsequently performed canonical variates and Mahalanobis D^2 analysis. The Mahalanobis D^2 distances formed the basis of the calculation of a minimum spanning tree and a UPGMA cluster analysis. The authors also employed eight linear measurements (maximum vault length, maximum vault breadth, frontal sagittal chord, minimum frontal breadth, bizygomatic breadth, orbital height, nasal height, upper facial height) in a factor analysis. As far as the Hofmeyr skull's phylogenetic status was concerned, Grine *et al.* (2007: 226) came to the following conclusion: "*Its strongest morphometric affinities are with Upper Paleolithic (UP) Eurasians rather than recent, geographically proximate people. The Hofmeyr cranium is consistent with the hypothesis that UP Eurasians descended from a population that emigrated from sub-Saharan Africa in the Late Pleistocene*". This result is astonishing for a number of reasons. The Hofmeyr skull is indisputably a biologically sub-Saharan *Cranium*. With the exception of the Grotte des Enfants specimen, the selected Upper Palaeolithic Europeans, on the other hand, all represent fully biologically European samples (e.g. Henke/Rothe 1998: 253-257; Knußmann 1996: 397, 399; Schwidetzky 1982: 358-366; Trinkaus 2005, 2006, 2007; Wolpoff 1980: 338-349, 1999). A direct comparison of the Hofmeyr skull with Cro-Magnon I, a modern male *Cranium* from the Democratic Republic of the Congo and a modern male *Cranium* from Germany in frontal and lateral view (*Norma frontalis et lateralis*) makes this fact blatantly obvious (see Grine *et al*. 2007: 227 - Fig. 1.; Johanson/Edgar 1996: 58-59, 60-61; Vallois/Chamla 1974: *Tafel* I/1). The degree of protrusion of the back of the nose (*Dorsum nasi*), the shape of the nasal saddle (*Sella nasi*), the degree of alveolar prognathism and the shape as well as the relative height and breadth of the nasal aperture (*Apertura piriformis*) are the traits relevant to the estimation of biological ancestry which are assessable on the photographs of all four *Crania* (see V.B.2.e.). The Hofmeyr skull, which is also characterised by an ill-defined inferior nasal margin (*Margo infranasalis*), exhibits the same expressions of these traits as the modern *Cranium* from the Democratic Republic of the Congo. Cro-Magnon I, in turn, exhibits the same expressions of these traits as the modern *Cranium* from Germany. Consequently, as far as these traits are concerned, the Hofmeyr skull and Cro-Magnon I are separated by the same differences as the two modern *Crania*. The only differences between the Hofmeyr skull and the modern *Cranium* from the Democratic Republic of the Congo are expressions of robusticity traits. The same is true for Cro-Magnon I and the modern *Cranium* from Germany. The most striking differences in robusticity are apparent in the shape of the orbit (*Orbita*), the morphology of the supraorbital region (*Regio supraorbitalis*) and the breadth of the ascending ramus (*Ramus mandibulae*). Not surprisingly, the expressions of these robusticity traits are the only characteristics which the Hofmeyr skull and Cro-Magnon I, on the one hand, and the two modern *Crania*, on the other hand, seem to have in common. Unfortunately, structures relevant to the estimation of biological ancestry were decidedly under-represented in the catalogue of mainly neurocranial measurements and landmarks Grine *et al*. (2007) based their study on. In addition, the authors did not attempt to incorporate any relevant cranial or dental non-metric data into their analyses. Moreover, either the applied data preparation procedures, the used classification method or both were not particularly well suited to assigning a single specimen to one of a range of comparative samples (see V.B.3.b.4.). As a result, Grine *et al*.'s (2007) analyses failed to separate the modern comparative samples properly and the Hofmeyr skull erroneously appeared to be closest to the similarly robust Upper Palaeolithic European specimens (see Grine *et al*. 2007: 228 - Fig. 2., 3., 229 - Fig. 4.).

Grine *et al*.'s (2007) poor choice of data is probably best understood in the context of an increasingly common, highly questionable opinion. Several authors propagate the view that craniometric studies which try to unravel phylogenetic relationships between human populations should primarily rely on, preferably "selectively neutral", neurocranial measurements and landmarks (e.g. Cramon-Taubadel 2009(b); Harvati/Weaver 2006). There is much evidence which suggests that neither neurocranial measurements in general nor "selectively neutral" ones are likely to be particularly useful. The dimensions of the *Neurocranium* can change considerable within decades. Research on secular changes indicates that such short-term fluctuations are mainly caused by nutritional factors. Jantz/Meadows Jantz (2000), for example, demonstrated that the *Viscerocranium* is less affected by these changes than the *Neurocranium*. They were also able to show that the magnitude of the secular change in vault height even exceeds that in long bones. Like the *Viscerocranium*, the *Neurocranium* is also subject to gracilisation and climatic influences (for secular changes in craniofacial dimensions see for examples: Abbie 1947; Baten 1996; Boas 1912; Buretić-Tomljanović *et al*. 2006; Dalou *et al*. 2008; Gravlee *et al*. 2003; Harris *et al*. 2001; Holden 2002; Holloway 2002; Hossain *et al*. 2004; Knußmann 1996: 438-439; Kouchi 2000; Little *et al*. 2006; Relethford 2004; Sparks/Jantz 2002; Tanner 1986; Weidenreich 1945; Zellner *et al*. 1998; for craniofacial gracilisation see for example: Alt 1997(c): 707-708; Beals *et al*. 1984; Bernal *et al*. 2006; Brace 1983; Brace *et al*. 1991: 39-40, 46-50; Brace/Mahler 1971; Calcagno 1986; Calcagno/Gibson 1988; Carlson 1976; Carlson/Van Gerven 1977; Frayer 1978, 1980; Holt/Formicola 2008; Ivanhoe *et al.* 1998; Ivanhoe/Chu 1996; Jaeger *et al*. 1998(b); Lieberman 1996; Lieberman *et al*. 2004; Macchiarelli/Bondioli 1986; Pinhasi *et al*. 2008; Pucciarelli *et al*. 1990; Rose *et al*. 1993: 67-69; Sardi *et al*. 2006; Schwidetzky/Rösing 1990; Spencer/Ungar 2000; Stynder *et al*. 2007; for craniofacial climate adaptations see for example: Beals *et al.* 1983; Bharati *et al*. 2001; Carey/Steegmann 1981; Franciscus/Long 1991; Gilligan/Bulbeck 2007: 81; Harvati/Weaver 2006; Hernández *et al*. 1997; Ivanhoe *et al.* 1998; Roseman 2004; Steegmann 1970; Yokley 2009). As far as "selective neutrality" is concerned, it firstly appears worth mentioning that all cranial bones (*Ossa cranii*) fulfil vital functions. It is therefore highly unlikely that any part of the *Cranium* is not affect by selection. The temporal bone (*Os temporale*), which has been repeatedly singled out as a bone which shows strong correlations with neutral genetic data, seems to be an especially ill-suited candidate (e.g. Cramon-Taubadel 2009(b); Harvati/Weaver 2006). It accommodates the temporomandibular joint (*Articulatio temporomandibularis*) and provides points of origin (*Origo*) and insertion (*Insertio*) for important masticatory and cervical muscles (*Musculi masticatorii et colli*). Moreover, it is part of the cranial base (*Basis cranii*), a weight-bearing structure. The idea that selectively neutral traits are more informative is not overly convincing either. Since the frequencies of neutral alleles are by definition only regulated by drift, they change randomly. These random changes are most pronounced in small populations. Not least as a consequence of this, reconstructions of human population history based on the analysis of neutral loci have not necessarily proved trustworthy. Non-neutral markers, on the other hand, are less likely to be erased by drift and, therefore, in many respects more dependable, particularly at greater time depths. Loci whose allele frequencies have been shaped by selection are also decidedly more informative when DNA donors need to be assigned to most probable populations of origin in forensic cases (for the effects of drift see for example: e.g. Atherly *et al*. 1999: 664-665; Cook/Callow 1999: 120; Dorit *et al.* 1991: 158-159; Murken/Cleve 1996: 142-143; Vogel/Angermann 1995: 503; for the reliability of different markers in genetic studies see for example: Bramanti *et al*. 2009; Cann *et al*. 1987; Evans *et al*. 2006; Garrigan *et al*. 2005; Garrigan/Kingan 2007; Green *et al*. 2010; Haak *et al*. 2005; Harding *et al*. 2000; Hawks *et al*. 2000(a); Lewin 1998: 413-426; Relethford 1998, 2001; Relethford/Harpending 1995; Serre *et al*. 2004; Sherry *et al*. 1998; Templeton 2002; Tishkoff *et al*. 2007; Wall *et al*. 2009; Wolpoff 2009: 96-98; Wolpoff/Caspari 1996: 36-47, 257-269; Zhao *et al*. 2000; for the importance of loci under selection in assigning DNA donors to most probable populations of origin see for example: Brenner 1997, 1998, 2006; Egeland *et al*. 2004; Jobling *et al*. 2004; Klintschar *et al*. 2003; Lowe *et al*. 2001; Shriver *et al*. 1997). Of course, as, for instance, the geographic variation in human pigmentation shows, similar selection pressures can lead to similar adaptation outcomes. Comparable parallelisms can undoubtedly, in theory, distort the results of craniometric analyses. There is, however, not much reason to assume that the geographic variation in most of the relevant viscerocranial traits has been produced by such mechanisms. On the contrary, especially the basic differences between the mid-facial features of biologically sub-Saharan, European and East Asian populations do not seem to have changed since the Late Pleistocene. Furthermore, multiregionalists have persistently argued that certain viscerocranial traits which almost certainly constitute climate adaptations, such as the facial flatness of biologically East Asian and the projecting noses of biologically European populations, represent evidence of long-term regional continuity. It can therefore also be argued that, as far as population differences in mid-facial morphology are concerned, selection, and not neutrality, has preserved ancient population signatures (for the geographic variation in human pigmentation see for example: Cook/Callow 1999: 22-26; Knußmann 1996: 408-417; Lewin 1998: 137; Schwidetzky 1982: 352-354; Van De Graaff/Fox 1999: 194-195, 166-167; Vogel/Angermann 1995: 231; Walter 1994: 99-104; for morphological indications of minimum ages of biologically sub-Saharan, European and East Asian populations see for example: Brace *et al*. 2006; Cavalli-Sforza *et al*. 1994: 108-109, 160-161, 174, 203-204, 208-209, 316-317; Ferembach 1975: 101-108; Henke/Rothe 1998: 253-257, 269, 271; Knußmann 1996: 397, 399-400, 430-431, 437-440, 442-443; Kurth 1975: 171-181; Schwidetzky 1979: 90-92, 97-98, 1982: 343, 370-375, 1982: 358-366, 371; Trinkaus 2005, 2006, 2007; Wolpoff 1980: 320-325, 332-333, 336-349; for long-term regional continuity traits in Europe and East Asia see for example: Alekseev/Gochman 1983: Plate I; Brues 1977: 111, 126; Engeln 1998: 159, 161; Henke 1991: 77-96; Henke/Rothe 1994: 415, 1998: 281-283; Johanson/Edgar 1996: 234; Knußmann 1996: 415; Koesbardiati 2000; Schwidetzky 1979: 92, 1982: 354; Smith 2000: 70; Wolpoff 1980: 322, 1999, 2004: 19-20; Wolpoff/Caspari 1996: 29, 32, 241-250, 268-269, 280-285, 292, 298, 312-313; Wong 2000). In view of this, it does not come as a surprise that numerous authors have made similar points, have decided to favour viscerocranial measurements or have published findings which highlight the importance and reliability of viscerocranial measurements. Relethford (2004, 2009: 17) also drew attention to the fact that the effects of climate adaptations do not erase the craniometric signal from population history. Cramon-Taubadel's (2009(a)) results underlined that, although cranial regions related to mastication are more variable than non-masticatory regions, masticatory regions are still reliable population history markers. Viðarsdóttir *et al*. (2002) proved once more that modern human population complexes can be distinguished from each other relying on facial shape data alone. Analysing the contribution of various Neolithic and Bronze Age populations to European craniofacial form, Brace *et al*. (2006) employed the following measurements: nasal height, nasal bone height, piriform aperture height, *Nasion-Prosthion*, *Nasion-Basion*, *Basion-Prosthion*, superior nasal bone width, simotic width, inferior nasal bone width, nasal breadth, simotic subtense, inferior simotic subtense, FOW subtense at *Nasion*, MOW subtense at *Rhinion*, bizygomatic breadth, *Glabella-Opisthocranion*, maximum cranial breadth, *Basion-Bregma*, *Basion-Rhinion*, width at fmt-fmt, width at MOW subtense at *Rhinion*, IOW subtense at *Nasion*, width at fmo-fmo, minimum nasal tip elevation. Buzon (2006(a)) used nasal height, upper facial height, nasal breadth, bizygomatic breadth, *Basion-Bregma* height, maximum cranial breadth, maximum cranial length, biauricular breadth and *Basion-Nasion* length to separate New Kingdom Egyptians from New Kingdom Nubians. Morris/Ribot (2006) compared prehistoric Malawian cranial remains with several African comparative samples. The five of the 18 used vault, face and mandibular measurements which best reflected the inter-group differences in their study were: *Basion-Bregma* height, height of ascending ramus, orbital height, nasal height and *Nasion-Prosthion* height. Bruner/Manzi (2004) found that North and East African *Crania* differed in interorbital breadth, width and flatness of the nasal bones (*Ossa nasalia*), width of the nasal aperture (*Apertura piriformis*) and degree of prognathism. Roseman/Weaver (2004) reported that East Asians and Europeans differ in the degree of upper nasal projection and sub-Saharan Africans and Europeans in the degree of upper nasal breadth and projection. Moreover, they pointed out that the measurements which separate population complexes well quantify morphological traits which are commonly used to estimate biological ancestry. Finally, the above-mentioned relevant findings of the forensic studies by Gill *et al*. (1988), Gill/Gilbert (1990), İşcan *et al*. (2000: 232), Ousley *et al*. (2009: 71) and Weinberg *et al*. (2005) emphasised that the parts of the *Cranium* which are most valuable in the estimation of biological ancestry and separate different human population complexes especially well are viscerocranial structures which have been shaped by adaptations to different climates (see V.B.2.e.).

Petit-Maire, Dutour and a few other researchers have proposed a model in which Holocene Saharan material from sites such as Sebkha Mahariat, Tintan, Chami, Hassi el Abiod and Kobadi, North African remains from Iberomaurusian and Capsian sites and the Late Pleistocene Nubian series from Jebel Sahaba and Wadi Halfa belong to the same population complex (see I.D.1.a.2.c.). The way robusticity traits were used as the defining characteristics of this "Mechtoid" population complex is even more striking than Grine *et al*.'s (2007) questionable choice of metric cranial variables. A number of quotes from two pages of the same publication can be used to illustrate the situation. Describing the material from Hassi el Aboid, Petit-Maire/Dutour (1987) acknowledged the presence of a number of highly diagnostic trait expressions on page 272. They stated that "*the mean cranial index indicates dolichocrany*", that there is "*marked alveolar prognathism*", that the "*interorbital breadth is large*", that the "*mean value of the nasal index falls within the platyrhine range*", that "*a prenasal groove (sulcus praenasalis) can be observed on most specimens*", that the mandibular bodies (*Corpora mandibulae*) are "*very high*" and that the mandibular rami (*Rami mandibulae*) are "*broad and short*". Yet, these unambiguous expressions of traits relevant to the estimation of biological ancestry go almost entirely unmentioned on page 277. On this page, Petit-Maire/Dutour (1987) enumerated the "Cromagnoid" traits the Saharan, North African and Nubian "Mechtoids" have in common. There they explained that: "*The most striking characteristics, which may be more or less pronounced, are a long and robust neurocranium with mound-shaped occiput; heavy mastoids; very marked temporal lines; thick V-shaped glabellar ridges; a very wide, massive interorbital region; a short, broad face with low, rectangular orbits; a massive mandible with a short, broad, vertical ramus and gonial eversion; and a very high general robustness of the long bones with an occasional huge (but not pathological) transverse enlargement*". These "Mechtoid" characteristics are primarily expressions of robusticity traits which are typical of many Upper Palaeolithic and Mesolithic series from all over the world. These trait expressions merely constitute universal ontogenetic or, as the well-documented ongoing gracilisation shows, fairly easily reversible universal phylogenetic responses to the demands of the strenuous daily lives of prehistoric hunter-gatherers. To put it differently, they represent classic parallel adaptations, not traits inherited from a common ancestor. Thus, they cannot be used to reconstruct sub-specific phylogenetic relationships. If environmental factors can be ruled out as underlying causes, such robusticity markers can be part of a catalogue of features which distinguish certain synchronic populations. Nevertheless, they cannot be the main defining traits of a proposed population complex. This is especially true when, as in the case of the "Mechtoids", the different groups which are supposed to belong to such a proposed population complex display completely different expressions of traits which are relevant to the estimation of biological ancestry. Additionally, due to commonly occurring diachronic changes, robusticity traits are usually even more misleading when allochronic populations are compared (for traits relevant to the estimation of biological ancestry see III.A.8., III.B.1.b.2.c.1. and V.B.2.e.; for cranial robusticity traits see for example: Bernal *et al*. 2006; Ferembach *et al*. 1979; Gilligan/Bulbeck 2007; Hernández *et al*. 1997; Ivanhoe/Chu 1996; Lahr 1996; Lahr/Arensburg 1995; Lahr/Wright 1996; Rösing *et al*. 2007: 79-81; Sardi *et al*. 2006; Walker 2008; Walrath *et al*. 2004; Williams/Rogers 2006; for gracilisation and its reasons see for example: Brace 1983; Brace/Mahler 1971; Carlson 1976; Carlson/Van Gerven 1977; Frayer 1978; Lahr 1996: 248-263; Lieberman 1996; Lieberman *et al*. 2004; Macchiarelli/Bondioli 1986; Pinhasi *et al*. 2008; Pucciarelli *et al*. 1990; Rose *et al*. 1993: 67-69; Stynder *et al*. 2007; for descriptions of population complexes and the reconstruction of phylogenetic relationships see for example: Ax 1984; Brues 1977; Brugmann 1884; Hemmer 1982; Henke/Rothe 1994, 1998; Henke/Tattersall 2007; Hennig 1950; Knußmann 1996; Lewin 1998; Mayr 1963; Mossakowski/Prüser 1999; Rieppel 1999; Rothe/Henke 2001; Schwidetzky 1962, 1974, 1979; Sneath/Sokal 1973; Wiesemüller *et al*. 2003). To the knowledge of the author, the morphological affinities of the comparatively recently excavated material from Hassi el Abiod, Kobadi and similar sites have so far not been systematically re-evaluated by researchers who do not necessarily endorse the "Mechtoid" model. That the material is overwhelmingly biologically sub-Saharan has therefore never been sufficiently stressed. It thus certainly deserves to be mentioned that Pinhasi (2002) included Dutour's (1989) Hassi el Abiod sample in the multivariate statistical analysis he carried out to position the Nazlet Khater mandible (*Mandibula*) metrically in the context of a large number of Middle Pleistocene to recent specimens from Africa and the Levant. This analysis clearly separated the material from sites north of the Tropic of Cancer from that discovered south of this line. The Iberomaursians and Capsians in the analysis were placed in the northern, biologically North African cluster. The Hassi el Abiod sample, on the other hand, was allocated a position within the southern, biologically sub-Saharan group, close to Chamla's (1968) Saharan "*restes humains néolithiques*" and the Late Pleistocene Nubians from Wadi Halfa and Jebel Sahaba (Pinhasi 2002: 311-312, 328). Moreover, it should not be forgotten that Chamla's (1968) publication on Holocene Saharan human skeletal remains contains a rightfully still often cited, completely different classificatory scheme (see I.D.1.a.2.c.). Contrary to the population complex proposed by the supporters of the "Mechtoid" model, the groupings suggested by Chamla (1968) are largely defined on the basis of differing expressions of informative traits. Accordingly, Chamla's (1968) classification distinguishes between three groups. The first consists of "*négroïdes*", the second of "*mixtes ou indifférenciés*" and the third of "*non négroïdes*" specimens. Chamla (1968) also recognised the presence of both "*types fins et robustes*" in the first and second group. Furthermore, unlike the material from the Saharan sites, the relevant North African and Nubian remains have been frequently re-evaluated. As could be expected, the biologically non-sub-Saharan nature of the Iberomaurusian and Capsian and the biologically sub-Saharan nature of the Late Pleistocene Nubian material have been repeatedly pointed out in this context. Irish (2000: 404) summed it up perfectly when he wrote: "*Thus, evidence for a* *common Mechta-Afalou population in both the Maghreb and Nubia is not supported. … Moreover, even a casual inspection of crania in the three samples reveals that many characteristic Nubian traits, including, for example, alveolar prognathism, are uncommon or absent in Iberomaurusians*” (for material from pertinent Saharan sites see for example: Chevaux/Puech 1998; Dutour 1984, 1988, 1989, 1995; Georgeon *et al*. 1992, 1993, Petit-Maire/Dutour 1987; Petit-Maire/Riser 1983; for Chamla’s classification of Holocene Saharan human skeletal remains see I.D.1.a.2.c. and for example: Bräuer 1983: 119; Chamla 1968, 1986; Coppens/Chamla 1978; Ferembach 1975(b): 146-154, *Tafel* XVI; Kurth 1975: 179; MacDonald 1998: 44-45; Rightmire 1984: 194; for publications pointing out the biologically sub-Saharan affinities of the Late Pleistocene Jebel Sahaba and Wadi Halfa material see I.D.1.a.3.c. and for example: Bräuer 1983: 119; Groves/Thorne 1999; Irish 2000, 2005, 2008; Irish/Turner 1990; Keita 1990: 45; Pinhasi 2002: 311-312, 322-325, 328; Strouhal 1984; Turner/Markowitz 1990; for the affinities of Iberomaurusian and Capsian samples see for example: Dutour 1995; Ferembach 1975(a), 1975(b), 1985; Ferembach *et al*. 1962; Groves/Thorne 1999; Guatelli-Steinberg *et al*. 2001; Henke 1990; Henke/Rothe 1994: 475, 1998: 269, 271; Irish 2000, 2006; Kéfi *et al*. 2005; Lahr/Arensburg 1995; Larrouy 2004; Lubell 2001; MacDonald 1998: 45; Pinhasi 2002; Schwidetzky 1979: 98, 1982: 371).

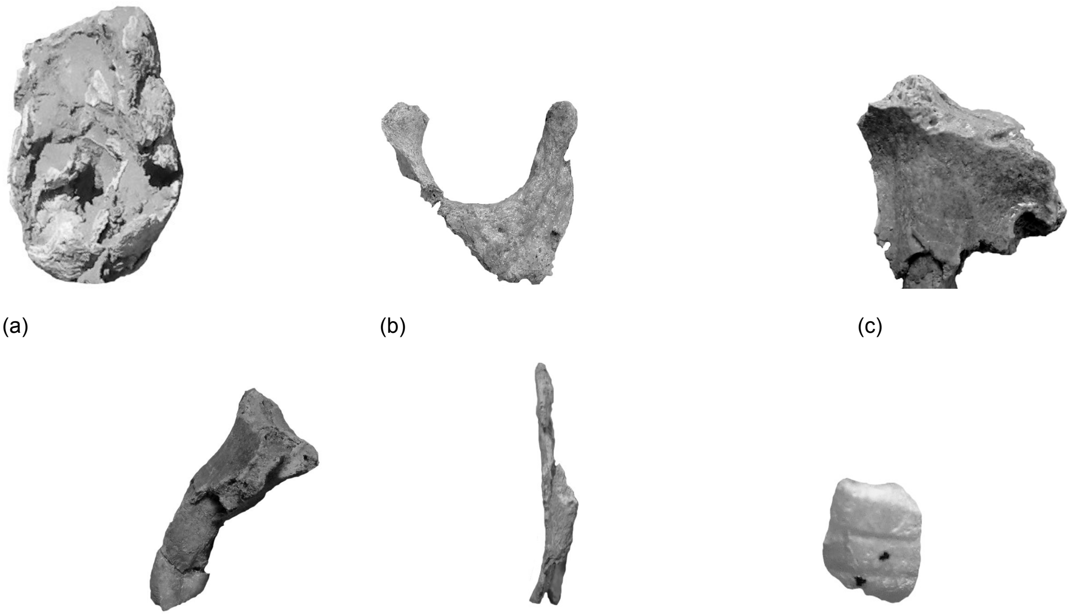
V.B.3.a.1. Metric data

Defining new measurements and indices was a necessity (see III.B.1.b.1., 1.a., 1.c. and 1.d.). Otherwise, many dimensions of the badly preserved material could not have been quantified. The resulting additional data could then be utilised in the various group analyses. Many incomplete or damaged structures were measured (see III.B.1.b.1., 1.a., 1.b. and 1.c.). The photogrammetric determination of angles was also often complicated by *post mortem* damage (see III.B.1.b.1.a.). Nevertheless, measuring angles photogrammetrically actually constituted a clear advantage in this context. Numerous angles which could still be measured on photographs could definitely not have been determined with osteometric instruments. In any case, damaged or incomplete structures had to be measured. Not taking such measurements would have meant loosing many still informative data. Very laborious, systematic steps were taken to minimise the resulting inaccuracies and structures which were too badly damaged were not measured (see III.B.1.b.1.). Luckily, the results of the intra-observer error analyses strongly suggested that this course of action did not diminish the reliability of the results (see IV.B.).

V.B.3.a.2. Non-metric data

Using non-metric data offered several advantages (see III.B.1.b.2.b. and c.). The visual assessment of non-metric traits created a large body of highly informative additional data (see IV.A.). The majority of the most informative variables were non-metric variables (see IV.C. and Appendix XXV.). These data could not have been gathered by measuring the relevant structures. This is a point which cannot be overemphasised. Studies which are based on metric data alone leave a vast source of information untapped. As a result, they are inevitably one-sided and cannot claim to be as conclusive as their counterparts which rely on both metric and non-metric data.

The evaluation of the selected traits was generally very straightforward (see III.B.1.b.2.a., b. and c.). The character states of the employed schemata were clearly defined and offered enough resolution. Comparisons within the sample eliminated most of the remaining problems. Consequently, truly ambiguous cases were simply few and far between. In addition, even expressions of badly damaged traits could often still be scored fairly confidently (see Appendix XI and Figure 70). A combined approach which involved examining a partially preserved or damaged trait expression in the laboratory, comparing it with securely scored expressions and evaluating pertinent *in situ* photographs proved to be very successful in this context. On many occasions, it was enough if a small part of the relevant structure could be assessed in the laboratory. In some cases, the overall shape of a structure which could not be reconstructed could be scored by only examining *in situ* photographs.



(a) (b) (c)

(d) (e) (f)

Figure 97: Scorable damaged or partially preserved structures. Conical Hill 02/3-4: damaged *Cranium in situ* whose length (CN001) could still be scored as “dolichocranic to hyper-dolichocranic” (a), Abu Tabari 02/28-3: partly preserved orbit (*Orbita*) whose shape (CN013) could still be scored as “round” (b), Abu Tabari 02/28-3: right inferior nasal margin (*Margo infranasalis*) which could still be scored as a “*Rotunditas infranasalis*” (CN023) (c), Abu Tabari 02/28-3: partially preserved right *Maxilla* which could still be scored as “hyper-prognathous to ultra-prognathous” (CN024) (d), Abu Tabari 02/28-5: partially preserved posterior edge of the left ascending ramus (*Ramus mandibulae*) whose inversion (CN031) could still be scored as “moderate to pronounced” (e) and Conical Hill 02/3-4: dental fragment whose hypoplasia lesions (DSb) could still be scored as “multiple horizontal” (f) (a: Godhoff/Jesse; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

From time to time, especially during the collection of the comparative data, a few unexpected phenomena and certain complications were, however, encountered (see III.B.1.b.2.c.). The use of the Arizona State University Dental Anthropology System (ASUDAS) occasionally created minor problems. The description of the expressions of the “Canine mesial ridge” trait (DE013), for instance, did not match the accompanying reference plaque. The number of *Foramina*, for example the number of zygomaticofacial foramina (*Foramina zygomaticofacialia*) (CE040b/41b) or *Foramina paranasalia* (CE054), could be difficult to determine. What could still be considered a small *Foramen* and what merely a minute opening which should not be counted was not always clear. Sometimes possible *Foramina paranasalia* were positioned fairly far lateral to the nasal aperture (*Apertura piriformis*) or fairly far up. Whether or not such slightly misplaced *Foramina* could be deemed to be *Foramina* *paranasalia* had to be decided on a case-by-case basis. The inversion of the posterior edges of the mandibular rami (*Rami mandibulae*) (CN031) often showed comparatively strong side differences. Whenever such left-right differences were observed, the mean left-right scores were assigned. A specimen with a very prominent alveolar region was, technically speaking, not necessarily very prognathous (CN024), if its Frankfurt plane was unusually placed. A low and broad nasal saddle (*Sella nasi*) (CN017) and very wide nasal bones (*Ossa nasalia*) were often coupled with steep frontal processes of the *Maxilla* (*Processus frontales maxillae*) (CN019).

Cranial shape in vertical view (*Norma verticalis*) (CN002) and certain other employed cranial morphological traits are, nowadays, usually thought of as antiquated (see III.B.1.b.2.c.1.). That was, however, no reason not to incorporate them into the study. These supposedly antiquated traits played a valuable role. Reporting the expressions of the traits in question was a valid part of the description of the Wadi Howar sample. Moreover, the sample-specific frequencies of the expressions of these traits could be analysed like those of any other trait in the inter-sample analyses.

A number of the employed classification schemata had to be modified or newly developed (see III.B.1.b.2.b. and c.). Only modifying existing scoring systems and developing new ones made it possible to capture the variability of the Wadi Howar sample adequately. Obviously, new classification schemes had to be created for newly defined traits. Existing scoring systems and typologies needed to be modified when the variability of the observed trait expressions was too dissimilar to that of the samples for which the published systems were originally developed. Seriating trait expressions and double-checking assigned scores, finally, were essential procedures (see III.B.1.b.2.a.). They were time-consuming but they ensured that the expressions were appropriately ordered and that the resulting data were as reliable as possible.

V.B.3.b. Data analysis

V.B.3.b.1. Description of the sample

The description of the sample was not only appropriately handled but also appropriately presented. An overview table was used to sum up the osteological results individual by individual (see Table 6). The quantifiable osteological and additional data were summarised with systematically computed descriptive statistics (see Appendix XI. to XXI.). A verbal and pictorial summary of all noteworthy results and observations was given in the results chapter (see IV.A.). The individual osteological as well as the sample specific metric and non-metric findings were also reported in this chapter. Additionally, they were dealt with in greater detail in the discussion chapter (see V.C.1.). Therefore, it was not considered necessary to provide full individual osteological reports as well. All relevant osteological information was communicated and discussed in these two chapters. Consequently, additional elaborate individual osteological reports would have almost entirely consisted of superfluous repetitions.

There was no need to adopt formalised demographic or epidemiological approaches. The desired information could be extracted by simpler means (see III.B.2.a.). It was sufficient to calculate suitable sets of descriptive statistics and to summarise all relevant results verbally (see Appendix XI. to XXI. and IV.A.). Given the small size of the Wadi Howar sample, it was considered unlikely that the application of more sophisticated demographic and epidemiological techniques were going to produce overly informative results. Statistics like mean age at death, mean adult age at death and percentage of sub- and post-adults, on the other hand, were at least going to be readily understandable. Not least because of this quality, they were preferred to a life table dominated by empty cells (see IV.A.5. and V.C.1.d.). Similarly, calculating simple descriptive statistics was regarded as more beneficial than applying more complex epidemiological procedures to summarise the results of the examination of the sample's occupational stress and health markers (see IV.A.12., 13., V.C.1.k., l., Appendix XX. and XXI.). It also needs to be stressed in this context that providing formal palaeodemographic and palaeoepidemiological descriptions was not an aim of this study (e.g. Barkey *et al*. 2001; Belcastro *et al*. 2007; Bello *et al*. 2006; Bentley *et al*. 2001; Birg 1994; Blau 2001; Buikstra *et al*. 1986; Buzon 2006(b); Domett/Tayles 2006; Drenhaus 1988; Erdal/Duyar 1999; Eshed *et al*. 2004(b); Gray *et al*. 2003; Grupe *et al*. 2005: 213-270; Herrmann *et al.* 1990: 301-314, 329-334; Hill *et al*. 2007; Hoppa/Vaupel 2002; Johansson/Horowitz 1986; Jurmain 2001; Karasik *et al*. 2000; Kemkes-Grottenthaler/Henke 2001; Kilgore *et al*. 1997; Knußmann 1996: 461-474; L'Abbé/Steyn 2007; Landers 1992; Larsen 2002: 141-142; Lieverse *et al*. 2007(a); Lovejoy/Heiple 1981; Lukacs 1995; Meindl 1992; Monge/Mann 2007; Mosothwane/Steyn 2009; Munson 2000; Nagaoka/Hirata 2007; Ortner/Frohlich 2007; Owens 2007; Paine *et al*. 2007; Paine/Harpending 1998; Papathanasiou *et al*. 2000; Pechenkina/Delgado 2006; Promińska 1984; Sattenspiel/Harpending 1983; Šlaus 2008; Sugiyama 2004; Ubelaker/Pap 1998, 2009; Wood *et al*. 1992).

V.B.3.b.2. Intra-observer error

The intra-observer error analyses had to be based on the control data collected from only eight individuals (see III.B.2.b.). Two measures were taken to ensure that there were still sufficient control data. Firstly, data for a large number of variables were gathered. Secondly, whenever it made sense to do so, single variables were merged to create additional combined variables containing many data. As a result, being restricted to a relatively small control sample was unproblematic (see IV.B.). The analyses involved several steps (see III.B.2.b. and IV.B.). The absolute differences between all data pairs were computed and statistically summarised. All differences between data pairs and the maximum, minimum and mean difference between the data pairs of each variable were reported. Consequently, this important information was easily accessible and could be used to contextualise the results of the statistical tests. The ability to use this information to interpret the results of the statistical tests proved to be pivotal. Had it not been for this ability, several variables would have probably been unnecessarily excluded, after the paired tests had produced a number of significant results (see IV.B. and V.C.2.). The original and the control data were compared variable by variable and individual by individual (see III.B.2.b. and IV.B.). This double analysis fulfilled an important function. Analysing the data individual by individual, i.e. across variables, as well made it possible to re-evaluate the results of the variable by variable analyses. Appropriate un-paired and paired statistical tests were performed to detect significant differences (see III.B.2.b.). Mann-Whitney U, Student's t- as well as Pearson's and Yates's χ^2 tests were carried out to identify significant differences between the original and the control data. Wilcoxon, paired t- and McNemar's tests were employed to determine if the differences between value pairs differed significantly from zero. The results of the un-paired test were considered to be more informative. The reasons why this view was taken are simple. Theoretically, the important question is if two samples with identical dimensions and trait expressions would be found to be significantly different from each other merely due to intra-observer error. Whether or not the differences between data pairs differ significantly from zero, on the other hand, is really only of secondary interest in a study such as this one (see IV.B.). Admittedly, the applied techniques were basic. Nonetheless, they were undoubtedly sufficient, valid, objective and reliable. Moreover, taking one set of control data, calculating mean differences between data pairs and using un-paired or paired statistical tests to search for significant differences are the most commonly performed inter- and intra-observer error analysis procedures. Not least because of that, there appeared to be absolutely no need to carry out any additional intra-observer error analyses (e.g. Buikstra/Ubelaker 1994: 183-184; Cohen 1960; Cramon-Taubadel *et al*. 2007; Gapert *et al*. 2009: 386; Goose 1963: 126; Hanihara/Ishida 2005: 288; Hillson 1996: 71-72; Hillson *et al*. 2005: 423-424; Irish 2008: 106; Kemkes-Grottenthaler *et al*. 2002: 103; Kieser 1990: 9-14; Kieser/Groeneveld 1988: 1200; Lease/Sciulli 2005: 57; Mays 2002: 863; Morris/Ribot 2006: 17; Perini *et al*. 2005; Pinhasi 1998: 3-4; Ross/Williams 2008; Temple 2007: 1038-1039; Teschler-Nicola/Prossinger 1998: 484; Walker 2005: 388-389; White 2000: 305, 307; Willems *et al*. 2002; Williams/Rogers 2006; Wolpoff 1971).

V.B.3.b.3. Diachronic differences

Many aspects of the search for diachronic differences in robusticity, occupational stress and health within the Wadi Howar sample were problematic. That the Handessi sub-sample was too small and too badly preserved to be included in these intra-sample comparisons was an obvious major weakness of this part of the study (see III.B.2.c.). The way the rest of the Wadi Howar sample was divided and the composition of the resulting pre-Leiterband and Leiterband sub-sample may have been a source of distortions (see III.B.2.c.). Particularly the fact that the Conical Hill 95/4 and Abu Tabari 02/1 material was combined to form the pre-Leiterband sub-sample was a cause for concern. Abu Tabari 02/1 is not a Leiterband/Herringbone site (see Table 1 and I.C.3.b.1.). It is probably about 400 to 500 years older than Abu Tabari 02/28, the main Leiterband/Herringbone site incorporated into this study. Abu Tabari 02/1 does, however, not predate the Leiterband/Herringbone phase. The people associated with Abu Tabari 02/1 were not foragers either. They merely appear to have been less dependent on animal husbandry than the groups which used Abu Tabari 02/28. The Conical Hill 95/4 remains are only assumed to be around 400 years older than the Abu Tabari 02/1 material (see Table 1 and I.C.3.b.). They have not been directly dated and they could only be tentatively associated with Wavy Line/Laqiya artefacts. If Conical Hill 95/4 and Conical Hill 95/4-1 are actually the same age is also unclear (e.g. Jesse 2007: written communication; Jesse/Keding 2002: 285). The Leiterband sub-sample was not exactly perfect either. Although two thirds of the Leiterband/Herringbone material were excavated at Abu Tabari 02/28, the remaining third constituted a temporally and geographically heterogeneous mix (see Table 1 and I.C.3.b.). Unfortunately, dividing the sample differently was not an option. For all its shortcomings, this division formed the basis of the search for diachronic differences. Without it, these intra-sample analyses would not have been possible.

Both the pre-Leiterband and the Leiterband sub-sample were small, especially the pre-Leiterband sub-sample (see II.B.2.c.). Due to the material's state of preservation, the effective sub-sample sizes were even smaller (see Table 6, IV.A.2. and IV.C.). Again, the pre-Leiterband sub-sample was particularly badly affected. Four of the six Abu Tabari 02/1 skeletons yielded very little data. Conical Hill 95/4 lacked a postcranium. The Conical Hill 95/4-1 remains consisted of a left upper first premolar (*Dens praemolaris superior I*) and a right upper third molar (*Dens molaris superior III*). As a result of the small overall and effective sub-sample sizes, variables with no more than two or three pre-Leiterband and seven or eight Leiterband values were anything but rare (see Appendix XXIII). The sex and age ratios of the two sub-samples were different (see Table 1 and III.B.2.c.). This had more serious consequences for the analysis of some variables than it had for the analysis of others. The expressions of musculoskeletal stress traits, for instance, were probably comparatively strongly influenced by sex and age (for references see III.b.1.b.2.b.3. and V.B.2.f.). Enamel hypoplasia scores, on the other hand, were neither affected by age nor likely to be heavily influenced by sex (for references see III.B.1.b.2.b.6.). In any case, possible distortions caused by unequal sex and age ratios were taken into account when the results of the intra-sample analyses were interpreted (see IV.C. and V.C.3.). The metric and non-metric affinities of the different parts of the Wadi Howar sample strongly suggested that the pre-Leiterband and the Leiterband sub-sample were separated by, at least, some degree of population discontinuity (see IV.D. and V.C.4.a.). Especially different robusticity levels could have therefore represented population rather than diachronic differences. This situation also needed to be, and was, factored in when the results of the search for diachronic differences were interpreted (see IV.C. and V.C.3.). Many analyses had to be based on data which were gathered using relatively low resolution techniques (see III.B.1.b.). Perhaps, the manner in which many data were prepared could have been improved as well (see III.B.2.c.). For example, different indices may have been more informative than the ones which were employed (see III.B.1.b.1.d.).

Two strategies were adopted to counteract the effects of the above-mentioned problems and to ensure that the results of the attempts to unveil diachronic differences were still as conclusive and reliable as possible. Whenever it made sense to do so, single variables were merged to create additional, large, combined variables (see III.B.2.c.). Since these combined variables contained large amounts of data, their analyses were not hampered by the small sub-sample sizes. Furthermore, many and many different types of potentially informative variables were tested (see III.B.2.c. and V.B.3.a.). The rationale behind this approach was that a particular difference should be less likely to be an artefact, if it can be detected in several or several groups of variables. Consequently, it should be right to regard conclusions based on a number of such different, mutually supporting results as reliable.

The statistical procedures which were used to summarise and analyse the data were well suited to the search for diachronic differences (see III.B.2.c.). Calculating sub-sample-specific sets of descriptive statistics made the extent of the diachronic differences readily apparent. Mann-Whitney U as well as Pearson's and Yates's χ^2 tests may not have overwhelming statistical power but they were the only available methods which were fully sufficient, valid, reliable, robust and simple. Because of the small and unequal sub-sample sizes not even the metric variables could have been analysed with different tests. As far as the non-metric variables were concerned, there were simply no realistic alternatives. Moreover, these tests have been widely and successfully used in comparable contexts (for references see III.B.1.b.2.b. and III.B.2.c.).

V.B.3.b.4. Metric and non-metric affinities

V.B.3.b.4.a. Basic approach

The strategy which was adopted to determine the Wadi Howar material's metric and non-metric affinities had obvious advantages (see III.B.1.b., III.B.2.d.1. and IV.D.). The basic approach was extraordinarily simple. A wide range of relevant metric and non-metric data were gathered form the Wadi Howar skeletons and a number of appropriate comparative samples. Only the data which could be collected from a Wadi Howar specimen was used in its analyses. Each Wadi Howar individual was separately assigned to the comparative samples it was most similar to. The pattern which became apparent when all resulting individual classifications were viewed together was interpreted. The whole procedure was transparent, logically structured and relied entirely on cheap, well-established, simple and robust osteological and statistical techniques. Last but not least, the results it produced were reliable, unambiguous and readily understandable.

Using the individualisation of the discriminant function analyses, the individual by individual classifications, the additional group analyses and the interpretation of the classification patterns together was the key to the approach's success (see III.B.1.b., III.B.2.d.1. and IV.D.). Firstly, the limitations imposed by the Wadi Howar material's appalling state of preservation were surmounted by collecting a large body of carefully selected comparative data and relying on a very large number of separate individualised analyses. Secondly, the shortcomings of the individual by individual approach were offset by summarising all individual classifications and using the resulting overview as the basis for analyses focusing on the sub-samples and the sample as a whole. Thirdly, additional group discriminant function analyses were performed to double-check the conclusions based on the interpretation of the classification patterns.

Perhaps most importantly, pursuing this strategy made it possible to answer a number of the studies research questions at the same time (see III.B.2.d.1. and IV.D.). The specially developed procedure did not only expose the metric and non-metric affinities between the comparative samples and each Wadi Howar individual, the comparative samples and each Wadi Howar sub-sample and the comparative samples and the whole Wadi Howar sample but also the composition of the Wadi Howar sub-samples and the biological relationships between them. Because this custom-designed, integrated approach was so effective there was no need for any additional or more complicated methods.

V.B.3.b.4.b. Data preparation

V.B.3.b.4.b.1. Generation of mean individuals

The mean individuals fulfilled important functions (see III.B.2.d.2.a.). Firstly, the mean individuals provided the values with which the gaps in both the data sets of the comparative samples and the Wadi Howar group analyses data set were filled (see III.B.2.d.2.b. and V.B.3.b.4.b.2.). Secondly, the sub-sample- and sample-specific mean individuals made it easy to compare sub-samples and samples directly (see III.B.2.d.2.a. and Appendix XXIV.). Thirdly, by entering them into sets of individualised discriminant function analyses, mean individuals were used to produce valuable additional results (see III.B.2.d.3. and IV.D.). Generating mean individuals was therefore an absolute necessity.

Using mean individuals was, however, also intrinsically problematic. The mean individuals were effectively “mean types”. Type specimens remain important in palaeoanthropology. Otherwise, types are rightfully no longer employed to describe or define samples or populations in anthropology. Types, no matter if they are defined on the basis of “ideal features”, trait combinations or combinations of averages, are unable to capture the variability which characterises populations. They are neither compatible with the modern understanding of populations, subspecies and species nor do they reflect the import role “atypical” individuals can play in the evolution of populations, subspecies and species. It goes without saying that these theoretical implications were borne in mind at all times when mean individuals were compared with one another and the results of their discriminant function analyses were interpreted (for the use of type specimens in zoology, palaeontology and palaeoanthropology see for example: Benton/Harper 1997: 74-76; Henke/Rothe 1994: 73-77; Henke/Tattersall 2007; Johanson/Edgar 1996: 52-53; Knußmann 1996: 17, 257; Mayr 1993; Rothe/Henke 2001: 6; Schwidetzky 1979: 5; Vogel/Angermann 1995: 543; for the use of types in anthropology see for example: Brace 1964; Caspari 2009; Hemmer 1982: 316; Knußmann 1996: 17, 406; Mayr 1993: 159; Ousley *et al*. 2009: 68-69; Sauer 1992; Schwidetzky 1979: 5-6, 1982: 340-341; Vogel 1965; for population, varietas, subspecies and species concepts see for example: Ax 1984; Benton/Harper 1997: 49-50; Cook/Callow 1999: 38-40, 219; Dorit *et al*. 1991: 170; Henke/Rothe 1994: 66-67, 1998: 17-18; Henke/Tattersall 2007; Knußmann 1996: 257, 405; Schwidetzky 1982: 339; Vogel/Angerman 1995: 237, 493, 495, 497, 505, 542; Wolpoff/Caspari 1996: 253-255; for the evolutionary significance of “atypical” members of populations, subspecies and species see for example: Atherly *et al*. 1999: 643-644, 671-675; Benton/Harper 1997: 49-51; Cook/Callow 1999: 55-62, 95-98, 102-105, 219-239; Dorit *et al*. 1991: 154-161, 163-168, 170-179; Henke/Rothe 1994: 546; Knußmann 1996: 258-261, 264-265, 406, 455-461; Vogel/Angermann 1995: 493-497, 505-507; Wolpoff/Caspari 1996: 253-255).

The view that all of the scant, available data should be used was, therefore, only one of the two reasons why the decision to incorporate means, rather than medians, of ordinal as well as small sets of continuous data into the mean individuals was taken (see III.B.2.d.2.a.). The opinion that the mean individuals should at least, whenever possible, consist of values which reflect the entire variability of the sub-samples or samples they were supposed to represent was the more important other reason. Of course, this opinion could not be taken into account when nominal data had to be incorporated into mean individuals. In this context, there was simply no alternative to relying on modes (see III.B.2.d.2.a.). That the mean individuals could not represent the sub-samples and samples properly also led to negative side effects when individualised discriminant function analyses were performed to assign the mean individuals to the comparative samples they shared most affinities with (see III.B.2.d.3. and IV.D.). Naturally, the conclusions which could be drawn from the classification of the mean individual of a sample were not as reliable as those which could be drawn from the summary of the individual classifications of all its members (see III.B.2.d.4., IV.D. and V.B.3.b.4.d.). Just like any other individual, mean individuals could be misclassified (see V.B.3.b.4.c.). An unrepresentative classification or a genuine misclassification could, for example, have been caused by the expression of a single trait, if the expressions of this trait were highly discriminating in a specific discriminant function analysis. Likely misclassifications of the mean individuals of the Wadi Howar sample could have been fairly easily identified. After all, the mean pre-Leiterband individual, for instance, should get assigned to the same prehistoric comparative sample as the majority of the normal pre-Leiterband individuals. Unfortunately, the classifications of the mean individuals of the comparative samples could not be critically assessed in this manner. Consequently, ambiguous classifications of these mean individuals were difficult to interpret (see V.C.4.).

V.B.3.b.4.b.2. Missing values

Only the gaps in the Wadi Howar matrix which was generated for the group discriminant function analyses needed to be filled (see III.B.2.d.2.b. and III.B.2.d.3.). In sharp contrast to this, it was essential for the success of all discriminant function analyses that missing values in the comparative data sets were replaced. The gaps in the data matrices were filled with the most appropriate, available sex-, sub-sample- or sample-specific modes and means (see III.B.2.d.2.b.). This minimal approach was very economical. More importantly, it constituted the only viable solution. The data collection list which was used to gather the relevant comparative data contained 212 entries (see III.B.1.b.). Depending on whether or not the "Sudanese Hotchpotch" sample is counted as one, the inter-group comparisons relied on three or four different prehistoric and five different modern comparative samples (see II.). Attempts to develop regression equations in order to fill gaps, for example, would have only made sense if they had focused on each possible variable and each comparative sample separately (e.g. Agnihotri *et al*. 2009; Auerbach/Ruff 2004; Behnke 1959; Bidmos 2008; Bortel/Pritchett 1993; Byers *et al*. 1989; Chibba/Bidmos 2007; Feldesman 1992; Giroux/Wescott 2008; Grine *et al*. 1995; Krishan 2008; Meadows/Jantz 1992; Porter 1999; Ruff 2007; Sciulli/Blatt 2008; Steel 1970; Steele/McKern 1969). Therefore, employing such more sophisticated methods to replace missing values would have been logistically impossible. Using sub-sample- or sample-specific modes and means instead of statistically reconstructed values was also considered the more transparent way of filling data gaps. It is obvious that this minimal approach had a major disadvantage as well. It reduced the variability within the samples. Naturally, the more gaps a data set exhibited, the more it was affected by this problem. Thankfully, on average, the comparative data sets were fairly complete (see IV.A.2. and V.C.1.b.).

V.B.3.b.4.b.3. Scaling

In view of the highly technical terms in which size correction is usually discussed, it appears to be worthwhile to put this matter into perspective first. In essence, size correcting a measurement means nothing else than transforming it into an index. All that indices do is express dimensions in relative rather than absolute terms. Calculating indices is anything but a cutting-edge technique and there is certainly no need to overcomplicate this procedure. Accordingly, a simple approach was adopted when the decision was taken to create scaled metric matrices (see III.B.2.d.2.c.). All measurements of each skeleton were divided by the mean width of its lower second molars (*Dentes molares inferiores II*). The reason why "DM061/62 - 81(1). Crown width LM2 (m)" was chosen as the scale was simple. As far as the Wadi Howar sample was concerned, lower second molar crown width was the dimension which could be measured most often (for discussions of size correction techniques see for example:

Darroch/Mosimann 1985; González-José *et al*. 2008: 179; Howells 1989; Jungers *et al*. 1995; Marroig 2007; Rosas/Bastir 2002; Slice 2007; Weber/Bookstein 2007; Williams-Blangero/Blangero 1989; for the use of indices in anthropometry see for example: Bass 1987; Bräuer 1988; Bräuer/Knußmann 1988; Brothwell 1981; Buikstra/Ubelaker 1994; Herrmann *et al*. 1990; İşcan 2000; Knußmann 1988(c); Krogman/İşcan 1986; Martin 1928).

This simple scaling technique was the only available size correction option. Other size correction methods would have either been inappropriate or created an unjustifiable amount of extra work (see III.B.2.d.2.c.). Methods like z- or c-score standardisation scale an individual's measurements in relation to a sample mean, not a value which is "individual-specific". In a sense, they therefore produce "illegitimate" indices. They also reduce the variability within and between samples. As a result, such size correction techniques were not deemed appropriate, especially for data intended to be used in discriminant function analyses. Furthermore, Jungers *et al*. (1995) showed that these methods do not provide ''size-free'' variables. Applying methods like Darroch/Mosimann's (1985), which scale an individual's measurements in relation to a value based on the individual's data in a set of variables, would have made sense. However, using them would have been extremely time-consuming. Each Wadi Howar individual's discriminant function analysis matrices consisted of unique combinations of variables (see III.B.2.d.). Thus, the details of any such size correction technique would have had to be modified for each Wadi Howar skeleton and applied separately to each one of the Wadi Howar specimens' individualised comparative matrices. Geometric morphometric size correction techniques, finally, are theoretically sound as well but were inapplicable (e.g. Bookstein 1991; Darroch/Mosimann 1985; González-José *et al*. 2008: 179; Hanihara *et al*. 2008: 286; Hanihara/Ishida 2005: 288; Harris/Lease 2005: 594; Hennessy/Stringer 2002: 37; Howells 1989; Irish 2008: 106-107; Jantz/Meadows Jantz 2000; Jungers *et al*. 1995; Konigsberg *et al*. 2009: 78; Marroig 2007: 21-23; Morris/Ribot 2006: 17; Rosas/Bastir 2002: 238; Roseman/Weaver 2004: 259; Sardi *et al*. 2006; Schillaci 2008: 817; Slice 2007: 262-266; Stefan/Chapman 2003; Weber/Bookstein 2007; Williams-Blangero/Blangero 1989).

It is unclear how useful the scaled metric data were in the context of this study. It is not clear either if including any other type of size corrected data in the study would have been beneficial. Size is biologically relevant. It is also a valid and often highly informative population marker. Moreover, there is certainly more than one underlying control mechanism determining the absolute and relative size of different parts of the skeleton. Consequently, removing size might be counterproductive. Since they capitalise on inter-sample differences, removing size should also reduce the effectiveness of discriminant function analyses. Not surprisingly, the classification accuracies of the discriminant function analyses which were based on scaled metric data were considerably lower than those of the discriminant function analyses which used unscaled metric data (see Appendix XXV.A.2.b.). The mean overall Wadi Howar individual by individual classification accuracies of all analyses relying on metric data were 87.47% for the prehistoric and 79.16% for the modern comparative samples. The respective values of the analyses based on scaled metric data were 81.82 and 72.66% (for size as a biologically relevant factor and its importance in population studies see for example: Allen 1877; Baker 1992; Bergmann 1847; Brues 1977; Froment/Hiernaux 1984; Gallagher *et al*. 2009; Gill/Rhine 1990; Hawks *et al*. 2000(a); Howells 1992; Ivanhoe *et al.* 1998; Knußmann 1996: 409-410, 429-448; Martin

1928; Migliano *et al*. 2007; Novotný *et al.* 1993: 77; Pearson *et al*. 1998; Roberts 1953; Roberts/Bainbridge 1963; Schillaci 2008: 817; Stringer 1998; Walter 1994; for discriminant function analysis and its use of inter-group differences see for example: Backhaus *et al*. 2003: 155-228; Barnard 1935; Bortz 2005: 605-625; Fisher 1936; Henke 1997; Jungers *et al*. 1995; Klecka 1980; Knußmann 1988(d): 750-766; Lachenbruch 1975; Mahalanobis 1936; Ousley *et al*. 2009: 71).

The non-metric affinities of the Wadi Howar material were analysed independently (see III.B.2.d. and IV.D.). It was assumed that the expressions of most of the cranial morphological as well as the vast majority of the cranial and dental epigenetic traits were largely unaffected by size. Alveolar prognathism (CN024) is one of the employed cranial morphological traits which are sometimes considered to be influenced by size. Yet, it is very unlikely that the correlation between increased cranial size and increased prognathism has any influence on the trait's reliability in inter-sample analyses. There are numerous biologically sub-Saharan populations whose small and gracile members are distinctly prognathic. Similarly, there are many biologically European populations whose large and robust members are distinctly orthognathic. Moreover, inter-population differences in the degree of prognathism are already discernible *in utero* and can be reliably used to estimate the biological ancestry of sub-adults. Characteristic expressions of other relevant cranial morphological traits, such as relative nasal breadth (CN021) and shape of the *Margo infranasalis* (CN023), also appear early in the course of an individual's ontogenetic development and possible size correlations do undoubtedly not diminish their value as population markers either (for the influence of size on cranial morphological traits see for example: Beals *et al*. 1984; Bruner/Manzi 2004: 53, 56; Cramon-Taubadel 2009(a); Ivanhoe *et al.* 1998; Lahr/Wright 1996; Pucciarelli *et al*. 1990; Rosas/Bastir 2002: 240, 242; for ontogenetic stability and size independence of cranial morphological traits see for example: Bruner/Manzi 2004; Di Lernia/Manzi 1998: 219, 238; Gill 1998; Gill/Rhine 1990; Hauschild 1937; Heberer *et al*. 1959: 338-339; İşcan *et al*. 2000: 228; Knußmann 1996: 409-410, 429-448; Limson 1932; Schultz 1926; Sereno *et al*. 2008: 2-11; Simon *et al*. 2002: 264-265; Viðarsdóttir *et al*. 2002; Weinberg *et al*. 2005). Interconnections between crown size and complexity or crown size and occurrence of certain dental epigenetic trait expressions have occasionally been demonstrated. These do, however, seem to be even less pronounced than those between cranial size and the mentioned cranial morphological traits. In addition, it is highly improbable that these interconnections influence the results of inter-population comparisons. As Irish (2005: 529) remarked: "*… development of morphological traits is largely independent of dental size. In support of this statement, prior research found that Late Paleolithic "Mechtoids" from Morocco have among the largest of all African teeth; yet they have the simplest morphology. Conversely, a San sample has the smallest teeth, yet possesses greater morphological complexity than other Africans*" (for evidence of interconnections between crown size and morphology see for example: Garn *et al*. 1966(a), 1966(b); Gilligan/Bulbeck 2007: 81; Harris 2007; Kieser/Becker 1989; Kondo *et al*. 2005; Williams/Corruccini 2007; for evidence suggesting that the interconnections between crown size and morphology do not influence the results of inter-population analyses see for example: Coppa *et al*. 2007; Cucina *et al*. 1999; Edgar 2009; Guatelli-Steinberg *et al*. 2001; Haeussler *et al*. 1989; Irish 1997, 2000, 2005: 529, 2006, 2008: 111; Irish/Konigsberg 2007; Irish/Turner 1990; Lease/Sciulli 2005; Martinón-Torres *et al*. 2007; Scott/Turner 1997; Turner *et al*. 1991; Turner/Markowitz 1990).

	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data	Modern series - Mixed data
Abu Tabari 02/1-7	**(Southern Sudan)**	**(Chad)**	**(Mandinka)**	**(Southern Sudan)**
Abu Tabari 02/28-2	**Southern Sudan**	**Chad**	**Southern Sudan**	**-**
Abu Tabari 03/34-1	**Southern Sudan**	**(Haya)**	**Southern Sudan**	**-**
Conical Hill 02/3-4	**(Southern Sudan)**	**(Mandinka)**	**Southern Sudan**	**(Southern Sudan)**

(a)

	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data	Modern series - Mixed data
Abu Tabari 02/28-15	**Chad**	**Southern Sudan**	**Southern Sudan**	**-**
Abu Tabari 02/28-20	**[Southern Sudan]**	**[Chad]**	**(Chad)**	**(Chad)**
Djabarona 96/1-2	**[Haya]**	**[Mandinka]**	**(Mandinka)**	**(Haya)**
Djabarona 96/4	**[Haya]**	**[Chad]**	**[Chad]**	**(Chad)**
Djabarona 96/120-5	**(Somalis)**	**(Haya)**	**[Mandinka]**	**(Haya)**

(b)

Figure 98: Conflicting classifications. Cases in which scaled metric classifications differed from matching metric and non-metric or matching metric and mixed classifications (a) and cases in which metric classifications differed from matching scaled metric and non-metric or scaled metric and mixed classifications (b) (result in square brackets: unreliable; result in round brackets: reliability uncertain).

Given this probable relative size independence of the cranial morphological as well as the cranial and dental epigenetic traits, the results of the Wadi Howar individuals' metric and non-metric discriminant function analyses could be used to assess the effects of the applied scaling technique (see Figure 98 and Appendix XXV.A.2.a.2.). The analyses which relied on scaled metric data seemed to have "misclassified" normal and mean Wadi Howar individuals in 13 cases. On the other hand, the scaling procedure appeared to have corrected size effects in twelve such cases. Taking this ambiguous situation and the reduced classification accuracies of the discriminant function analyses which were based on scaled metric data into account, it is doubtful if using scaled metric data was particularly advantageous.

V.B.3.b.4.b.4. Dichotomisation

Using binary data in discriminant function analyses is commonly considered to be unproblematic. Conversely, entering undichotomised ordinal and nominal data into discriminant function analyses is generally not recommended. Consequently, to ensure that they could be used safely, the non-metric data had to be dichotomised (see III.B.2.d.2.d.). A loss of resolution was an easily foreseeable side effect of dichotomising the non-metric data. Unfortunately, this side effect was unavoidable. The presence/absence sectioning points were chosen in accordance with the expressions typically encountered in the Wadi Howar sample (see Appendix VIII.). Being able to define the breakpoints on this basis was definitely an advantage. It probably helped to reduce the effects of the loss of information on the classification accuracies. Nevertheless, that these Wadi Howar sample-specific sectioning points were not necessarily identical to those customarily employed in other studies, for example in studies examining the expressions of dental epigenetic traits, was regrettable (for the use of binary data in discriminant function analyses see for example: Cohen *et al*. 2003: 302-353; Cox/Snell 1999: 132-139, 153-157, 158-160, 161-162, 163-165; Gilbert 1968, 1969; Hand 1983; Henke 1997: 23; Klecka 1980; Krzanowski 1975, 1977: 193; Lachenbruch/Goldstein 1979: 78, 82-83; Moore 1973; Moosbrugger/Richter 1999; Press/Wilson 1978; for presence/absence scores of epigenetic traits see for example: Berry/Berry 1967; Birkby *et al*. 2008; Brasili *et al*. 1999; Carson 2006; Case *et al*. 2006; Donlon 2000; Eroğlu/Erdal 2008; Finnegan 1978; Finnegan/McGuire 1979;

Gaherty 1971; Hanihara *et al.* 2003; Hauser/De Stefano 1989; Ihunwo/Phukubye 2006; Riesenfeld 1956; Rightmire 1972; Rösing 1982; Tyrrell 2000; for widely used Arizona State University Dental Anthropology System breakpoints see for example: Coppa *et al*. 2007: 923-924; Irish 1997: 461, 1998: 84-85, 2008: 106; Scott/Turner 1997; Turner 1987, 1990; Ullinger *et al*. 2005: 470-471; Willermet/Edgar 2009: 212-213).

V.B.3.b.4.b.5. Removal of cases and variables

Variables and cases had to be removed for two reasons. Firstly, variables needed to be taken out to individualise the different sets of discriminant function analyses (see III.B.2.d.1. and III.B.2.d.2.e.). Secondly, excluding cases and variables was necessary to make sure that the discriminant function analyses could be performed without violating any of the commonly recommended guidelines (see III.B.2.d.3.). The removal of cases, which were identified as outliers, and variables, which had failed the tolerance test, did usually not create any problems (see Appendix XXV.A.1.). Only 5.00% (i.e. nine) of the Wadi Howar individuals' 180 core analyses were affected by the removal of such variables. Outliers had to be removed in 37 (20.56%) of these 180 analyses. The exclusion of outliers led to the inclusion of comparative samples with less than 20 members in 19 analyses, i.e. 10.56% of the 180 core individual analyses. It needs to be stressed that outliers and variables only had to be removed from analyses which relied on few variables from the outset. In other words, this removal only affected analyses whose reliability had to be considered uncertain anyway (see III.B.2.d.4.).

V.B.3.b.4.c. Discriminant function analyses

Discriminant function analysis is a multivariate statistical method which separates predefined samples on the basis of the expressions of their continuous or dichotomous traits and assigns ungrouped cases to samples which have been separated in this manner. Discriminant function analysis is therefore rightfully the method of choice when individuals need to be assigned to groups they either probably belong to or are most similar to (e.g. Backhaus *et al*. 2003: 155-228; Bernhard 1994: 259-260; Bortz 2005: 605-625; Dayal *et al*. 2008; Finnegan/McGuire 1979; Gilbert 1969; Giles/Elliot 1963; Hemphill 1999(b); Henke 1997: 22-28; Klecka 1980; Knußmann 1988(d): 750-766; Konigsberg *et al*. 2009; Krzanowski 1977; Ousley *et al*. 2009; Pietrusewsky 2008). Several other statistical approaches which are sometimes employed for the same purpose, on the other hand, are less well suited to tackling this problem. For instance, factor analysis, principal component analysis and comparable methods summarise the variability observed among many variables by identifying underlying factors. Thus, unlike discriminant function analysis, which maximises inter-group differences, these methods do not aim to separate samples as efficiently as possible. As a result, when methods like factor analysis or underlying factors identified by such methods are used to classify single, unclassified cases, the results are not only usually less clear-cut but also likely to be less reliable (e.g. Buzon 2006(a); Grine *et al*. 2007; Hanihara/Ishida 2005; Harris/Lease 2005; Hemphill 1999(a); Henke 1997: 22-31; Knußmann 1988(d): 734-766; Neves/Hubbe 2005; Ousley *et al*. 2009; Pietrusewsky 2008; Roseman/Weaver 2004; Simon *et al*. 2002). Similarly, cluster analyses neither separate groups nor classify single cases as successfully as discriminant function analyses. This is hardly surprising. After all, cluster analyses were developed to divide a heterogeneous group into homogeneous sub-groups, not to maximise differences between samples. In view of this, relying on any of these methods, instead of discriminant function analysis, to classify the Wadi Howar individuals separately was not seriously considered (e.g. Brace *et al*. 2006; D'Amore *et al*. 2009; Grine *et al*. 2007; Henke 1997: 31-32; Knußmann 1988(d): 766-791; Mossakowski/Prüser 1999: 176, 178-179, 185, 193; Sneath/Sokal 1973; Varela *et al*. 2008; Wiesemüller *et al*. 2003: 18-23). Conversely, multinomial logistic regression analysis was regarded as a viable alternative to discriminant function analysis. This method is widely used in lieu of discriminant function analysis, especially if some or all of the variables under study are not continuous or not normally distributed. Assigning ungrouped cases is, however, not a standard function which statistics packages offer in connection with multinomial logistic regression analysis. To overcome this problem, Dr. I. Tharp of the University of Greenwich was asked to develop a technique which makes it possible to classify ungrouped cases on the basis of the results *SPSS 15.0.1* (SPSS Inc.) reports for multinomial logistic regression analyses. Unfortunately, it had to be acknowledged that the number of variables which could have been safely included in multinomial logistic regression analyses of the collected data was quite limited and that the application of the technique developed by Dr. Tharp would not have been economical in the context of this study. Multinomial logistic regression analysis was therefore not used in addition to, or instead of, discriminant function analysis (e.g. Buzon 2006(a); Cox/Snell 1999: 132-139; Finch/Schneider 2007; Hosmer/Lemeshow 2000; Lease/Sciulli 2005; Press/Wilson 1978; Tabachnick/Fidell 2001; Walker 2008; Weinberg *et al*. 2005).

Carrying out the discriminant function analyses was straightforward (see III.B.2.d.3.). Discriminant function analysis is a normal component of *SPSS* (SPSS Inc.). Accordingly, there was no need for special or difficult to use software. Perhaps even more importantly, relying on a standard statistics package, the analyses could be carried out with relative ease. Since discriminant function analysis is such a tried and tested method, there were no disagreements about what requirements a satisfactory analysis should meet. Deciding which steps should be part of the strict core analysis protocol was therefore anything but a lengthy process (see III.B.2.d.3.). It was not difficult either to make sure that all measures included in the protocol were implemented. Ensuring that the case-variable ratios were acceptable, entering only normally distributed or dichotomised data, removing outliers and so forth were not particularly demanding tasks (see III.B.2.d.2. and 3.). Moreover, many corrections which are prerequisites for other types of analyses were unnecessary. For example, it is unproblematic to pool sexes and to refrain from applying size correction techniques to metric data, as this study has demonstrated as well (e.g. Irish 2008: 106-107; Jungers *et al*. 1995; Kitagawa 2000; Matsumura/Zuraina 1999; Morris/Ribot 2006: 17; Pinhasi/Cramon-Taubadel 2009; Rosas/Bastir 2002; Schillaci/Schillaci 2009; Slice 2007: 262-266; Ullinger *et al*. 2005: 470-471). It should not be forgotten either that discriminant function analysis is well-known for its robusticity and reliability. Usually, classification accuracies will remain high, or at least sufficiently high, even if several of the method's assumptions are violated (e.g. Finch/Schneider 2007; Gilbert 1968, 1969; Henke 1997: 22-28; Klecka 1980; Knußmann 1988(d): 753-754; Krzanowski 1977; Lachenbruch/Goldstein 1979; Moosbrugger/Richter 1999; Ousley *et al*. 2009: 70-72; Press/Wilson 1978; Tabachnick/Fidell 2001). Admittedly, it was very time-consuming to optimise the classification accuracies manually (see III.B.2.d.3. and IV.D.). The usually considerable increases in classification accuracy were, however, undoubtedly worth the effort. The results of the discriminant function analyses were unambiguous and readily understandable (see IV.D. and Appendix XXV.A.1.). The reported classification accuracies fulfilled two very important functions. They provided an immediate measure of the success of the analyses. They also indicated how reliable the classifications of the ungrouped cases probably were. It was the right decision to report the secondary individual classifications as the results of the Wadi Howar group analyses (see III.B.2.d.4. and IV.D.). Discriminant function analysis was developed to separate a priori defined groups as well as possible and to assign cases to these groups, not to establish representative distances between groups. Consequently, the secondary classification frequencies, not the centroid distances, constituted the relevant results of the Wadi Howar group analyses (e.g. Bortz 2005: 605-625; Fisher 1936; Henke 1997: 22-28; Klecka 1980; Knußmann 1988(d): 750-751; Lachenbruch/Goldstein 1979; Ousley *et al*. 2009: 71-72). Indeed, presenting the distances between group centroids as the results of these analyses would have been misleading. This would have been the case because the comparative sample whose centroid a specific Wadi Howar sub-sample's centroid was closest to was by no means always the comparative sample to which most of its members were assigned in the secondary classification (see Appendix XXV.A.1.c.).

Assigning individuals separately was a potential source of complications (see III.B.2.d.3. and V.B.3.b.4.b.1.). Any individual is characterised by combinations of dimensions and trait expressions which are more or less representative of the averages of the skeletal population the individual belongs to (see V.B.2.b. and V.B.2.e.). If less representative characteristics outnumber the more representative ones, a member of a particular population can be "rightfully" assigned to a comparative sample most other members of the same population are not assigned to. A specimen can also be misclassified if it only exhibits one or two unrepresentative characteristics, provided these characteristics are among the most important predictors in a specific discriminant function analysis (see V.B.3.b.4.b.1.). Abu Tabari 02/1-3, for example, exhibited a *Trema* (see IV.A.10. and Appendix XVIII.B.). "DE077 - Midline diastema" was an important predictor in the analysis which was carried out to identify the modern comparative sample Abu Tabari 02/1-3 shared most non-metric affinities with. The Haya sample was characterised by a high *Trema* frequency and, consequently, Abu Tabari 02/1-3 was classified as a Haya in this analysis (see Appendix XXIV.C.2.). Abu Tabari 02/1-3 was, however, grouped with the Chad sample in the analyses which relied on this individual's metric and scaled metric data (see Appendix XXV.A.1.a. and Appendix XXV.A.2.a.2.a.). Not surprisingly, Abu Tabari 02/1-3 was also classified as a member of the Chad sample if the "DE077 - Midline diastema" variable was excluded from the non-metric analysis. In view of this and because the classification accuracy of the non-metric analysis was not decreased when the "DE077 - Midline diastema" variable was replaced with a combination of other variables, Abu Tabari 02/1-3's classification in the analysis which included the "DE077 - Midline diastema" variable was treated as a misclassification and not reported (see Appendix XXV.A.1.a. and Appendix XXV.A.2.a.2.a.). The "DE077 - Midline diastema" variable was used in the non-metric analysis in which the Wadi Howar sample as a whole was entered together with the modern comparative samples. As a result, Abu Tabari 02/1-3 was misclassified again in this analysis (see Appendix XXV.A.1.c.). Nevertheless, since the results of all relevant discriminant function analyses could be examined together, assigning individuals separately did, on the whole, not create serious problems (see III.B.2.d.4. and V.B.3.b.4.d.). Basing each set of individual analyses on a different combination of variables may have had deleterious effects as well. The results of the individualised discriminant function analyses did, however, not suggest that this actually caused any distortions (see III.B.2.d.1., 3. and IV.D.).

Table 12: Differences between the Wadi Howar individual classification accuracies based on mixed data and their counterparts based on separate metric, scaled metric and non-metric data.

	Prehistoric comparative samples	Modern comparative samples	All samples
No.	32 (separate data), 11 (mixed data)	28 (separate data), 11 (mixed data)	60 (separate data), 22 (mixed data)
Min. diff.	-9.3%	1.4%	-9.3%
Max. diff.	33.8%	46.5%	46.5%
Mean diff.	14.9%	20.0%	17.3%

Nowadays, most researchers prefer to use logistic regression analysis to process mixed matrices, i.e. matrices which contain both metric and non-metric data. Nonetheless, it is also perfectly acceptable to enter both continuous and binary data into a discriminant function analysis (e.g. Cohen *et al*. 2003: 302-353; Cox/Snell 1999: 132-139, 163-165; Finch/Schneider 2007; Finnegan/McGuire 1979; Gilbert 1968, 1969; Klecka 1980; Krzanowski 1975, 1977; Lachenbruch/Goldstein 1979: 82-83; Lease/Sciulli 2005; Moore 1973; Press/Wilson 1978). Individual discriminant function analyses based on mixed data sets were very successful (see Table 12 and Appendix XXV.A.2.b.2.a.). In the cases in which it became necessary to rely on mixed data sets, the classification accuracy of a specimen's mixed data analysis was on average 17.3% higher than that of its separate metric, scaled metric and non-metric data analyses. The drastically increased classification accuracies strongly suggest that mixed matrices should have been used systematically. That it broadened the basis upon which the discriminant function analyses of poorly preserved individuals could be performed was an additional advantage of utilising metric and non-metric data together. It appears worth noting in this context that, for example, Lease/Sciulli (2005) also reported that the accuracy with which their logistic regression equations classified European American and African American deciduous dentitions correctly was 4 to 12% higher when metric and non-metric data were used together.

V.B.3.b.4.d. Interpretation of the classification patterns

The manner in which the classification patterns were interpreted was simple and effective (see III.B.2.d.4.). The techniques which were used to determine the overall individual classifications and to analyse the classification frequencies were basic. However, they were valid, produced clear results and provided a maximum degree of transparency.

An overall individual classification was usually based on the results of three analyses, one based on metric, one on scaled metric and one on non-metric data (see III.B.2.d.4., IV.D. and Appendix XXV.A.2.a.2.). Thus, they were unquestionably more reliable than individual classifications which are only based on one type of data (see V.B.3.b.4.a.). Since most Wadi Howar individuals were assigned to the same comparative sample two or three times in their sets of three individualised discriminant function analyses, coming up with overall individual classifications was not difficult (see Appendix XXV.A.2.a.2.). Indeed, only three (i.e. 10.7%) of the 28 Wadi Howar individual sets with prehistoric comparative samples and only five (i.e. 17.9%) of the 28 Wadi Howar individual sets with modern comparative samples yielded less clear-cut results. These more ambiguous results were only produced by the analyses of very poorly preserved Wadi Howar individuals. All overall classifications

based on such results had low overall classification accuracies and were considered possibly or definitively unreliable.
The interpretation of the classification patterns took a range of results into account (see III.B.2.d.4. and IV.D.). Not only the results of all 180 Wadi Howar individual, all 36 Wadi Howar mean individual and all 18 Wadi Howar group discriminant function analyses but also the results of the 32 χ^2 tests which compared the pre-Leiterband, Leiterband and Handessi phase classification frequencies could be given due attention. Interpreting this large number of results produced by analyses of cranial and dental metric, scaled metric and non-metric data was not complicated. On the contrary, since the different results supported each other, the classification patterns could be interpreted with relative ease (see Appendix XXV.). It almost goes without saying that appropriate combinations of the numerous, reliable individual results formed highly reliable overall sub-sample- and sample-specific results (see V.B.3.b.4.a.). Thus, relying on a combination of simple and well-established techniques, questions concerning individual affinities, group affinities, admixture and population continuity could be answered fairly conclusively (see IV.D. and V.C.4.). None of the overcomplicated methods which are used by many researchers who investigate biological affinities, population continuity or admixture were necessary to produce the unambiguous, transparent and reliable results of this study (e.g. Ackermann *et al*. 2006; Brace *et al*. 2006; Buzon 2006(a); D'Amore *et al*. 2009; González-José *et al*. 2008; Grine *et al*. 2007; Hanihara *et al*. 2008; Hanihara/Ishida 2005; Hemphill 1999(a); Konigsberg *et al*. 2009; Martínez-Abadías *et al*. 2006; Matsumura/Zuraina 1999; Neves/Hubbe 2005; Nystrom 2006; Pinhasi/Cramon-Taubadel 2009; Relethford/Blangero 1990; Sardi *et al*. 2006; Stefan 2004; Stefan/Chapman 2003; Stojanowski 2003; Varela *et al*. 2008; Viðarsdóttir *et al*. 2002).

V.C. Results

V.C.1. Description of the sample

V.C.1.a. *In situ* position

Numerous relevant prehistoric and modern groups did or continue to use simple graves within their settlements to inter their dead in contracted positions, just like the majority of the prehistoric inhabitants of the Wadi Howar (see IV.A.1.). Virtually all Southern Sudanese mixed economy pastoralists and several other groups lay their dead to rest in this manner (see I.D.2.d.8.). Simple, flexed burials within settlements were also very widespread throughout the prehistoric Sahara and the prehistoric Sudanese Nile Valley (e.g. Caneva 1983(a); Clark 1989; Coppens/Chamla 1978; Di Lernia/Manzi 1998; Dutour 1989: 112-115; Dzierżykray-Rogalski 1977, 1984; Gauthier/Gauthier 1999; Georgeon *et al*. 1993; Geus 1991; Jesse/Keding 2002; Paris 1990, 1995, 1996; Petit-Maire 1978; Schild *et al*. 2002; Schuck 2002; Sereno *et al*. 2008; Zeitoun *et al*. 2004).
Like the more or less standard Wadi Howar *in situ* position, most of what was usually encountered *in situ* was rather unremarkable. Yet, some observations deserve special mention. The remains of Abu Tabari 02/28-20 appeared to be part of the contents of a pit which possibly served ritual purposes (see I.C.3.b.2., I.D.2.d.7. and IV.A.1.). Conceivable explanations for the presence of human remains in a

ritual or rubbish pit are speculative at best. An earlier burial could have been disturbed by a later pit. Alternatively, a human body or some of its parts could have been intentionally placed in this pit which also contained animal remains, pottery sherds, stone artefacts, ostrich eggshell beads and a lip plug. Many individuals, especially at Abu Tabari 02/28, were buried beneath ceramic vessels (see I.C.3.b.2.). Obviously, pottery is frequently encountered in prehistoric graves in the Sahara and the Sudanese Nile Valley (e.g. Geus 1991; Paris 1996). More interestingly, whereas grave goods are generally less common among most relevant ethnic groups, the Shilluk bury bodies underneath broken pots (see I.D.2.d.8.). The elevated *in situ* position of Abu Tabari 02/1-2's *Cranium* could have been caused by a perishable headrest (see I.D.2.d.8. and for example: Geus 1991: 57; Herrmann *et al*. 1990: 32; Roksandic 2002: 105). One skeleton, Conical Hill 02/3-4, was definitely sitting in its grave (see IV.A.1.). The same is probably true for at least another two individuals, Abu Tabari 02/28-11 and -21. It appears noteworthy that the Bari traditionally inter the Dupi and the Uduk all their dead in sitting positions (see I.D.2.d.8.).

Several skeletons were found in atypical positions (see IV.A.1.). There was, however, no evidence of a connection between the seemingly deviant *in situ* positions and any unusual burial customs. The underlying post-depositional movements were unquestionably caused by the build up of putrefaction gasses, natural disarticulation processes, animal activities and strong winds (e.g. Aufderheide/Rodríguez-Martín 1998: 15-17; Bass 1997; Benton/Harper 1997: 8, 11-13; Boddington *et al*. 1987; Byers 2002: 105-114; Galloway 1997; Galloway *et al*. 1989; Grupe 2007; Haglund/Sorg 1997; Henke/Rothe 1994: 21-23; Herrmann *et al.* 1990: 5, 34, 126, 320; Janaway 1996; Kjorlien *et al*. 2009; Littleton 2000; Nawrocki 1995; Nelson 1998; Reeves 2009; Renfrew/Bahn 1996: 267-270; Roksandic 2002; Wells 1967: 11). For instance, the build-up of putrefaction gasses had almost certainly caused Abu Tabari 02/28-5 and -8 to assume such atypical *in situ* positions (see Figure 68). If sufficient space is available or only little resistance to post-depositional movements is encountered, positions similar to those in which these two individuals were found are to be expected as the result of normal taphonomic processes. Considerable amounts of gas, produced by the bacteria involved in putrefaction, can build up inside cadavers, particularly at temperatures between 21 and 38°C and after *ante mortem* bacterial infections. The substantial pressures caused by the build-up of these gases, which can be powerful enough to make led coffins explode, regularly cause arms and legs to move, in most cases to flex and abduct (e.g. Green 2000: 1165-1166; Herrmann *et al*. 1990: 5, 32, 34, 320; Pounder 2000: 1171; Prokop 1976: 45-48; Roksandic 2002: 101-104, 106-107; Schwerd 1992: 190). Conical Hill 02/3-4 may be cited as another example of a deviant *in situ* position. The way this skeleton was positioned when it was unearthed suggested that Conical Hill 02/3-4 was originally sitting with bent and adducted arms and legs drawn close to the body (see Figure 68). Both the hip (*Articulatio coxae*) and the knee joint (*Articulatio genus*) are surprisingly unstable after death. In addition, the head is regularly the first part of the body which becomes detached during the period of *post mortem* disarticulation. Bearing this and the likely effects of gravity in mind, the position of Conical Hill 02/3-4's left leg and *Cranium* and the fact that the body as a whole was slightly leaning backwards were interpreted as the results of post-depositional movements brought about by ordinary taphonomic processes (e.g. Benton/Harper 1997: 8, 11-13; Grupe 2007: 249; Herrmann *et al*. 1990: 5, 34, 320; Prokop 1976: 48; Roksandic 2002: 102-104, 106-107).

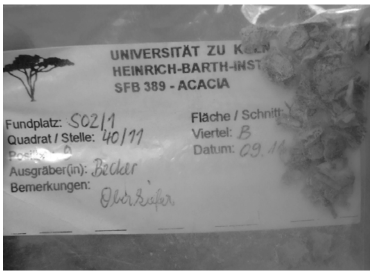
In situ positions which are seemingly extraordinary, like the ones just described, can often be normal or easily explained as the result of events connected with the decomposition of a body. Nonetheless, the possibility that certain cultural practices may have caused peculiar *in situ* positions or created conditions which could have encouraged post-depositional movements should always be taken into consideration as well. For example, wrapping bodies in animal skins and constructing burial chambers have been described in various pertinent ethnographic and archaeological publications. Yet, whenever convincing evidence of some sort of burial custom, which could easily explain an unusual *in situ* position, is missing and natural post-depositional movements cannot be ruled out, hypotheses about human interference should undoubtedly be rejected (see I.D.2.d.8. and for example: Coppens/Chamla 1978: 175; Di Lernia/Manzi 1998; Dzierżykray-Rogalski 1977: 585, 1984: 333; Fitzpatrick/Nelson 2008; Gauthier 1996; Gauthier/Gauthier 1999; Georgeon *et al*. 1993; Geus 1991; Irish *et al*. 2003; Lange 2005; Mariotti *et al*. 2009; Paris 1990, 1996; Schuck 2002: 239, 247, 248, 249, 251; Sereno *et al*. 2008: 2-11).

V.C.1.b. Preservation

The Wadi Howar skeletons' extraordinarily poor state of preservation was to be expected (see I.C.4.a., I.C.4.b.1., 2. and IV.A.2.). The Wadi Howar region's climate is hot and was seasonally humid in the past. The daily temperature fluctuations in the Eastern Sahara are considerable. Fierce desert winds, which occur almost daily in the Wadi Howar, can expose and modify skeletal remains. The sand in which the individuals were buried is highly permeable. Many animals commonly encountered in savannah and desert environments damage skeletons (see I.C.1.b., c. and for example: Bass 1997; Behrensmeyer 1978; Bell *et al*. 1996; Bello *et al*. 2006; Boddington *et al*. 1987; Domínguez-Solera/Domínguez-Rodrigo 2009; Fiedler/Graw 2003; Galloway 1997; Galloway *et al*. 1989; Grupe 2007; Haglund/Sorg 1997; Herrmann *et al*. 1990: 5-8, 12, 126; Hughes/White 2009; Janaway 1996; Janjua/Rogers 2008; Kjorlien *et al*. 2009; Klippel/Synstelien 2007; Littleton 2000; Nelson 1998; Nielsen-Marsh *et al*. 2007; Pittoni 2009; Reeves 2009; Smith *et al*. 2007; Stojanowski *et al*. 2002; Wilson *et al*. 2007).

Although the extensive *post mortem* damage was not surprising, a number of animal-induced lesions as well as the occurrence of both pseudopathologies and damage mimicking traces of occupational stress were remarkable. The fairly widespread presence of *post mortem* damage caused by insects was quite striking (see Table 6, Figure 69 and 100). Certain types of beetles, moth larvae, bees, wasps and termites can leave gnawing marks on bones. *Hymenoptera* burrowing into the sand are a common sight in the Wadi Howar. Therefore, it can probably be assumed that these animals are to blame for most of the observed insect-induced damage (e.g. Aufderheide/Rodríguez-Martín 1998: 15-16; Behrensmeyer 1978: 154, 156; Brothwell 1981: 173; Dutour 1983: 311; Herrmann *et al*. 1990: 5; Mitchell 2003: 120; Pittoni 2009; Wells 1967: 10). Small bone masses were attached to the surfaces of various bones of six individuals (see Table 6, Figure 69 and 100). Given the appearance, number and location of these bone masses, it was originally suspected that they could be secondary tumours. However, the histological analyses carried out by Prof. Dr. Dr. M. Schultz at the University of Göttingen showed that these small bone masses were in fact small bone fragments sintered onto the surfaces of other bones (Schultz 2001: 137-140, 2010: personal communication).


(a)

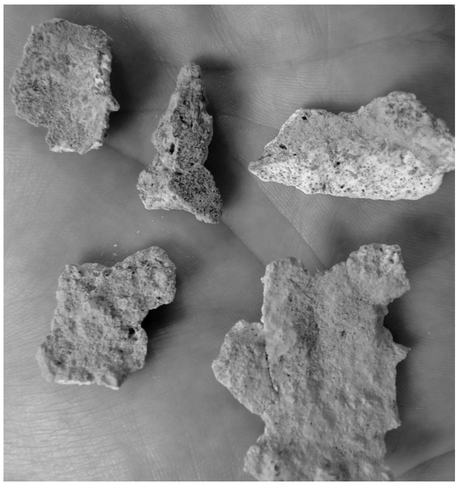


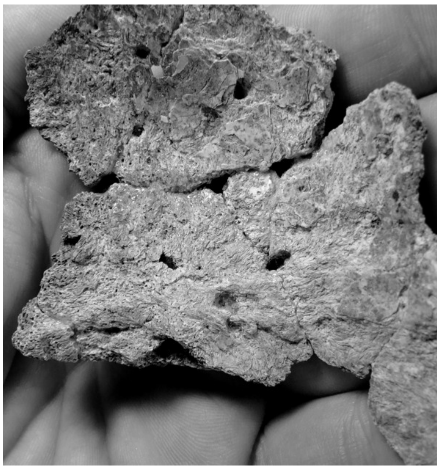
(b)


(c)


(d)


(e)


(f)


(g)


(h)


(i)


(j)


(k)


(l)

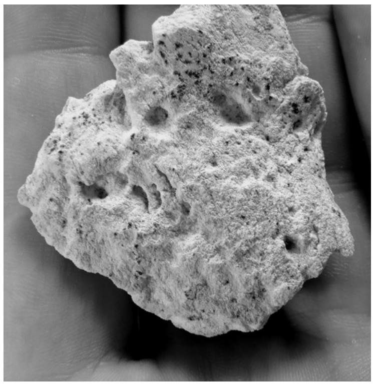
Figure 99: Fragmentation, sandblasting, bleaching, weathering and decomposition. Abu Tabari 02/1-2: fragments of the bones of the left upper extremity (*Ossa membri superioris*) (a), Abu Tabari 02/1-8: fragments of the *Maxilla* (b), Abu Tabari 02/28-7: fragments of the left *Radius* and *Ulna* (c), Abu Tabari 02/1-5: sandblasted and bleached long bone fragments (d), Abu Tabari 02/1-6: partially decomposed, bleached and weathered fragments (e), Abu Tabari 02/1-7: partially decomposed cranial fragments (f), Abu Tabari 02/28-7: partially decomposed and weathered fragments of the occipital bone (*Os occipitale*) (g), Abu Tabari 02/28-7: partially decomposed and weathered fragment of the left *Femur* (h), Abu Tabari 02/28-20: partially decomposed cranial fragments (i), Abu Tabari 02/28-20: partially decomposed long bone fragments (j), Abu Tabari 02/1-7: sandblasted and bleached fragment of the right *Femur* (k) and Abu Tabari 02/28-15: sandblasted and bleached fragment of the right *Femur* (l).

Most of the countless pits and scratches, almost every fragment of the Wadi Howar remains exhibited, undoubtedly represented *post mortem* damage. Still, the shape and location of some lesions could have been interpreted as evidence of *ante* or *peri mortem* trauma. Unfortunately, given the abundance of *post mortem* damage and the possibility of *ante mortem* healing, it was not always possible to determine the exact nature of these lesions (e.g. Aufderheide/Rodríguez-Martín 1998: 15-17, 23-24, 27-28; Benton/Harper 1997: 11-13; Boddington *et al*. 1987; Brothwell 1981: 48, 173; Calce/Rogers 2007; Czarnetzki *et al*. 1985: 45, 56-58; Domínguez-Rodrigo/Piqueras 2003; Haglund/Sorg 1997; Herrmann *et al*. 1990: 117, 125-126, 133; İşcan/McCabe 2000; İşcan/Quatrehomme 2000: 273-274; Ortner/Putschar 1981: 44; Quatrehomme/İşcan 1997; Wells 1967; Wheatley 2008; White 2000: 407-423; Wieberg/Wescott 2008). For example, two scratches formed an approximately 2.6 cm long lesion about 1 cm above the right temporal line (*Linea temporalis*) on the frontal bone (*Os frontale*) of Abu Tabari 02/28-5 (see Figure 69). They neither looked like the single rough lesions caused by carnivores nor like the flat-bottomed grooves indicative of rodent gnawing. They were, however, reminiscent of the typically V-shaped marks left behind by sharp-edged tools. Their location, above the line where the brim of a hat would come to rest, lent further support to the hypothesis that they were traces of *ante mortem* trauma. Despite these facts, it seemed much more likely that the scratches were merely sandblasted vessel impressions. Vessel impressions in this area of the *Cranium* are particularly common in biologically sub-Saharan populations. Furthermore, the relevant part of Abu Tabari 02/28-5's *Cranium* had obviously been exposed on the surface for a considerable amount of time. Yet, associating these scratches on Abu Tabari 02/28-5's frontal bone (*Os frontale*) with *ante mortem* sharp force trauma was tempting. Not only dangerous tribal sports and intra- or inter-tribal violence but also intentional scarification could have theoretically caused the lesions. Not least the Ancient Egyptian depictions of "*Nehesiu*" demonstrate that tribe-specific scarification patterns on the forehead have been in use for millennia. Evans-Pritchard (1940: 249) observed that the brows of young Nuer men were "*cut to the bone with a small knife, in six long cuts from ear to ear*." Moreover, Abu Tabari 02/28-5's lesions were compatible with the tribal scars of certain Dinka groups (see I.D.1.a.3.b., I.D.2.b.3., I.D.2.c.1., I.D.2.d.4., I.D.2.d.5., I.D.2.d.7. and for example: Alvrus 1999: 423-425; Aufderheide/Rodríguez-Martín 1998: 23-24; Caputo 1982; Coote 1994: 259; Evans-Pritchard 1940: 236-237, 249-251, 256-257; Fisher 1984; Herrmann *et al*.1990: 5-8, 12, 117, 126-127, 133, 138; İşcan/McCabe 2000: 200, 204-205; İşcan/Quatrehomme 2000: 273-274; Kanz/Grossschmidt 2006; Kaufmann *et al*. 1984: 31; Lienhardt 1961: 145; Rhine 1990: 12, 16; Ryle 1982; Seligman 1913: 646-648; Steyn/İşcan 2000: 222-223; Wells 1967: 7, 10-11; White 2000: 407-423; Williamson *et al*. 2003: 117, 120).

(a) (b)

(c)

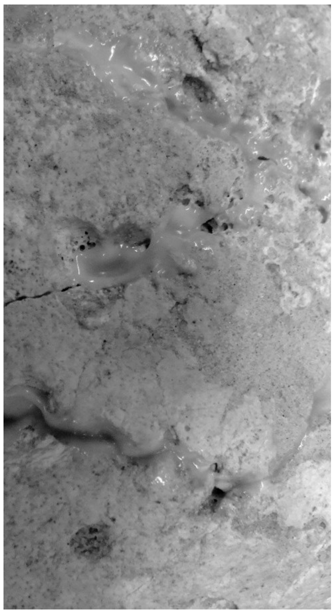
(d)



(e)

(f)

(g)



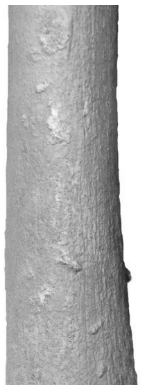
(h)

(i)

(j)

(k)

(l)



(m)

(n)

(o)

(p)

(q)

(r) (s) (t)

Figure 100: Animal-induced lesions, pseudopathologies, *post mortem* damage mimicking traces of occupational stress and secondary *post mortem* damage. Abu Tabari 02/28-2: left *Humerus* with animal (probably rodent) gnawing (a), Abu Tabari 02/28-5: left *Humerus* with animal (probably rodent) gnawing (b), Abu Tabari 02/28-21: fragment of the right *Femur* with animal-induced lesions enlarged by bone decay (c), Abu Tabari 02/28-23: *post mortem* damage caused by rodent gnawing and bone decay on the outer surface (*Tabula externa*) of the *Cranium* (d), Conical Hill 02/3-4: fragment of the right temporal bone (*Os temporale*) with traces of insect gnawing enlarged by bone decay (e), Abu Tabari 02/28-8: occipital bone (*Os occipitale*) with insect gnawing (f), Conical Hill 95/4: right parietal bone (*Os parietale*) with insect-induced lesions enlarged by bone decay (g), Conical Hill 95/4: left parietal bone (*Os parietale*) with insect gnawing (h), Abu Tabari 02/1-2: pseudo-neoplasm distal to the left lesser trochanter (*Trochanter minor*) (i), Abu Tabari 02/1-2: pseudo-neoplasms on the medial surface (*Facies medialis*) of the distal third of the left *Tibia* (j), Abu Tabari 02/28-2: pseudo-neoplasms on the medial surface (*Facies medialis*) of the left *Humerus* (k), Abu Tabari 02/28-8: pseudo-neoplasm in the left mandibular fossa (*Fossa mandibularis*) (l), Abu Tabari 02/28-15: pseudo-neoplasms on the posterior surface (*Facies posterior*) of the distal half of the left *Tibia* (m), Conical Hill 02/3-4: right lower second molar (*Dens molaris inferior II*) with distolingual facets mimicking paramasticatory wear (n), Conical Hill 02/3-4: right lower third molar (*Dens molaris inferior III*) with mesial facets mimicking paramasticatory wear (o), Conical Hill 02/3-4: right lower first, second and third molar (*Dens molaris inferior I, II et III*) with facets mimicking paramasticatory wear (p), Djabarona 96/120-3: right lower third molar (*Dens molaris inferior III*) with vestibular facets mimicking paramasticatory wear (q), Abu Tabari 02-28-5: cut mark-like lesion on the external surface (*Facies externa*) of a costal fragment (r), Abu Tabari 02/1-3: crushed fragment of the right *Femur* in glue matrix (s) and Conical Hill 02/3-4: bone fragments in glue matrix (t).

A number of Conical Hill 02/3-4's, Djabarona 96/4's and 96/120-3's molars (*Dentes molares*) displayed facets which resembled traces of paramasticatory tooth use (see Table 6, Figure 69 and 100). As far as Djabarona 96/4 and 96/120-3 were concerned, the facets were almost certainly the result of a combination of cracking and sandblasting. Conical Hill 02/3-4's two affected molars (*Dens molaris inferior II et III*), on the other hand, had not been exposed to sandblasting. Thus, it is not clear what could have caused this *post mortem* damage (e.g. Aufderheide/Rodríguez-Martín 1998: 15-16; Behrensmeyer 1978; Grupe 2007; Herrmann *et al*. 1990: 5-8; Hughes/White 2009; Littleton 2000; Nelson 1998; White 2000: 410-416).

It is self-evident that an enormous amount of information was lost due to the extensive primary and secondary *post mortem* damage (see III.A.2., III.B.1.a., IV.A.2. and Appendix XI.). Clearly, distorting factors had to be borne in mind when the preservation indices of the Wadi Howar series and the comparative samples were compared (see Figure 70, Table 13 and Appendix XI.). The preservation indices unquestionably overestimated the quality of the comparative samples. For obvious reasons, only the best-preserved members of these samples were selected when the comparative data were collected. The Wadi Howar material's preservation indices were not entirely representative either. The preservation data lists were variants of the data collection lists (see III.A.2. and III.B.1.b.). Only variables for which data could usually be gathered from a Wadi Howar individual were put on the data collection lists. In addition, the Wadi Howar individuals were processed much more thoroughly than the comparative specimens (see III.A. and III.B.1.). As a result, partially preserved structures of Wadi Howar skeletons were much more likely to be measured or scored. The preservation indices therefore also overestimated the quality of the Wadi Howar material. Nonetheless, even if all these distortions were factored in, a comparison of the preservation indices of the Wadi Howar material and the comparative samples still highlighted just how badly preserved the Wadi Howar material actually was (see Table 13). Differently calculated preservation indices published for other series were not too dissimilar to the ones which were computed for the comparative samples used in this study. A fact which suggested that the preservation indices of the Wadi Howar material and the comparative samples were probably not significantly distorted (e.g. Bello *et al*. 2006; Dutour 1989: 106-109; Galloway *et al*. 1997; Judd 2008(a); Spennemann 1992; Stojanowski *et al*. 2002; Waldron 1987; Walker *et al*. 1988).

Table 13: Overall preservation indices.

	Full preservation data list (%)	Shortened preservation data list (%)	Additional shortened preservation data list (%)
Wadi Howar	24.20	30.66	35.26
Jebel Sahaba/Tushka	-	70.09	80.24[1]
All prehistoric comparative samples	-	63.39[2]	-
All modern comparative samples	-	64.23	-

[1] The values were based on the 15 individuals processed using the alternative shortened data collection list.
[2] The values were calculated without the data of the "Sudanese Hotchpotch" sample.

V.C.1.c. Sex

The Wadi Howar sample's sex distribution was well-balanced (see IV.A.4. and Table 14). This situation was not necessarily to be expected. Empirically, in skeletal series, males are more likely to outnumber females than vice versa. Taphonomic factors favour the preservation of the relatively larger skeletons of males. Generally, the ratio of newborn boys to newborn girls is around 102:100 to 108:100. Populations whose members have low mean life expectancies usually comprise more males than females. Thus, the slight relative lack of males, particularly adult or older males, in the Wadi Howar sample was somewhat surprising (for sex ratios in skeletal series see Table 15 and for example: Bentley *et al*. 2001; Grupe *et al*. 2005: 107-113; Herrmann *et al.* 1990: 301-334; Hewlett 1991; Hoppa/Vaupel 2002; Landers 1992; Larsen 1995; Ortner/Frohlich 2007: 359; Promińska 1984: 327-329; Saunders *et al*. 1995; Wood *et al*. 1992; for taphonomic factors favouring the preservation of larger skeletal elements see for example: Bello *et al*. 2006; Galloway *et al*. 1997; Grupe 2007; Herrmann *et al*. 1990: 5-12; Littleton 2000; Munson 2000; Spennemann 1992; Stojanowski *et al*. 2002; Waldron 1987; Willey *et al*. 1997; for sex ratios in living populations see for example: Birg 1994; Grupe *et al*. 2005: 213-270; Knußmann 1996: 465-466, 472-474; Møller *et al*. 2009).

Table 14: Age-, sub-sample- and sample-specific sex distributions.

	pre-Leiterband sub-sample	Leiterband sub-sample	Wadi Howar sample
Males	50.00% (4:8)	42.86% (9:21)	43.75% (14:32)
Females	37.50% (3:8)	52.38% (11:21)	50.00% (16:32)
Indeterminate	12.50% (1:8)	4.76% (1:21)	6.25% (2:32)
Sub-adult males	25.00% (1:4)	22.22% (2:9)	21.43% (3:14)
Sub-adult females[1]	33.33% (1:3)	0.00% (0:11)	6.25% (1:16)
Sub-adult females[2]	33.33% (1:3)	9.09% (1:11)	12.50% (2:16)
Adult or older males	75.00% (3:4)	77.78% (7:9)	78.57% (11:14)
Adult or older females[1]	66.67% (2:3)	100.00% (11:11)	93.75% (15:16)
Adult or older females[2]	66.67% (2:3)	90.91% (10:11)	87.50% (14:16)

[1] not counting Abu Tabari 02/28-7 as a sub-adult; [2] counting Abu Tabari 02/28-7 as a sub-adult

This deficit could have been caused by, for example, sampling error, sex-specific risks during childhood or violence-related burial customs. Of course, it is not overly unlikely that sampling error was to blame for this situation. Nevertheless, it is certainly not inconceivable that sex-specific risks during childhood and violence-related burial customs were the primary underlying factors. The pertinent ethnographic sources strongly suggest that the boys of the prehistoric Wadi Howar population must have been involved in dangerous day-to-day activities. For instance, it is highly probable that boys performed hunting and herding tasks much more frequently than girls. Both activities can easily result in fatal injuries. This could explain why males were over-represented in the "sub-adult" and under-represented in the "adult and older" category (for sex-specific tasks performed by sub-adults see I.D.2.d.2. and for example: Barnard 1992; Blurton Jones *et al*. 1996; Evans-Pritchard 1940; Gordon 1992; Holý 1974; Little/Leslie 1999; Nadel 1947; Seligman/Seligman 1932; Southall 1976; Tubiana/Tubiana 1977; for the dangers of hunting and herding see for example: Boyle *et al*. 1997; Busch *et al*. 1986; Carruth *et al*. 2002; Conrad 1994; Criddle 2001; Durrheim/Leggat 1999; Freer 2004; Khan/Olumide 2006; Langley 1999; Norwood *et al*. 2000; Pickles 1987; Pratt *et al*. 1992; Salminen 2004; Sugiyama 2004; Ugboko *et al*. 2002). Intra- and inter-tribal violence was and remains common among the relevant prehistoric and modern groups (see I.D.1.a.3.b., I.D.2.b.2., I.D.2.c.1., I.D.2.d.4., 6., 5. and 7.). People who have died a violent death are traditionally either not or separately buried by various Southern Sudanese groups (see I.D.2.d.8.). It can be assumed that men had a higher likelihood of dying during episodes of inter-personal violence. Consequently, adult or older males could have also been under-represented for this reason (e.g. Alvrus 1999; Anderson 1968: 1025, 1035, 1039-1040; Barnard 1992; Buzon/Richman 2007; Carroll 1988; Domett/Tayles 2006; Evans-Pritchard 1940; Gray *et al*. 2003; Greene/Armelagos 1972: 53-54, 63; Hill *et al*. 2007; Judd 2004, 2006; Kelly 1985; Nadel 1947; Owens 2007; Roksandic *et al*. 2006; Seifert *et al*. 2009; Seligman/Seligman 1932; Sugiyama 2004; Thorpe 2003; Tung 2008; Wendorf 1968: 990, 992-993; Williamson *et al*. 2003; Wrangham *et al*. 2006).

Table 15: Sex distributions of selected samples.

	Males	**Females**	**Indeterminate**
pre-Leiterband sub-sample	50.00% (4:8)	37.50% (3:8)	12.50% (1:8)
Leiterband sub-sample	42.86% (9:21)	52.38% (11:21)	4.76% (1:21)
Wadi Howar sample	43.75% (14:32)	50.00% (16:32)	6.25% (2:32)
Sahara "*néolithique*"[1]	50.00% (29:58)	20.69% (12:58)	29.31% (17:58)
Sahara "*protohistorique*"[1]	30.30% (20:66)	36.36% (24:66)	33.33% (22:66)
Malian Sahara[2]	7.96% (9:113)	7.08% (8:113)	84.96% (96:113)
Wadi Tanezzuft 96/129[3]	28.57% (8:28)	32.14% (9:28)	39.29% (11:28)
Jebel Sahaba[4]	36.54% (19:52)	32.69% (17:52)	30.77% (16:52)
Kadero ("Khartoum Neolithic")[5]	48.65% (18:37)	21.62% (8:37)	29.73% (11:37)
R12[6]	33.33% (56:168)	32.74% (55:168)	33.93% (57:168)
A-Group[7]	50.00% (37:74)	50.00% (37:74)	-
C-Group[7]	56.20% (213:379)	43.80% (166:379)	-
Pharaonic[7]	60.87% (70:115)	39.13% (45:115)	-
Meroïtic[7]	47.17% (50:106)	52.83% (56:106)	-
Natufian[8]	30.41% (66:217)	13.82% (30:217)	55.76% (121:217)
Neolithic (Levant)[8]	33.21% (87:262)	17.56% (46:262)	49.24% (129:262)
Bâb edh-Dhrâ (Bronze Age, Jordan)[9]	20.91% (78:373)	22.52% (84:373)	56.57% (211:373)
Copper Age (Hungary)[10]	31.69% (58:183)	30.60% (56:183)	37.12% (68:183)

[1] Chamla 1968: 33-34, 121-122; [2] Dutour 1989: 109-112; [3] Ricci *et al*. 2001: 239-242; [4] Anderson 1968: 997; [5] Promińska 1984: 327-329; [6] Judd 2008(a): 96; [7] Nielsen 1970: 27-28; [8] Eshed *et al*. 2004(b): 320; [9] Ortner/Frohlich 2007: 359; [10] Ubelaker/Pap 2009: 25

Interestingly, the possibly sex-specific *in situ* positions at Abu Tabari 02/1 appeared to be the only cultural sex indicators (see IV.A.1). At first glance, it did, however, seem that certain grave goods may be indicative of the sex of individuals. Unfortunately, both the results of the sex estimations and the pertinent ethnographic literature leave little doubt that ceramic vessels, axe heads, ostrich eggshell beads or bird wings could have been buried with men and women (see I.D.2.d.7., 8. and IV.A.4.). Household utensils like pots are still buried with dead of either sex in various relevant groups (see I.D.2.d.8.). Axe heads, like the one found together with Abu Tabari 02/28-3, are not necessarily suggestive of a male skeleton (see I.C.3.a.2., I.C.3.b.1., 2., I.D.2.b.2. and I.D.2.d.8.). Nuba women use ceremonial axes which are often placed on their graves after their death (see Nadel 1947: 227). Axe heads are also used as rain stones (see Seligman/Seligman 1932: 476-477). Rain makers, of course, can be male or female (e.g. Seligman/Seligman 1932). Moreover, it is usually women who gather wood, a task for which axes are used (see I.D.2.d.2.). Abu Tabari 02/28-7 was the most striking case of a skeleton associated with ostrich eggshell beads (see I.C.3.b.2.). Ostrich eggshell beads, strung up as necklaces or belts or attached to clothes, are worn by girls and boys as well as men and women. Bodies are also often buried with such personal effects (see I.D.2.d.7. and 8.). When Abu Tabari 02/1-2 was excavated the wing bones of a spur-winged goose (*Plectropterus gambensis*) were discovered on her *Pelvis* (Jesse 2003(a): 45). Placing bird wings in general and those of a spur-winged goose in particular on a body could be interpreted in connection with several facts. The spur-winged goose lends its name to the Atwot, a tribe which probably separated from the Nuer in the 16th century (see I.D.2.d.6. and Seligman/Seligman 1932: 135). A Shilluk funerary ritual involves placing a fowl next to the head of the deceased (see Seligman/Seligman 1932: 103-104). Male members of Nuba tribes, like the Otoro, keep wings of guinea fowls (*Numididae*) as hunting trophies and Otoro girls keep such wings given to them by their boyfriends or suitors (see Nadel 1947: 59).

V.C.1.d. Age

The Wadi Howar sample's overall and adult mean age at death were similar to those published for other prehistoric series (see IV.A.5. and Table 16). Yet, even in comparison with these mean ages at death, they were relatively low. They were also lower than, but not entirely dissimilar to, those of modern East African foragers or arid zone pastoralists (see I.D.2.d.4.). Furthermore, not only individuals in the "*Infans I*", "*Infans II*" and "*Iuvenis*" category but also individuals in the "*Maturus*" and "*Senilis*" category appeared to be under-represented (see IV.A.5. and Table 16). In this context, it is important to remember that direct comparisons of relevant osteological data, such as average ages at death or percentages of sub- and post-adults, can be misleading. Firstly, taphonomic processes, funerary customs and logistical shortcomings of excavations affect the composition of skeletal series. As a result, virtually no prehistoric sample is fully representative of the living population its members once belonged to. Secondly, there are serious methodological problems. Different researchers employ different aging techniques. Of course, different aging techniques can produce quite different age at death estimates. The population specificity of the pertinent methods and their intrinsic inaccuracies create further difficulties. Additionally, there are several ways of categorising and reporting age at death estimates. Comparisons of modern and prehistoric demographic data have to be treated with even greater caution. Unlike their palaeodemographic counterparts, demographic studies can make sure that they use representative samples. Demographic research which focuses on living populations can usually also determine individual ages fairly easily and reliably (for factors influencing the composition of skeletal samples see I.D.2.d.8., V.C.1.c. and for example: Bass 1987: 300-309; Bello *et al*. 2006; Boddington *et al*. 1987; Di Lernia/Manzi 1998; Galloway *et al*. 1997; Geus 1991; Grupe 2007; Grupe *et al*. 2005: 102-123; Guy *et al*. 1997; Haglund/Sorg 1997; Herrmann *et al*. 1990: 5-14, 21-27, 43-45, 48-51, 303-333; Kunter 1988; Littleton 2000; Mariotti *et al*. 2009; Munson 2000; Nelson 1998; Paine/Harpending 1998; Paris 1995; Renfrew/Bahn 1996: 45-110; Spennemann 1992; Stojanowski *et al*. 2002; Ullrich 1996; Waldron 1987; White 2000: 277-301; Willey *et al*. 1997; Wood *et al*. 1992; Zeitoun *et al*. 2004; for palaeodemographic problems created by the application of different aging techniques see for example: Cho *et al*. 2006; Djurić *et al*. 2007; Falys *et al*. 2006; Herrmann *et al*. 1990: 52-73; Hoppa 2000; Hoppa/Vaupel 2002; Kemkes-Grottenthaler 1996, 2002; Martrille *et al*. 2007; Meindl/Russel 1998; Molleson/Cox 1993; Rösing *et al*. 2007: 82-85; Schmeling *et al*. 2003; Szilvássy 1988; Wittwer-Backofen *et al*. 2008; for information on demographic research see for example: Birg 1994; Grupe *et al*. 2005: 213-270; Knußmann 1996: 461-474; Mueller *et al*. 2000; Poston/Bouvier 2010; Yaukey *et al*. 2007).

Table 16: Comparison of average overall and adult ages at death and percentages of sub- and post-adults.

	Mean age at death (years)	**Mean adult age at death** (years)	**Sub-adults**	**Post-adults**
pre-Leiterband sub-sample[1]	32.2	38.8	25.00% (2:8)	37.50% (3:8)
pre-Leiterband sub-sample[2]	32.2	38.8	25.00% (2:8)	12.50% (1:8)
Leiterband sub-sample[1, 3]	24.2	25.9	9.52% (2:21)	9.52% (2:21)
Leiterband sub-sample[2, 4]	24.2	26.4	14.29 (3:21)	4.76 (1:21)
Wadi Howar sample[1, 3]	26.8	29.1	12.50% (4:32)	15.63% (5:32)
Wadi Howar sample[2, 4]	26.8	29.5	15.63% (5:32)	6.25% (2:32)
Sahara "*néolithique*"[5]	-	-	15.91% (7:44)	15.91% (7:44)
Sahara "*protohistorique*"[5]	-	-	31.11% (14:45)	28.89% (13:45)
Malian Sahara[6]	-	-	25.66% (29:113)	7.08% (8:113)
Wadi Tanezzuft 96/129[7]	-	-	39.29% (11:28)	10.71% (3:28)
Jebel Sahaba[8]	-	-	40.38% (21:52)	13.46% (7:52)
Kadero ("Khartoum Neolithic")[9]	29.6	44.8	29.73% (11:37)	37.84% (14:37)
R12[10]	27.1	38.7	27.98% (47:168)	28.57% (48:168)
A-Group[11]	-	-	28.74% (25:87)	28.74% (25:87)
C-Group[11]	-	-	29.34% (120:409)	33.01% (135:409)
Pharaonic[11]	-	-	18.75% (24:128)	40.63% (52:128)
Meroïtic[11]	-	-	18.58% (21:113)	43.36% (49:113)
Iberomaurusian[12]	33.2	-	-	-
Natufian[12]	36.5	-	-	-
Natufian[13]	24.6	31.2	37.79% (82:217)	17.51% (38:217)
Neolithic (Levant)[13]	25.5	32.1	42.37% (111:262)	22.52% (59:262)
Bâb edh-Dhrâ (Bronze Age, Jordan)[14]	21.4	36.7	46.92% (175:373)	17.96% (67:373)
Franchthi (Mesolithic, Greece)[15]	28.1	-	-	-
Franchthi (Neolithic, Greece)[15]	28.5	-	-	-
Alepotrypa Cave (Neolithic, Greece)[15]	29.0	-	-	-
Copper Age (Hungary)[16]	28.2	33.8	24.04% (44:183)	21.31% (39:183)

[1] counting individuals with an analysis age of 40 years as post-adults; [2] not counting individuals with an analysis age of 40 years as post-adults; [3] not counting Abu Tabari 02/28-7 as a sub-adult; [4] counting Abu Tabari 02/28-7 as a sub-adult; [5] Chamla 1968: 33-34, 121-122; [6] Dutour 1989: 109-112; [7] Ricci *et al*. 2001: 239-242; [8] Anderson 1968: 997; [9] Promińska 1984: 327-330; [10] Judd 2008(a): 96; [11] Nielsen 1970: 26, 29; [12] Karasik *et al*. 2000: 269-270; [13] Eshed *et al*. 2004(b): 320; [14] Ortner/Frohlich 2007: 359, 365; [15] Papathanasiou *et al*. 2000: 218; [16] Ubelaker/Pap 2009: 25

All the same, the Wadi Howar sample's comparatively low mean ages at death and the under-representation of sub- and post-adults warranted interpretation. The relative lack of sub- and post-adults was, in all probability, the result of sampling error. Both the generally poor preservation of skeletal remains at the sites in the Wadi Howar and the highly selective excavation strategy could have easily caused such a distortion (see IV.A.2., V.C.1.b. and V.C.4.b.2.). Sampling error could have also been to blame for the comparatively low overall and adult mean age at death. However, this could have had other reasons as well. Skeletal samples drawn from both growing populations and populations with a genuinely low life expectancy are characterised by a low average age at death. As, for example, Sattenspiel/Harpending (1983), Buikstra *et al*. (1986) and Johansson/Horowitz (1986) pointed out, skeletal samples drawn from growing populations have low mean ages at death. High percentages of sub-adults and young adults are the hallmarks of such growing populations. In other words, the young continuously outnumber the old when a population is growing. Therefore, the average life expectancy at birth of a growing population is likely to be higher than the mean age at death of a sample of its dead. A low average age at death can thus not automatically be equated with adverse living conditions in palaeodemography. Nevertheless, a low life expectancy is undoubtedly a valid indicator of a poor quality of life in demography. Moreover, as demographic analyses of historically documented and modern populations clearly show, population growth and low life expectancies are by no means mutually exclusive (for difficulties interpreting palaeodemographic data see for example: Buikstra *et al*. 1986; Drenhaus 1988; Grupe *et al*. 2005: 102-123; Herrmann *et al.* 1990: 303-333; Johansson/Horowitz 1986; Landers 1992; Larsen 2002: 141-142; Meindl 1992; Paine/Harpending 1996, 1998; Sattenspiel/Harpending 1983; Wood *et al*. 1992; for relevant demographic findings about historically documented and modern populations see for example: Birg 1994: 217-223; Bocquet-Appel/Naji 2006; Cohen 2003: 1172; Duncan *et al*. 2001; Grupe *et al*. 2005: 213-270; Klaus/Tam 2009; Knußmann 1996: 461-474; L'Abbé *et al*. 2008(a); Lee 2003; Lewis 2002; Malina *et al*. 2008; Mueller *et al*. 2000; Pennington 1996; Pfister 2007; Poston/Bouvier 2010; United Nations 2007; Yaukey *et al*. 2007).

In view of all the relevant evidence, it seemed to be most probable that both population growth and adverse living conditions were responsible for the Wadi Howar sample's low average ages at death. Generally speaking, populations grew during the Neolithic. Depending on how one defines sub- and post-adults, the Wadi Howar sample's ratio of sub- to post-adults could have been interpreted as indicative of population growth as well (see IV.C., Table 16 and V.C.3.). Furthermore, there is archaeological, linguistic, ethnographic, demographic, genetic and anthropological data which suggests that the population of the Sahara must have grown both in the course of its recolonisation and during the intensification of animal husbandry. Some of the results of the analyses performed to determine the Wadi Howar material's metric and non-metric affinities also appeared to be best interpreted in connection with these two population expansions (see IV.D. and V.C.4.). Most of the results of analyses comparing Meso- and Neolithic skeletal samples strongly suggest that the shift from an extractive to a productive subsistence economy was usually not only accompanied by population growth but also by increases in occupational stress, morbidity and mortality. Although they were apparently slightly healthier than their Leiterband successors, the pre-Leiterband individuals unquestionably already led fairly stressful lives (see IV.A.12, 13., IV.C. and V.C.3.). More importantly, the results of the search for diachronic differences within the Wadi Howar sample indicated that the specialised herding economy of the Leiterband/Herringbone phase was associated with rising physiological stress levels (for population growth during the Neolithic in general see for example: Bocquet-Appel 2002; Bocquet-Appel/Naji 2006; Eshed *et al*. 2004(b); Knußmann 1996: 470-472; Kremer 1993; Landers 1992; Larsen 1995; Meindl 1992; Wood *et al*. 1992; Zilhão 1998: 692; for archaeological, linguistic, ethnographic, demographic, genetic and anthropological data suggestive of prehistoric population growth in the Sahara see V.C.4.b. and for example: Achard *et al*. 1994; Bentley *et al*. 1993; Bentley *et al*. 2001; Blench 2006: 95-108, 139-162; Blurton Jones *et al*. 1992; Blurton Jones *et al*. 1996: 168-169, 179-180; Breunig/Neumann 2002; Černý *et al*. 2007; Černý *et al*. 2009; Coppens/Chamla 1978; Cornevin 1982; Di Lernia/Manzi 2002; Dimmendaal 2007(a), 2007(b); Dutour 1989; Dutour *et al*. 1994; Ehret 1993, 1999(a), 1999(b), 2006(a), 2006(b); Evans-Pritchard 1940: 3-4, 59, 128; Finucane *et al*. 2008(b); Fratkin 2001: 7; Gallin/Le Quellec 2008; Garcea 2006; Gehlen *et al.* 2002; Haaland 1992, 1995, 2009; Hays 1974; Hewlett 1991; Hoelzmann *et al*. 2001; Jesse 2003(b): 285-287, 2004(a); Jesse/Keding 2002; Keding 1997(a), 2009: 290-447, 784-788; Kelly 1985; Kröpelin *et al*. 2008; Kuper 1978; Kuper/Kröpelin 2006; Lange 2005: 18; Leslie *et al*. 1999(a); Leslie *et al*. 1999(b); MacDonald 1998; Marlowe 2005; Mohammed-Ali/Khabir 2003; Mulder 1992; Ozainne *et al*. 2009; Pachur/Altmann 2006; Paris 1996; Pennington 1996, 2001; Petit-Maire 1979; Petit-Maire/Riser 1983; Rilly 2004; Roth 1993; Sadig 2009; Sereno *et al*. 2008; Smith 1980; Southall 1976: 478-482; Sutton 1974; Testart 1982; Walker *et al*. 2006; for osteological evidence indicative of worsening living conditions brought about by the adoption of typically Neolithic subsistence strategies see for example: Cohen/Armelagos 1984; Eshed *et al*. 2004(a); Eshed *et al*. 2004(b); Johansson/Horowitz 1986; Judd 2008(a): 102-103; Larsen 1995, 2002; Lieverse *et al*. 2007(a); Lieverse *et al*. 2007(b); Lieverse *et al*. 2009; Marchi 2008; Starling/Stock 2007; Wood *et al*. 1992).

V.C.1.e. Height

At first glance, the reconstructed living heights of the Wadi Howar sample's adults seemed rather low (see IV.A.6. and for example: Knußmann 1988(c): 258). Yet, the Wadi Howar material was by no means isolated in this regard. On the contrary, not only the published stature estimates for several prominent Saharan and circum-Saharan prehistoric specimens and samples but also the average heights of some highly pertinent modern Sudanese and Saharan groups were quite similar to the calculated Wadi Howar means (see Table 17 and 18). As far as the prehistoric specimens and samples were concerned, Endpfanne I, Shum Laka 1 and Iwo Eleru were close to the Wadi Howar male and Napta Playa E-91-1, R12 and the A-Group were close to the Wadi Howar female mean. The Fur, Teda, Fajelu, Datoga, Dogon and Hadza are modern groups whose average heights were comparable to those of the Wadi Howar sample. That Endpfanne I and Napta Playa E-91-1 were close to the Wadi Howar means made a lot of sense. Morphologically, Nabta Playa E-91-1 is most similar to modern biologically sub-Saharan groups. These female skeletal remains were excavated in the Napta Playa Basin of the Southern Egyptian Sahara. The skeleton was associated with an Early Neolithic settlement. The Early Neolithic of this area has been dated to the period between about 9800 and 7300 BP. It is also noteworthy that the Napta Playa sites yielded remains of very ancient, possibly domesticated, cattle (e.g. Di Lernia 2006: 52, 59; Edwards 2004: 42; Finucane *et al*. 2008(b); Haour 2003: 210; Hassan 2000: 69-78; Henneberg *et al*. 1980; Irish 2001, 2005: 530; Irish *et al*. 2003: 281; Le Quellec 2006: 176-177; Wendorf/Schild 1998, 2001, 2002, 2003). There is a ^{14}C date of 6930±370 BP for Endpfanne I. Endpfanne I has biologically sub-Saharan morphological affinities. The specimen was unearthed at Endpfanne Bardagué in the Chadian Tibesti region. Bardagué is also an area where very early cattle remains have been found (e.g. Finucane *et al*. 2008(b); Hallier/Hallier 2001(b);

Herrmann/Gabriel 1972; Jesse 2003(b): 284, 286, 2004(a): 303-304; Keding 1997(a): 147-165; Kuper 1978: 67, 69; Lhote 1978: 78-79; MacDonald 1998: 41, 2000: 8; Roset 1974). That the Wadi Howar means were comparable to those of the Fur and Teda was not surprising either. 14 of the 24 Southern Sudanese comparative specimens which were processed at the *Musée de l'Homme* were from Darfur, the land of the Fur (see I.D.1.c.2.b., I.D.2.a.1., I.D.2.c.3., I.D.2.d.7. and II.B.2.a.). Similarly, the Tubu were the best represented ethnic group in the Chadian comparative sample used in this study. The Tubu comprise two sub-groups, the Teda and the Daza (see I.C.3.a.4., I.D.2.a.1., I.D.2.c.3., I.D.2.d.1., 2., 5., 6., 7., 8. and II.B.2.b.).

Table 17: Comparison of living height estimates and maximum *Femur* and *Tibia* lengths.

	Living height (cm)			***Femur*** (mm)			***Tibia*** (mm)		
	♂	♀	ø	♂	♀	ø	♂	♀	ø
Wadi Howar	162.1	156.6	158.8	448.6	436.5	441.5	374.0	378.3	376.8
Napta Playa E-91-1[1]	-	152-159	-	-	-	-	-	-	-
Endpfanne I[2]	162.0	-	-	-	-	-	-	-	-
Endpfanne II[2]	170.0	-	-	461.0	-	-	366.5	-	-
Yebbigué[2]	-	159.0	-	-	-	-	-	-	-
W. Teshuinat 96/129[3]	-	-	-	-	-	446.8	-	-	374.5
Tamaya Mellet[4]	175.0	-	-	-	-	-	-	-	-
Tamanrasset II/1[4]	178.0	-	-	480.0	-	-	-	-	-
Tamanrasset II/2[4]	181.0	-	-	-	-	-	418.0	-	-
Karkarichinkat-Sud II[4]	165.0	-	-	-	-	-	-	-	-
El Guettara 1[4]	172.0	-	-	-	-	-	-	-	-
Hassi el Abiod[5]	-	-	-	-	-	466.7	-	-	369.9
Adrar Bous S137[6]	163-178	-	-	450.0	-	-	400.0	-	-
Adrar Bous S141[6]	165-186	-	-	480.0	-	-	392.0	-	-
Iwo Eleru[7]	165.0	-	-	430.0	-	-	-	-	-
Shum Laka 1[8]	166.0	-	-	452.0	-	-	-	-	-
Jebel Sahaba/Tushka[9]	-	-	-	447.4	421.1	435.1	378.1	352.9	366.3
Jebel Sahaba/Tushka[10]	176.9	167.5	-	475.0	443.0	-	407.4	370.0	-
Wadi Halfa[11]	172.7	160.0	-	460.5	437.7	-	402.0	350.0	-
R12[12]	169.7	157.6	-	467.3	430.0	-	-	-	-
Geili[13]	177.0	-	-	-	-	-	-	-	-
A-Group[14]	172.2	156.7	-	476.0	425.3	-	-	-	-
C-Group[14]	167.9	155.9	-	455.4	421.9	-	-	-	-
Pharaonic[14]	165.5	155.0	-	444.2	417.5	-	-	-	-
Meroïtic[14]	166.9	155.3	-	450.9	419.0	-	-	-	-
X-Group[14]	165.8	155.1	-	450.4	418.0	-	-	-	-
Kerma[15]	-	-	-	463.5	430.5	-	-	-	-
Aksha (Meroïtic)[16]	169.5	159.9	-	440.6	412.6	-	377.5	349.9	-
Nubia[17]	-	-	-	430.1	395.7	-	370.9	331.9	-
Sudan[17]	-	-	-	455.1	420.4	-	387.6	357.8	-
West Africa[17]	-	-	-	452.6	422.0	-	388.4	359.3	-
East Africa[17]	-	-	-	462.2	424.6	-	398.8	365.4	-

[1] Irish 2001: 522; [2] Herrmann/Gabriel 1972: 144-148; [3] Ricci *et al.* 2002: 226; [4] Chamla 1968: 224-225, 242-243; [5] Dutour 1989: *Table* 13, 14, 22; [6] Agrilla *et al.* 2008: 372-380; [7] Brothwell/Shaw 1971: 225-226; [8] Orban *et al.* 1996: 217; [9] Appendix XXIV.A.3.; [10] Anderson 1968: 1024; [11] Greene/Armelagos 1972: 47, 91-94; [12] Judd 2008(a): 89, 95; [13] Promińska 1989: 418; [14] Nielsen 1970: 86; [15] Buzon 2006(b): 33; [16] Chamla 1967: 119; [17] Holliday 1997: 258

These findings were fully compatible with the results of the analyses which were performed to determine the Wadi Howar material's metric and non-metric affinities (see IV.D. and V.C.4.). However, it needs to be borne in mind that comparisons of living height estimates can be deceiving (see III.A.5., IV.A.6. and V.B.2.d.). Rarely do different authors employ the same equations to calculate living heights. No stature reconstruction method is entirely accurate. The widespread use of inappropriate formulae is a serious additional problem. Furthermore, given the shortcomings of the Wadi Howar individual's living height estimates, any interpretations with respect to data collected from living groups have to be treated with utmost caution. Comparing long bone lengths, rather than stature estimates, on the other hand, is much less problematic. It therefore appears to be infinitely more important to underline that the Wadi Howar sample's mean maximum *Femur* and *Tibia* lengths blended in extraordinarily well with those of other prehistoric and modern Saharan, Sudanese and East African series (see Table 17). Moreover, the comparison of these data clearly showed that the Wadi Howar averages of maximum femoral and tibial dimensions were certainly not particularly low.

V.C.1.f. Weight

The averages of the Wadi Howar sample's body mass reconstructions were low (see IV.A.7.). Of course, any interpretation of these low mean weight estimates had to take the low averages of the stature reconstructions into account (see IV.A.6. and V.C.1.e.). Differing body heights could be easily factored in by basing comparisons on both body weights and body mass index values. Yet, even then, it was not forgotten that the living weight estimates of the Wadi Howar individuals were probably not entirely accurate (see III.A.6. and V.B.2.d.).

Table 18: Comparison of heights, weights and body mass index values.

	Stature (cm)		**Weight** (kg)		**Body mass index** (g/cm^2)	
	♂	♀	♂	♀	♂	♀
Wadi Howar	162.1	156.6	48.7	46.2	1.86	1.89
Teda[1]	167.7	-	51.5	-	1.83	-
Fur[2]	168.0	159.0	-	-	-	-
Fur[3]	165.0	-	-	-	-	-
Berta[3]	167.0	-	-	-	-	-
Fajelu[3]	163.0	-	-	-	-	-
Nuer[3, 4]	179.0	-	62.1	-	1.94	-
Dinka[5]	181.5	-	58.2	-	1.77	-
Shilluk[5]	178.7	-	58.1	-	1.82	-
Turkana[6, 7]	172.2	166.0	50.8	48.9	1.70	1.77
Karimojong[8]	175.8	166.2	59.0	54.5	1.91	1.97
Datoga[9, 10]	170.6	156.9	57.2	45.9	1.96	1.86
Sara[1]	173.5	163.9	66.8	58.3	2.22	2.17
Banda[1]	167.3	-	58.3	-	2.08	-
Dogon[1]	167.6	-	59.1	-	2.10	-
Southern Mali[11]	171.3	160.4	58.8	53.4	2.00	2.08
Kenya/Uganda[12]	166.4	158.7	56.7	51.9	2.05	2.06
Luo (17 years)[13]	163.5	163.6	57.1	65.6	2.45	2.45
Haya[14]	168.0	-	-	-	-	-
Hadza[15]	162.5	150.7	53.2	46.3	2.01	2.03
Sandawe[1]	164.6	-	49.4	-	1.82	-
Žu/'hoãsi[7]	161.0	150.0	50.6	42.2	1.95	1.88
Egyptians[16]	171.4	157.4	71.6	61.3	2.44	2.47
Somalis[1]	170.4	-	56.8	-	1.96	-

[1] Crognier 1973: 50, 102-103; [2] Orban *et al*. 1996: 217; [3] Seligman/Seligman 1932: 13, 240, 418, 452; [4] Kelly 1985: 95; [5] Roberts/Bainbridge 1963: 356; [6] Barkey *et al*. 2001: 403; [7] Walker *et al*. 2006: 300-301; [8] Gray *et al*. 2004: 195, 199; [9] Muller *et al*. 2009: 350; [10] Sellen 2000: 767; [11] Dettwyler 1992; [12] Ruff 2000(b): 272; [13] Semproli/Gualdi-Russo 2007: 466; [14] Bräuer 1983: 114; [15] Sherry/Marlowe 2007: 112; [16] El-Meligy *et al*. 2006: 29

Of the selected modern groups, the Teda, Shilluk, Datoga and Sandawe were most similar to the Wadi Howar series in terms of their average body weights and body mass index values (see Table 18). Like the inter-sample similarities in stature, these similarities in absolute and relative body weight were fully compatible with the results of the search for the Wadi Howar material's metric and non-metric affinities (see IV.A.9., IV.D., V.C.1.e. and V.C.4.). The Teda are Saharan-speaking Eastern Saharan pastoralists, the Shilluk Nilotic-speaking Southern Sudanese mixed economy pastoralists, the Datoga Nilotic-speaking Northern Tanzanian pastoralists and the Sandawe a Tanzanian group of former foragers (see I.C.3.a.4., I.D.1.c.2.b., I.D.2.a.1., I.D.2.c.3., I.D.2.d.1., 2., 3., 5., 6., 7., 8., II.B.2.b. and V.C.1.e.).

V.C.1.g. Physique

The average Wadi Howar individual was "leptosome", exhibited tropically adapted body proportions and had low height-weight index values (see IV.A.3., 8. and Table 19). Although the long bones of the Wadi Howar sample often displayed rather pronounced expressions of specific occupational stress and robusticity traits, generally speaking, they were fairly long and gracile (see IV.A.8., 11., 12. and V.1.j.). Given this fact, it was clear from the start that, on average, the members of the Wadi Howar sample could have only been "leptosome". A leptosome physique is, of course, also one of the hallmarks of many contemporary Nilo-Saharan-speaking populations (e.g. Cavalli-Sforza *et al*. 1994: 165, 168; Fuchs 1978; Himes 1988; Knußmann 1996: 408-415, 429-437; Reuer/Winkler 1980: 200; Roberts/Bainbridge 1963; Seligman/Seligman 1932). Even when the generally strong femoral shaft bowing and its effect on the tibio-femoral index was taken into account, the Wadi Howar material's mean tibio-femoral index values could still only be described as very high (see IV.A.3. and 11.). Not surprisingly, the means of the Wadi Howar series surpassed those of a wide variety of comparative samples (see Table 20). This finding left little doubt that the Wadi Howar individuals had distinctly tropically adapted body proportions, very reminiscent of those of members of modern Saharan, Southern Sudanese and East African populations (e.g. Allen 1877; Bergmann 1847; Knußmann 1996: 408-415; Lewin 1998: 137-148; Roberts 1953; Vogel/Angermann 1995: 231; Walter 1994: 105-107).

Table 19: Selected Wadi Howar means of variables relevant to the estimation of physique.

	Wadi Howar - adult or older males	**Wadi Howar - adult[1] or older females**	**Wadi Howar - all adult[1] or older individuals**	**Wadi Howar - sub-adults[1]**
Living height (cm)	162.14	156.55	158.78	115.14
Living weight (kg)	48.67	46.18	47.26	23.20
Quetelet index (g/cm)	3.01	2.95	2.98	2.01
Body mass index (g/cm^2)	1.86	1.89	1.87	1.75
Rohrer index (g/cm^3)	1.14	1.21	1.18	1.52
Index ponderalis ($g^{0.333}/cm$)	2.25	2.29	2.28	2.48
Tibio-femoral index	86.62	86.94	86.84	83.19

[1] Abu Tabari 02/28-7 was treated as an adult

Modern mean body mass index values in the USA, Europe and Asia range from 1.98 to 2.82 g/cm^2 for males and from 1.96 to 3.08 g/cm^2 for females. They average around 2.57 g/cm^2 for males and 2.61 g/cm^2 for females. Body mass indices above 2.50 g/cm^2 are generally considered to fall into the "overweight" category. Those between 2.00 and 2.49 g/cm^2 are associated with minimum morbidity and mortality. Values below 1.85 g/cm^2 are indicative of undernutrition and chronic energy deficiency. Body mass indices of 1.30 and 1.10 g/cm^2 are regarded as the lower limits of human survival for the two sexes (e.g. Barkey *et al*. 2001: 403; Cole 1991; Ferro-Luzzi *et al*. 1992; Fratkin 2001: 4; Henry 1994; Jenike 2001; Knußmann 1988(c): 277; McGee 2005; Sherry/Marlowe 2007: 108; Stini 1994). Like the body mass index values of groups like the Teda, Shilluk, Datoga and Sandawe, the Wadi Howar sample's means were below 2.00 g/cm^2 and close to 1.85 g/cm^2 (see Table 18). This fact lent further weight to the assumption that the members of the prehistoric population of the Wadi Howar were characterised by a strikingly lean build. In sum, like the means of the Wadi Howar individuals' heights and weights, the average physique of the members of the Wadi Howar sample resembled that typically encountered among various Nilo-Saharan-speaking groups of today's Southeastern Sahara, Southern Sudan and East Africa (see V.C1.e and f.).

Table 20: Comparison of selected tibio-femoral index values.

	Tibio-femoral index	
	♂	♀
Wadi Howar	86.6	86.9
Sudan[1]	85.2	85.1
Nubia[1]	86.3	83.9
East Africa[1]	86.3	86.1
West Africa[1]	85.8	85.1
Zulu[2]	84.1	83.0
"Khoisan"[2]	83.8	83.4
"San"[1]	84.4	84.3
Egypt[3]	83.6	82.8
"Whites"[3]	81.9	82.0
"Whites"[4]	83.3	83.5
"Blacks"[3]	83.7	83.8
"Blacks"[4]	86.2	86.1
African Americans[2]	82.1	82.4
Australia[2]	83.4	83.1

[1] Holliday 1997: 258; [2] Carlson *et al*. 2007: 16; [3] Raxter *et al*. 2008: 151; [4] Krogman/İşcan 1986: 294-295

As already repeatedly pointed out, attempts to contextualise a skeletal sample's average adult heights, weights, height-weight indices and body build types have to factor in a number of methodological problems (see V.B.2.d., V.C.1. and f.). The added ontogenetic dimension exacerbates all of these problems when sub-adult values need to be interpreted (see V.B.2.c.). In addition, there are only a handful of potentially usable sub-adult living height and weight reconstruction techniques and very few sources which contain relevant comparative data (see III.A.5., 6., 7. and V.B.2.c.). As a result, the stature, living weight and body mass index values of the three sub-adults of the Wadi Howar series could only be tentatively compared with data from paediatric reference charts for biologically European sub-adults and information which has been published on Karimojong and Luo children (see Table 21). The children of the Nilotic-speaking Luo fishermen, farmers and herders of Western Kenya's arid Suba District were examined by Semproli/Gualdi-Russo (2007). Gray *et al*. (2004) gathered the Karimojong data in the semi-arid scrub-and-grass savannah of Northeast Uganda where the Nilotic-speaking Karimojong, who were part of the same ethnic unit as the Turkana until the mid-1700s, live as pastoralists (see I.D.2.a.1., 3., I.D.2.d.1., 2., 3., 4., 5., 6., 7. and 8).

Table 21: Comparison of selected sub-adult values.

	Sex	**Analysis age** (years)	**Living height** (cm)	**Living weight** (kg)	**Body mass index** (g/cm^2)
Abu Tabari 02/28-2	**probably male**	**7.0**	**113.9**	**21.8**	**1.68**
Karimojong[1]	male	7.0	115.2	19.2	1.45
Luo[2]	male	7.0	124.4	29.7	1.86
Abu Tabari 02/28-14	**probably male**	**9.5**	**109.1**	**21.5**	**1.81**
Karimojong[1]	male	9.0	121.1	20.7	1.41
Luo[2]	male	9.0	131.0	31.7	1.87
Abu Tabari 02/1-8	**probably male**	**13.5**	**122.4**	**26.3**	**1.75**
Karimojong[1]	male	13.5	143.2	32.3	1.56
Luo[2]	male	13.0	144.1	42.2	1.96
Wadi Howar (sub-adult mean)	**male**	**10.0**	**115.1**	**23.2**	**1.75**
Karimojong[1]	male	10.0	126.8	23.8	1.48
Luo[2]	male	10.0	136.0	37.0	1.91

[1] Gray *et al*. 2004: 195; [2] Semproli/Gualdi-Russo 2007: 466

Interestingly, both the body mass index values of the three Wadi Howar sub-adults and the mean Wadi Howar sub-adult body mass index value fell between the 25th and 75th percentile of European

American and German sex-specific BMI-for-age charts. In other words, the values were well within the normal range of these two biologically non-sub-Saharan populations (e.g. Cole 1991; Cole *et al*. 2007; Eveleth/Tanner 1990; Grupe *et al*. 2005: 271-286; Hammer *et al*. 1991; Knußmann 1996: 169-209; Kromeyer-Hauschild *et al*. 2001). Furthermore, the Wadi Howar sample's sub-adults' body mass index values were consistently higher than those of the Karimojong and consistently lower than those of the Luo children (see Table 21). The Wadi Howar sub-adult body heights were, however, lower than those of either comparative sample at all ages. Accordingly, it seemed likely that the physique of the Wadi Howar sub-adults was similar to that of the children of comparatively small-bodied Nilo-Saharan-speaking groups, like the Tubu or Fur (see V.C.1.e. and f.).

V.C.1.h. Biological ancestry

The results of the estimation of the Wadi Howar sample's biological ancestry were unambiguous. It could be concluded that the prehistoric inhabitants of the Wadi Howar were biologically sub-Saharan and morphologically most similar to modern groups encountered in the Southeastern Sahara, Southern Sudan and East Africa (see IV.A.9. and V.B.2.e.). Not only highly diagnostic, typically biologically sub-Saharan combinations of trait expressions but also combinations of trait expressions which are more or less peculiar to a number of modern populations associated with Nilo-Saharan languages recurred consistently (see IV.A.3., 8., 9., V.B.2.e. and V.C.1.g.).

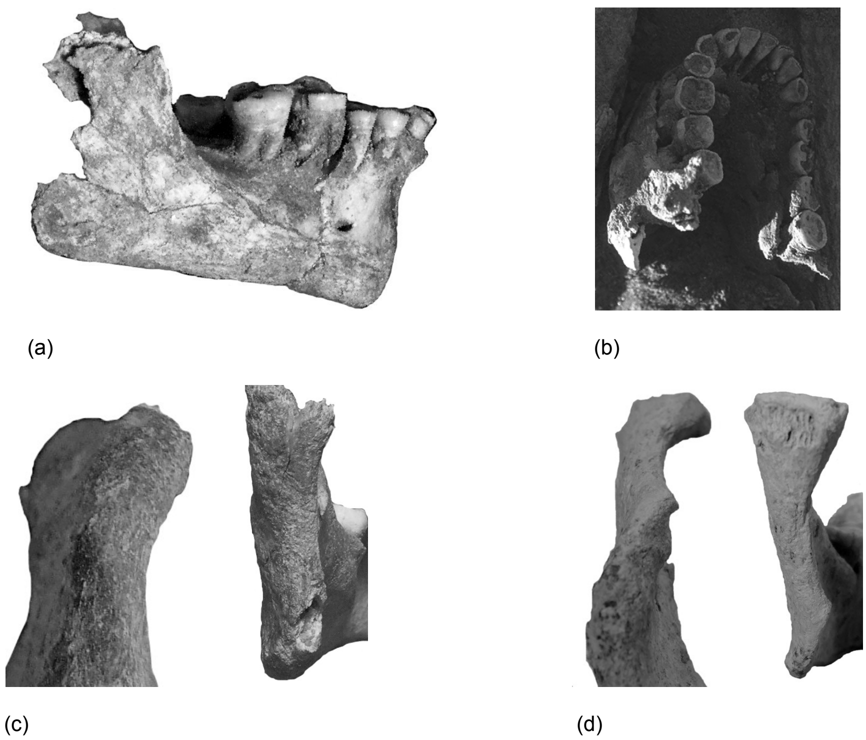


Figure 101: Examples of expressions of relevant mandibular traits. A high mandibular symphysis (*Symphysis mandibulae*): Abu Tabari 02/1-3 (a), a "hyperbolic" dental arch (*Arcus dentalis*): Abu Tabari 02/28-3 (b) and ascending rami of mandibles (*Rami mandibularum*) with an inverted posterior edge: Abu Tabari 02/28-15 (c) and Abu Tabari 02/28-22 (d) (b: E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

These consistently recurring trait expressions included a dolicho- to hyper-dolichocranic skull (*Cranium*), great interorbital breadth, a low, round nasal saddle (*Sella nasi*), flat frontal processes of the maxilla (*Processus frontales maxillae*), a wide nasal aperture (*Apertura piriformis*), a smooth and rounded inferior nasal margin (*Margo infranasalis*), very pronounced alveolar prognathism, a high or very high mandibular symphysis (*Symphysis mandibulae*), a relatively prominent chin (*Mentum osseum*), rather low and broad ascending rami of the mandible (*Rami mandibulae*), shallow notches of the mandible (*Incisurae mandibulae*), inversion of the posterior edge of the mandibular ramus (*Ramus mandibulae*), large and morphologically complex teeth, decidedly tropically adapted body proportions and a particularly slender build (e.g. Anderson 1968: 1016, 1035; Angel/Kelley 1990; Baker 1992: 46-47; Bass 1987: 83-88; Brace *et al*. 1991: 38-39; Bräuer 1983: 119; Brues 1977: 286-291; Byers 2002: 160-167; Cavalli-Sforza *et al*. 1994: 167-169; Chali 1995; Derry 1914: 101, 103-105, 1949: 32-33; Gill 1998; Greene/Armelagos 1972: 24, 28; Hanihara/Ishida 2005; Harris/Lease 2005; Heberer *et al*. 1959: 338-339; Hemmer 1982: 323-333; Irish 1997; İşcan *et al*. 2000: 228-229, 233-234; Knußmann 1996: 408-410, 415, 429, 431-432, 438-439; Krogman/İşcan 1986: 294-295; Lewin 1998: 137-147; Martin 1928: 688-689, 939-940, 949; Novotný *et al*. 1993: 77-78; Reuer/Winkler 1980: 200; Rhine 1990; Roberts/Bainbridge 1963; Schwidetzky 1982: 354; Strouhal 1975: 34-35, 1984: 297; Weinberg *et al*. 2005; White 2000: 375-376; Winkler/Wilfing 1991: 19).

Other expressions were only observed at low frequencies (see IV.A.9., V.B.2.e., Appendix XVII. and XVIII.). For instance, only one individual displayed a *Crista infranasalis*, while the remaining eleven assessable inferior nasal margins (*Margines infranasales*) could be placed in the "*Rotunditas infranasalis*" or, in one case, "*Sulcus praenasalis*" category. "CN031 - Ramus inversion" may be cited as another example. The Wadi Howar sample's average expression of this trait was "moderate to pronounced". Ramus inversion was only absent in one of twelve scored mandibles (*Mandibulae*). The expressions of "CN026 - Dental arch shape" were remarkable for another reason. Eight of the 14 scored dental arches (*Arcus dentales*) were "parabolic" rather than "hyperbolic" (see Appendix VI.B.1. and XVII.). Two of the other six were "hyperbolic", two "hyperbolic to parabolic" and another two "parabolic to elliptic". A "hyperbolic" or U-shaped dental arch (*Arcus dentalis*) is usually described as the expression which biologically sub-Saharan specimens tend to exhibit. A V-shaped or "parabolic" dental arch (*Arcus dentalis*), on the other hand, is generally regarded as a feature which is more common in biologically European *Crania* (e.g. Brues 1990: 3; Byers 2002: 160-161; Derry 1949: 32; Gill 1998: 302-303, 306-307; İşcan *et al*. 2000: 229; Olivier 1969; Rhine 1990; White 2000: 377). Yet, this observation was neither seen as evidence of gene flow from biologically North African groups nor considered relevant to the estimation of the Wadi Howar sample's overall biological ancestry. The finding did, however, draw attention to another issue. The trait expressions which are most frequently cited as typically biologically sub-Saharan have mainly been identified in studies of the remains of biologically West African groups and their American descendants. It was therefore not surprising that an undoubtedly fully biologically sub-Saharan sample from another part of the African continent, i.e. the Wadi Howar, was characterised by different frequencies of certain trait expressions (see V.B.2.e. and for example: Angel/Kelley 1990; Bräuer 1983; Brooks *et al*. 1990; Brues 1977: 286-291, 1990; Byers 2002: 151-168; Chamla 1968; De Villiers 1968; Derry 1914, 1949; Gill 1998; Gill/Gilbert 1990; Hájek *et al*. 2008; Hefner 2003, 2007, 2009; Hemmer 1982: 323-333; İşcan *et al*. 2000: 228-234; Knußmann 1996: 430-437; Mayr 1993: 159; Morris/Ribot 2006; Ousley *et al*. 2009: 71-72; Parr 2005; Rhine 1990; Rooyen 2010; Weinberg *et al*. 2005).

V.C.1.i. Epigenetic traits

Several members of the Wadi Howar sample displayed remarkable expressions of certain epigenetic traits (see Table 6 and IV.A.10.). Mainly because the trait expressions in question are rare in biologically sub-Saharan populations or in general, the presence of wormian bones in the lambdoid suture (*Ossa suturae lambdoideae*), an Inca bone (*Os incae*), an epipteric bone (*Os epiptericum*), specimens with an ossicle at the *Asterion* (*Os astericum*), cases of incisive suture (*Sutura incisiva*) persistence, multiple *Foramina* superior to nasal root (*Radix nasi*), multiple zygomaticofacial foramina (*Foramina zygomaticofacialia*), paranasal foramina (*Foramina paranasalia*), enlarged mental foramina (*Foramina mentalia*), a case of mylohyoid bridging (*Ponticulus mylohyoideus*), a mandibular head (*Caput mandibulae*) with a shallow depression (*Fossa*), shovel-shaped upper first incisor (*Dentes incisivi superiores I*), double shovel-shaped upper first incisors (*Dentes incisivi superiores I*), “Bushman canines”, i.e. upper canines (*Dentes canini superiores*) with a very pronounced mesial ridge (*Crista marginalis*) which is incorporated into the dental tubercle (*Tuberculum dentale*), upper first molars (*Dentes molares superiores I*) with a Carabelli’s cusp (*Tuberculum anomale*), a large parastyle (*Tuberculum paramolare*), a peg-shaped, hypoplastic upper third molar (*Dens molaris superior III*), a midline diastema (*Trema*), specimens with a palatine torus (*Torus palatinus*), additional cusps (*Cuspides*) on the lingual surfaces (*Facies linguales*) of upper third molars (*Dentes serotini superiores*), septal apertures (*Foramina supratrochlearia*), intertrochlear foramina (*Foramina intertrochlearia*) and *Patellae* with a vastus notch (*Incisura vasta*) was considered worth noting.

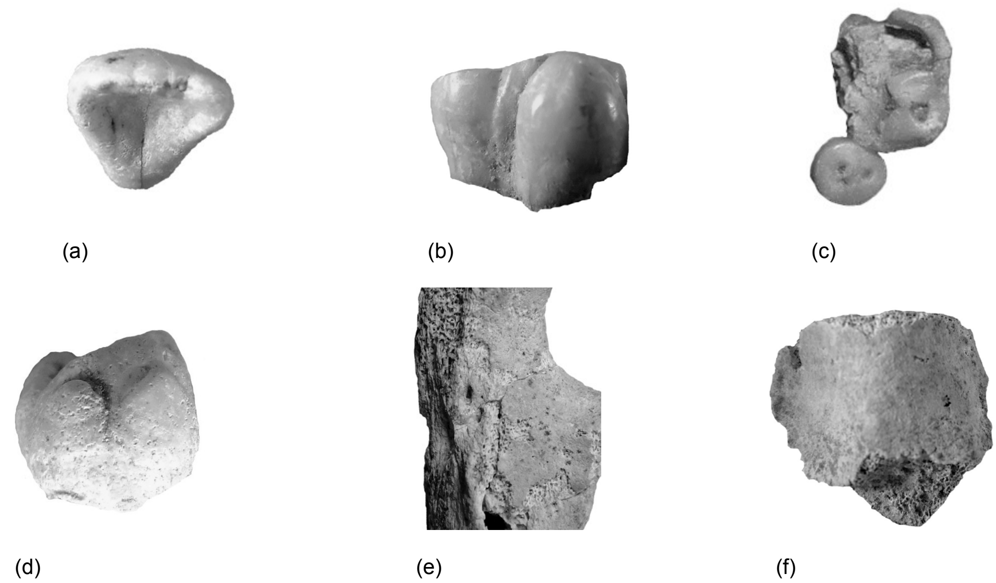


Figure 102: Examples of noteworthy expressions of epigenetic traits. Abu Tabari 02/28-2: shovel-shaped right upper first incisor (*Dens incisivus I*) (a), Abu Tabari 02/28-3: left upper second molar (*Dens molaris superior II*) with a large parastyle (*Tuberculum paramolare*) (b), Abu Tabari 02/28-21: left upper second and peg-shaped, hypoplastic third molar (*Dens molaris superior II et III*) (c), Abu Tabari 03/34-1: additional cusps (*Cuspides*) on the lingual surface (*Facies lingualis*) of the right upper third molar (*Dens serotinus superior*) (d), Abu Tabari 02/28-22: right *Ulna* with a *Foramen intertrochleare* (e) and Abu Tabari 02/28-22: *Patella* with a vastus notch (*Incisura vasta*) (f).

Virtually all of the trait expressions in question, even those which are rather rare otherwise, were, however, also present at similar frequencies in some of the comparative samples, particularly in the ones which were morphologically closest to the Wadi Howar series (see Table 22 and 23; for wormian bones in the lambdoid suture (*Ossa suturae lambdoideae*) see for example: Anderson 1968: 1011;

Berry/Berry 1967: 365-366; Binder/Uerpmann 2004: 15-18; Bräuer 1983: 37; Brothwell 1981: 47, 92-94; Česnys/Pavilonis 1982; Czarnetzki 1971; Greene/Armelagos 1972: 27; Herrmann *et al*. 1990: 110-111; Judd 2008(a): 87-88, 90, 92; Prowse/Lovell 1995: 107; Ricci *et al*. 2008: 377; Rightmire 1972: 271; Rösing 1982: 115; Simon *et al*. 2002: 262-263; for Inca bone (*Os incae*) presence see for example: Anderson 1968: 1011; Binder/Uerpmann 2004: 15-18; Bräuer 1983: 37; Brothwell 1981: 91; Gaherty 1971; Greene/Armelagos 1972: 27; Hauser/De Stefano 1989; Herrmann *et al*. 1990: 111; Judd 2008(a): 87-88, 90, 92; Martin 1928: 841; Nielsen 1970: 104-106; Prowse/Lovell 1995: 107; Rightmire 1972: 271; Rösing 1982: 115; for epipteric bone (*Os epiptericum*) presence see for example: Anderson 1968: 1011; Berry/Berry 1967: 367; Bräuer 1983: 37; Brothwell 1981: 92-95; Carson 2006; Judd 2008(a): 87-88, 90, 92; Prowse/Lovell 1995: 107; Ricci *et al*. 2008: 377; Rightmire 1972: 271; for ossicle at the *Asterion* (*Os astericum*) presence see for example: Anderson 1968: 1011; Berry/Berry 1967: 368; Brothwell 1981: 94; Carson 2006; Hanihara *et al.* 2003: 244; Judd 2008(a): 87-88, 90, 92; Prowse/Lovell 1995: 107; Ricci *et al*. 2008: 377; for incisive suture (*Sutura incisiva*) or bone (*Os incisivum*) persistence see for example: Feneis 1993: 24-25; Kieser *et al*. 1999; for multiple *Foramina* superior to the nasal root (*Radix nasi*) see: Schiwy-Bochat 2001; for multiple zygomaticofacial foramina (*Foramina zygomaticofacialia*) see for example: Berry/Berry 1967: 369; Brothwell 1981: 94-95; Carson 2006; Hauser/De Stefano 1989; Herrmann *et al*. 1990: 110-111; Judd 2008(a): 87-90; Prowse/Lovell 1995: 107; Rightmire 1972: 271; Rösing 1982: 107; for mental foramen (*Foramen mentale*) variants see for example: Anderson 1968: 1011; Hanihara *et al.* 2003: 244; Nielsen 1970: 89-92; Prowse/Lovell 1995: 107; Rightmire 1972: 271; for mylohyoid bridging (*Ponticulus mylohyoideus*) see for example: Hauser/De Stefano 1989; Jidoi *et al*. 2000; Nielsen 1970: Plate 6; Prowse/Lovell 1995: 107; Trinkaus 2007: 7369-7370; for presence of a depression (*Fossa*) in the mandibular head (*Caput mandibulae*) see: Oxenham/Whitworth 2006; for shovel-shaped upper first incisors (*Dentes incisivi superiores I*) see for example: Alt 1997(a): 684; Anderson 1968: 1020; Bass 1987: 283-284; Coppa/Macchiarelli 1983: 122; Greene/Armelagos 1972: 30-31; Harvey 1976: 38; Hrdlička 1920: 449-458; Irish 1997, 2000: 400; Irish/Turner 1990: 45; İşcan *et al*. 2000: 230; Krogman/İşcan 1986: 368; Turner *et al*. 1991: 14-15; Turner/Markowitz 1990: 36; Winkler/Wilfing 1991:26-27; for double shovel-shaped upper first incisors (*Dentes incisivi superiores I*) see for example: Coppa *et al*. 2007: 923; Cucina *et al*. 1999: 406-407; Hanihara 2008: 170, 172; Higa *et al*. 2003: 129-131; Irish 1997: 461, 464, 2000: 400; Irish/Turner 1990: 45; Turner *et al*. 1991: 15-16; for "Bushman canines" see for example: Cucina *et al*. 1999: 406-407; Hillson 1996: 85-103; Irish 1997: 461, 2000: 400; Irish/Turner 1990: 45; Turner *et al*. 1991; for Carabelli's cusp (*Tuberculum anomale*) presence see for example: Anderson 1968: 1021; Coppa *et al*. 2007: 923; Cucina *et al*. 1999: 406-407; Edgar/Lease 2007: 728, 732-733; Gilligan/Bulbeck 2007: 81; Hanihara 2008: 170, 172; Harris 2007; Hughes *et al*. 2009; Irish 1997: 461; 2000: 400; Kieser/Becker 1989; for parastyle (*Tuberculum paramolare*) presence see for example: Alt 1997(b): 700; Alt/Türp 1998: 98, 101; Anderson 1968: 1021; Irish 2000: 400; Irish/Turner 1990: 45; Krogman/İşcan 1986: 368; Schumacher 1997: 493-494; for peg-shaped, hypoplastic molar (*Dens molaris*) presence see for example: Alt/Türp 1998: 110-111; Anderson 1968: 1021; Bass 1987: 284-285; Coppa *et al*. 2007: 923; Herrmann *et al*. 1990: 152; Irish 1997: 461; Judd 2008(a): 100; for midline diastema (*Trema*) presence see for example: Alt/Türp 1998: 117; Anderson 1968; Harvey 1976: 37; Herrmann *et al*. 1990: 153; Irish 1997: 464, 2000: 400;

Knußmann 1996: 79; for palatine torus (*Torus palatinus*) presence see for example: Anderson 1968: 1011; Bräuer 1983: 37; Brothwell 1981: 92, 95, 96; Eroğlu/Erdal 2008; Irish 2000: 400; Irish/Turner 1990: 46; Judd 2008(a): 92; Rightmire 1972: 271; Rösing 1982: 107, 115; for additional cusps (*Cuspides*) of molars (*Dentes molares*) see for example: Alt/Türp 1998; Coppa *et al*. 2007: 923; Cucina *et al*. 1999: 406-407; Hillson 1996: 85-103; Turner *et al*. 1991; for septal apertures (*Foramina supratrochlearia*) see for example: Anderson 1968: 1023; Bass 1987: 148, 151; Binder/Uerpmann 2004: 12; Brothwell 1981: 97-99; Coppa/Macchiarelli 1983: 118, 119, 122; Finnegan 1978: 25; Greene/Armelagos 1972: 37; Herrmann *et al*. 1990: 112-113; Judd 2008(a): 93-94; Martin 1928: 1104; Simon *et al*. 2002: 258-260; for vastus notch (*Incisura vasta*) presence see for example: Binder/Uerpmann 2004: 20; Brothwell 1981: 97-99; Dastugue 1979: 301; Dutour 1983: 310, 315, 1989: 197-199; Finnegan 1978: 26; Judd 2008(a): 94-95).

Table 22: Observed frequencies of selected epigenetic trait expressions in the Wadi Howar series and the prehistoric comparative samples.

	Wadi Howar	**Jebel Sahaba/Tushka**	**A-Group**	**Malian Sahara**
CE003 - *Ossa suturae lambdoideae*	Mean individual: 2 (1) 4:8, 50.0%; (2) 4:8, 50.0%	Mean individual: 1 (1) 14:20, 70.0%; (2) 6:20, 30.0%	Mean individual: 2 (1) 7:17, 41.2%; (2)10:17, 58.8%	Mean individual: 1 (1) 12:19, 63.2%; (2) 7:19, 36.8%
CE014 - *Os incae*	Mean individual: 1 (1) 9:10, 90.0%; (2) 1:10, 10.0%	Mean individual: 1 (1) 20:20, 100.0%	Mean individual: 1 (1) 16:17, 94.1%; (2) 1:17, 5.9%	Mean individual: 1 (1) 17:19, 89.5%; (2) 2:19, 10.5%
CE015 - *Os incisivum*/*Sutura incisiva*	Mean individual: 2 (1) 6:9, 66.7% (2) 1:9, 11.1% (3) 2:9, 22.2%	Mean individual: 1 (1) 12:17, 70.6%; (2) 4:17, 23.5%; (3) 1:17, 5.9%	Mean individual: 2 (1) 7:21, 33.3%; (2) 8:21, 38.1%; (3) 4:21, 19.1%; (4) 2:21, 9.5%	Mean individual: 2 (1) 12:19, 63.2%; (2) 3:19, 15.8%; (3) 4:19, 21.0%
CE040b/41b - *Foramen zygomaticofaciale* (m) - number	Mean individual: 2 (0) 1:10, 10.0%; (1) 2:10, 20.0%; (2) 6:10, 60.0%; (3) 1:10, 10.0%	Mean individual: 1 (0) 5:34, 14.7%; (1) 21:34, 61.8%; (2) 7:34, 20.6%; (3) 1:34, 2.9%	Mean individual: 1 (0) 7:34, 20.6%; (1) 20:34, 58.8%; (2) 6:34, 17.6%; (3) 1:34, 2.9%	Mean individual: 2 (0) 4:29, 13.8%; (1) 11:29, 37.9%; (2) 11:29, 37.9%; (3) 2:29, 6.9%; (4) 1:29, 3.4%
CE054a/54b - *Foramina paranasalia* (m)	Mean individual: 4 (2) 3:12, 25.0%; (4) 9:12, 75.0%	Mean individual: 4 (1) 9:24, 37.5%; (2) 2:24, 8.3%; (4) 13:24, 54.2%	Mean individual: 1 (1) 26:34, 76.5%; (3) 3:34, 8.8%; (4) 5:34, 14.7%	Mean individual: 1 (1) 16:25, 64.0%; (2) 2:25, 8.0%; (3) 1:25, 4.0%; (4) 6:25, 24.0%
DE005/6 - Shovel UI1 (m)	Mean individual: 2 (1) 9:22, 40.9%; (2) 7:22, 31.8%; (3) 6:22, 27.3%	Mean individual: 2 (1) 6:17, 35.3%; (2) 11:17, 64.7%	Mean individual: 1 (0) 7:10, 70.0%; (2) 3:10, 30.0%	Mean individual: 2 (2) 11:11, 100.0%
DE007/8 - Double shovel UI1 (m)	Mean individual: 1 (0) 5:25, 20.0%; (1) 14:25, 56.0%; (2) 6:25, 24.0%	Mean individual: 1 (0) 6:12, 50.0%; (1) 3:12, 25.0%; (2) 3:12, 25.0%	Mean individual: 1 (0) 4:8, 50.0%; (1) 4:8, 50.0%	Mean individual: 1 (0) 3:14, 21.4%; (1) 10:14, 71.4%; (2) 1:14, 7.1%
DE013/14 - Canine mesial ridge ("Bushman canine") UC (m)	Mean individual: 2 (0) 1:11, 9.1%; (1) 2:11, 18.2%; (2) 5:11, 45.5%; (3) 3:11, 27.3%	Mean individual: 1 (0) 2:4, 50.0%; (2) 2:4, 50.0%	Mean individual: 1 (0) 5:7, 71.4%; (1) 1:7, 14.3%; (2) 1:7, 14.3%	Mean individual: 1 (0) 5:10, 50.0%; (1) 2:10, 20.0%; (2) 2:10, 20.0%; (3) 1:10, 10.0%
DE031/32 - Carabelli's trait UM1 (m)	Mean individual: 3 (0) 4:13, 30.8% (2) 2:13, 15.4% (3) 1:13, 7.7% (5) 5:13, 38.5% (6) 1:13, 7.7%	Mean individual: 1 (0) 6:8, 75.0% (2) 1:8, 12.5% (5) 1:8, 12.5%	Mean individual: 0 (0) 8:15, 53.3% (1) 7:15, 46.7%	Mean individual: 1 (0) 10:16, 62.5% (2) 2:16, 12.5% (4) 2:16, 12.5% (5) 2:16, 12.5%
DE033/34 - Parastyle UM2 (m)	Mean individual: 0 (0) 26:27, 96.3%; (5) 1:27, 3.7%	Mean individual: 0 (0) 40:40, 100.0%	Mean individual: 0 (0) 33:34, 97.1%; (3) 1:34, 2.9%	Mean individual: 0 (0) 27:27, 100.0%
DE045/46 - Peg-shaped molar UM3 (m)	Mean individual: 0 (0) 27:29, 93.1%; (1) 1:29, 3.4%; (2) 1:29, 3.4%	Mean individual: 0 (0) 42:42, 100.0%	Mean individual: 0 (0) 38:38, 100.0%	Mean individual: 0 (0) 28:29, 96.6%; (1) 1:29, 3.4%
DE077 - Midline diastema	Mean individual: 0 (0) 8:9, 88.9%; (1) 1:9, 11.1%	Mean individual: 0 (0) 10:11, 90.9%; (1) 1:11, 9.1%	Mean individual: 0 (0) 7:8, 87.5%; (1) 1:8, 12.5%	Mean individual: 0 (0) 11:12, 91.7%; (1) 1:12, 8.3%
DE078 - Palatine torus	Mean individual: 1 (0) 4:7, 51.7%; (1) 2:7, 28.6%; (2) 1:7, 14.3%	Mean individual: 0 (0) 9:13, 69.2%; (1) 4:13, 30.8%	Mean individual: 0 (0) 15:20, 75.0%; (1) 4:20, 20.0%; (2) 1:20, 5.0%	Mean individual: 0 (0) 13:17, 76.5%; (1) 4:17, 23.5%
PE021a/22a - *Foramen intertrochleare* - presence (m)	inspected *Ulnae*: (1) 1:5, 20.0% (2) 4:5, 80.0% inspected individuals: (1) 1:3, 33.3% (2) 2:3, 66.7%	inspected individuals: (1) 4:13, 30.8% (2) 9:13, 69.2%	-	-

Although these findings put the presence of some of the initially surprising trait expressions into perspective, the occurrence of paranasal (*Foramina paranasalia*) and intertrochlear foramina (*Foramina intertrochlearia*) was still striking. Several individuals were characterised by paranasal foramina (*Foramina paranasalia*) (see IV.A.10). Abu Tabari 02/28-5 showed the clearest manifestation of the trait (see Figure 76). In this case, a comparatively large *Foramen* was located immediately lateral to and on either side of the nasal aperture (*Apertura piriformis*) at the root of the frontal process (*Processus frontalis maxillae*). A small *Foramen* could also be observed on the right side of Abu Tabari 02/1-2's nasal aperture (*Apertura piriformis*). In addition, another four individuals, namely Abu Tabari 02/28-2, 13, -23 and Djabarona 96/1-1, were characterised by similar paranasal foramina (*Foramina paranasalia*). Except for Abu Tabari 02/28-13's paranasal foramen (*Foramen paranasale*), these were, however, neither large nor single *Foramina* (see Appendix VI.B.2. and XVIII.A.).

Table 23: Observed frequencies of selected epigenetic trait expressions in the Wadi Howar series and the modern comparative samples.

	Wadi Howar	**Southern Sudan**	**Chad**	**Mandinka**	**Somalis**	**Haya**
CE003 - *Ossa suturae lambdoideae*	Mean individual: 2 (1) 4:8, 50.0%; (2) 4:8, 50.0%	Mean individual: 2 (1) 11:24, 45.8%; (2) 13:24, 54.2%	Mean individual: 1 (1) 12:21, 57.1%; (2) 9:21, 42.9%	Mean individual: 2 (1) 9:22, 40.9%; (2) 13:22, 59.1%	Mean individual: 2 (1) 8:19, 42.1%; (2) 11:19, 57.9%	Mean individual: 1 (1) 11:19, 57.9%; (2) 8:19, 42.1%
CE014 - *Os incae*	Mean individual: 1 (1) 9:10, 90.0%; (2) 1:10, 10.0%	Mean individual: 1 (1) 20:24, 83.3%; (2) 4:24, 16.7%	Mean individual: 1 (1) 19:21, 90.5%; (2) 2:21, 9.5%	Mean individual: 1 (1) 22:22, 100.0%	Mean individual: 1 (1) 19:19, 100.0%	Mean individual: 1 (1) 20:20, 100.0%
CE015 - *Os incisivum*/*Sutura incisiva*	Mean individual: 2 (1) 6:9, 66.7% (2) 1:9, 11.1% (3) 2:9, 22.2%	Mean individual: 2 (1) 7:24, 29.2%; (2) 13:24, 54.2%; (3) 3:24, 12.5%; (4) 1:24, 4.2%	Mean individual: 2 (1) 9:21, 42.9%; (2) 7:21, 33.2%; (3) 4:21, 19.1%; (4) 1:21, 4.8%	Mean individual: 2 (1) 13:22, 59.1%; (2) 7:22, 31.8%; (3) 2:22, 9.1%	Mean individual: 2 (1) 12:20, 60.0%; (2) 4:20, 20.0%; (3) 2:20, 10.0%; (4) 2:20, 10.0%	Mean individual: 2 (1) 11:20, 55.0%; (2) 6:20, 30.0%; (3) 3:20, 15.0%
CE040b/41b - *Foramen zygomaticofaciale* (m) - number	Mean individual: 2 (0) 1:10, 10.0%; (1) 2:10, 20.0%; (2) 6:10, 60.0%; (3) 1:10, 10.0%	Mean individual: 2 (0) 3:37, 8.1%; (1) 12:37, 32.4%; (2) 18:37, 48.6%; (3) 3:37, 8.1%; (4) 1:37, 2.7%	Mean individual: 1 (0) 10:40, 25.0%; (1) 25:40, 62.5%; (2) 5:40, 12.5%	Mean individual: 1 (0) 7:44, 15.9%; (1) 20:44, 45.5%; (2) 13:44, 29.5%; (3) 3:44, 6.8%; (4) 1:44, 2.3%	Mean individual: 1 (0) 10:39, 25.6%; (1) 15:39, 38.5%; (2) 10:39, 25.6%; (3) 4:39, 10.3%	Mean individual: 2 (0) 4:40, 10.0%; (1) 18:40, 45.0%; (2) 13:40, 32.5%; (3) 3:40, 7.5%; (4) 1:40, 2.5%; (6) 1:40, 2.5%
CE054a/54b - *Foramina paranasalia (m)	Mean individual: 4 (2) 3:12, 25.0%; (4) 9:12, 75.0%	Mean individual: 1 (1) 22:46, 47.8%; (2) 7:46, 15.2%; (3) 10:46, 21.7%; (4) 7:46, 15.2%	Mean individual: 4 (1) 11:41, 26.8%; (2) 5:41, 12.2%; (3) 5:41, 12.2%; (4) 20:41, 48.8%	Mean individual: 4 (1) 10:44, 22.7%; (2) 4:44, 9.1%; (3) 12:44, 27.3%; (4) 18:44, 40.9%	Mean individual: 4 (1) 10:39, 25.6%; (2) 5:39, 12.8%; (3) 3:39, 7.7%; (4) 21:39, 53.8%	Mean individual: 1 (1) 24:40, 60.0%; (2) 3:40, 7.5%; (3) 1:40, 2.5%; (4) 12:40, 30.0%
DE005/6 - Shovel UI1 (m)	Mean individual: 2 (1) 9:22, 40.9%; (2) 7:22, 31.8%; (3) 6:22, 27.3%	Mean individual: 2 (1) 3:17, 17.6%; (2) 14:17, 82.4%	Mean individual: 1 (0) 1:7, 14.3%; (1) 2:7, 28.6%; (2) 4:7, 57.1%	-	Mean individual: 1 (0) 2:11, 18.2%; (1) 6:11, 54.5%; (2) 3:11, 27.3%	Mean individual: 1 (1) 3:3, 100.0%
DE007/8 - Double shovel UI1 (m)	Mean individual: 1 (0) 5:25, 20.0%; (1) 14:25, 56.0%; (2) 6:25, 24.0%	Mean individual: 1 (0) 5:17, 29.4%; (1) 8:17, 47.1%; (2) 4:17, 23.5%	Mean individual: 1 (0) 4:13, 30.8%; (1) 7:13, 53.8%; (2) 2:13, 15.4%	Mean individual: 1 (1) 2:2, 100.0%	Mean individual: 1 (0) 3:10, 30.0%; (1) 6:10, 60.0%; (2) 1:10, 10.0%	Mean individual: 0 (0) 2:2, 100.0%
DE013/14 - Canine mesial ridge ("Bushman canine") UC (m)	Mean individual: 2 (0) 1:11, 9.1%; (1) 2:11, 18.2%; (2) 5:11, 45.5%; (3) 3:11, 27.3%	Mean individual: 2 (0) 2:16, 12.5%; (1) 3:16, 18.8%; (2) 8:16, 50.0%; (3) 3:16, 18.8%	Mean individual: 1 (0) 6:10, 60.0%; (1) 1:10, 10.0%; (2) 3:10, 30.0%	Mean individual: 2 (1) 1:3, 33.3%; (2) 2:3, 66.7%	Mean individual: 0 (0) 14:14, 100.0%	Mean individual: 2 (1) 5:8, 62.5%; (2) 1:8, 12.5%; (3) 2:8, 25.0%
DE031/32 - Carabelli's trait UM1 (m)	Mean individual: 3 (0) 4:13, 30.8% (2) 2:13, 15.4% (3) 1:13, 7.7% (5) 5:13, 38.5% (6) 1:13, 7.7%	Mean individual: 1 (0) 23:31, 74.2% (1) 2:31, 6.5% (3) 2:31, 6.5% (4) 4:31, 12.9%	Mean individual: 1 (0) 12:17, 70.6% (1) 2:17, 11.8% (2) 2:17, 11.8% (5) 1:17, 5.9%	Mean individual: 2 (0) 13:24, 54.2% (2) 2: 24, 8.3% (3) 2: 24, 8.3% (4) 2: 24, 8.3% (5) 4: 24, 16.7% (7) 1: 24, 4.2%	Mean individual: 5 (0) 2:27, 7.4% (1) 1:27, 3.7% (2) 1:27, 3.7% (3) 1:27, 3.7% (4) 6:27, 22.2% (5) 5:27, 18.5% (6) 4:27, 14.8% (7) 7:27, 25.9%	Mean individual: 3 (0) 7:26, 26.9% (3) 2:26, 7.7% (4) 3:26, 11.5% (5) 6:26, 23.1% (6) 1:26, 3.8% (7) 7:26, 26.9%
DE033/34 - Parastyle UM2 (m)	Mean individual: 0 (0) 26:27, 96.3%; (5) 1:27, 3.7%	Mean individual: 0 (0) 34:34, 100.0%	Mean individual: 0 (0) 28:28, 100.0%	Mean individual: 0 (0) 31:31, 100.0%	Mean individual: 0 (0) 36:36, 100.0%	Mean individual: 0 (0) 31:31, 100.0%
DE045/46 - Peg-shaped molar UM3 (m)	Mean individual: 0 (0) 27:29, 93.1%; (1) 1:29, 3.4%; (2) 1:29, 3.4%	Mean individual: 0 (0) 43:43, 100.0%	Mean individual: 0 (0) 28:29, 96.6%; (1) 1:29, 3.4%	Mean individual: 0 (0) 34:36, 94.4%; (1) 1:36, 2.8%; (2) 1:36, 2.8%	Mean individual: 0 (0) 37:38, 97.4%; (1) 1:38, 2.6%	Mean individual: 0 (0) 37:37, 100.0%
DE077 - Midline diastema	Mean individual: 0 (0) 8:9, 88.9%; (1) 1:9, 11.1%	Mean individual: 0 (0) 8:8, 100.0%	Mean individual: 0 (0) 5:5, 100.0%	Mean individual: 0 (0) 1:1, 100.0%	Mean individual: 0 (0) 7:7, 100.0%	Mean individual: 1 (0) 1:2, 50.0%; (1) 1:2, 50.0%
DE078 - Palatine torus	Mean individual: 1 (0) 4:7, 51.7%; (1) 2:7, 28.6%; (2) 1:7, 14.3%	Mean individual: 0 (0) 19:24, 79.2%; (1) 5:24, 20.8%	Mean individual: 0 (0) 15:20, 75.0%; (1) 5:20, 25.0%	Mean individual: 1 (0) 12:22, 54.5%; (1) 9:22, 40.9%; (2) 1:22, 4.5%	Mean individual: 0 (0) 15:20, 75.0%; (1) 5:20, 25.0%	Mean individual: 0 (0) 16:20, 80.0%; (1) 4:20, 20.0%

Low frequencies of large, single, bilateral *Foramina* of the type exhibited by Abu Tabari 02/28-5 could also be observed in the comparative samples (see Table 22 and 23). That a number of individuals had such *Foramina*, that they were usually bilateral and that they appeared to be entirely independent of accessory infraorbital foramina (*Foramina infraorbitalia*) suggested that paranasal foramina (*Foramina paranasalia*) could indeed be regarded as a, as yet undescribed, independent epigenetic trait (e.g. Berry/Berry 1967: 370; Brothwell 1981: 90-100; Hanihara/Ishida 2001; Hauser/De Stefano 1989; Nielsen 1970: 89-92; Riesenfeld 1956: 87, 89, 96; Rightmire 1972: 271; Rösing 1982: 107; Tyrrell 2000).

An oval, about 6.5 mm long and 2 mm wide, *Foramen* directly posterior to the radial (*Incisura radials*) and distal to the trochlear notch (*Incisura trochlearis*) was present in both *Ulnae* of Abu Tabari 02/1-2 (see Figure 76). Although these openings were decidedly smaller, Abu Tabari 02/28-22's *Ulnae* were characterised by intertrochlear foramina (*Foramina intertrochlearia*) as well (see Figure 102, Appendix VI.B.4. and Appendix XVIII.C.). Interestingly, such intertrochlear foramina (*Foramina intertrochlearia*) were also identified in nine of 13 examined Jebel Sahaba and two Jebel Shaqadud individuals (see II.B.1.d.1. and Table 22). It seemed most reasonable to interpret these *Foramina* either in connection with the capsular attachment of the elbow joint (*Articulatio cubiti*) or as unusually placed nutrient foramina (*Foramina nutritia*). Regardless of its genesis, the intertrochlear foramen (*Foramen intertrochleare*) appeared to be another undescribed epigenetic trait (e.g. Brothwell 1981: 90-100; Finnegan 1978; Herrmann *et al*. 1990: 109-115; Mysorekar 1967: 819; Shulman 1959; Tortora/Grabowski 2000: 163, 166; Van De Graaff/Fox 1999: 190).

V.C.1.j. Robusticity

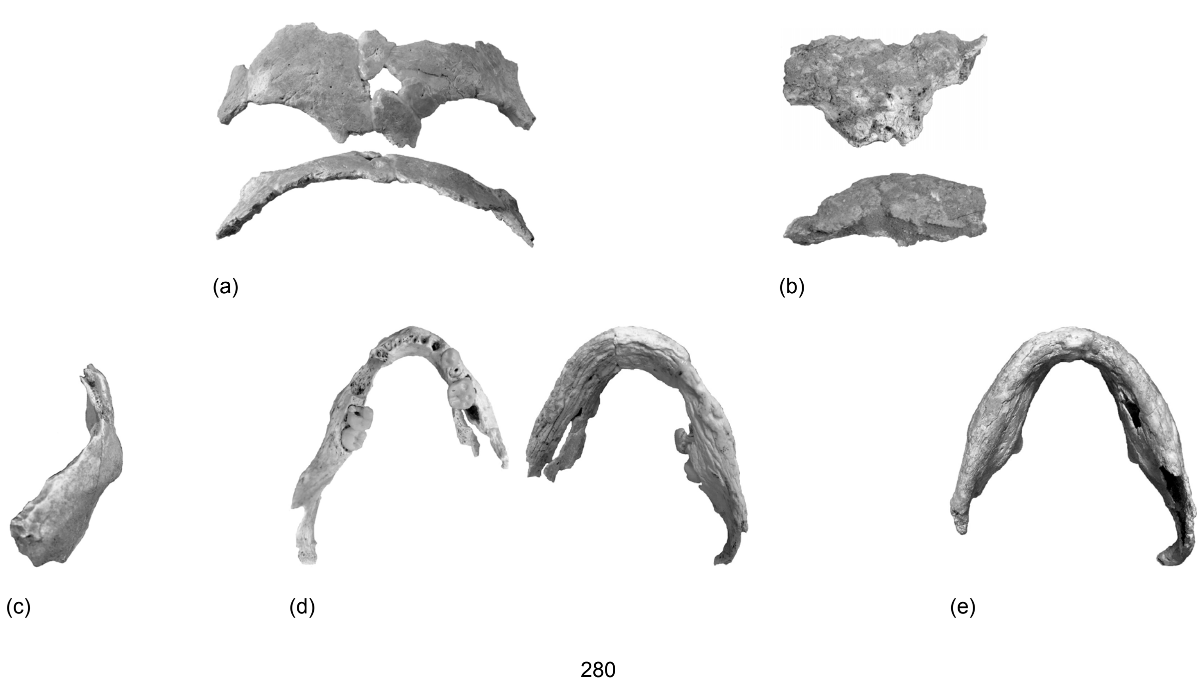
The peculiar mixture of gracility and robusticity which characterised the Wadi Howar material probably reflected not only the sample's biological ancestry and its temporal distance to older, generally more robust material but also certain activity patterns. Both the, on average, comparatively gracile cranial superstructures and the, on the whole, long and slender long bones were evidently primarily manifestations of the biologically sub-Saharan or, more specifically, Saharo-Nilotic nature of the material (see IV.A.11.). The gracility of the superstructures of biologically sub-Saharan *Crania* has been repeatedly shown and remarked upon (e.g. Bräuer 1983: 35; De Villiers 1968; Rhine 1990: 14-15; White 2000: 376; Winkler/Wilfing 1991: 19). Lahr/Wright (1996: 175-179, 181), for instance, conclusively demonstrated that modern biologically sub-Saharan *Crania* are characterised by low levels of robusticity. That Walker (2008: 47-48) documented that his biologically European samples exhibited more pronounced expressions of a number of sexually dimorphic cranial traits than his African American sample may be cited as an additional example of a relevant finding (see Figure 95). As far as biologically sub-Saharan material is concerned, robust cranial superstructures are usually only consistently observed in Late Pleistocene or Early Holocene series (e.g. Anderson 1968; Angel/Kelley 1986; Baab *et al*. 2010; Brothwell/Shaw 1971; Chamla 1968; Clark 1989; Coppa/Macchiarelli 1983; Crevecoeur *et al*. 2009; Derry 1949; Dutour 1989; Dzierżykray-Rogalski 1977; Greene/Armelagos 1972; Henke *et al*. 2002; Herrmann/Gabriel 1972; Knußmann 1996: 431; Lahr/Arensburg 1995; Rightmire 1984; Sereno *et al*. 2008; Simon *et al.* 2002; Stynder *et al*. 2007; Thoma 1984). The comparatively long and slender long bones of biologically sub-Saharan populations in general are the result of climate-related selection on body build. Various Saharan and Southern Sudanese groups, not least the ones the Wadi Howar sample shared most metric and non-metric affinities with, are well-known for having particularly strongly topically adapted body proportions (see IV.A.8., V.C.1.g., Table 24 and for example: Allen 1877; Bergmann 1847; Cavalli-Sforza *et al*. 1994: 165, 168; Fuchs 1978; Himes 1988; Knußmann 1996: 408-415, 429-437; Lewin 1998: 137-148; Reuer/Winkler 1980: 200; Roberts 1953; Roberts/Bainbridge 1963; Seligman/Seligman 1932; Vogel/Angermann 1995: 231; Walter 1994: 105-107).

Table 24: Comparison of mean values of selected robusticity indices.

	Sex	IPM003 - *HI1c. Pearson's robusticity index	IPM008 - *RI1c. Pearson's robusticity index	IPM011 - *UI1c. Pearson's robusticity index	IPM016 - *FI2b. Pearson's robusticity index	IPM027 - *TI5. Modified robusticity index
Wadi Howar	♂	10.9	10.9	10.3	11.9	13.4
	♀	11.6	10.8	11.1	12.0	12.2
	ø	11.4	10.8	10.9	12.0	12.6
Jebel Sahaba[1]	♂	11.4	-	10.7	12.4	14.7
	♀	11.3	-	9.7	11.9	11.8
African American[1]	♂	12.8	11.9	12.3	12.3	14.3
	♀	12.0	11.1	11.1	12.0	13.6
Zulu[1]	♂	13.0	11.4	11.8	12.5	14.9
	♀	11.9	10.8	11.3	12.3	14.3
"Khoisan"[1]	♂	11.1	10.3	10.8	12.5	12.5
	♀	10.8	10.2	10.2	12.0	13.6
European American[1]	♂	13.1	12.6	12.7	12.6	15.1
	♀	11.7	11.9	11.4	12.3	13.9
Sami[1]	♂	13.7	13.0	13.0	13.0	15.5
	♀	12.6	12.8	12.3	12.6	15.1
Inuit[1]	♂	13.6	12.4	12.4	13.3	16.1
	♀	12.3	11.7	11.7	13.0	15.0
Australian[1]	♂	13.2	11.5	11.3	12.2	14.4
	♀	10.5	10.0	9.9	11.4	13.6

[1] Pearson 2000: 578-579

The generally rather marked humeral, radial, ulnar and femoral shaft bowing, the impressive radial and ulnar interosseous border (*Margo interosseus*) as well as pilaster sizes, the physiological medullary stenosis and the, in some, cases increased mandibular robusticity appeared to be best explained as indicators of habitually high occupational stress levels (see IV.A.11.). The expressions of the relevant musculoskeletal and masticatory stress markers made this seem a very likely explanation (see IV.A.12. and V.C.1.k.). A fairly large body of research lends support to this view as well. Humeral torsion and retroversion are usually discussed in the context of activities which involve lifting the entire arm, such as overhand throwing and pounding grain with a large pestle and a log mortar. It would clearly make sense to interpret humeral shaft bowing along similar lines (e.g. Aiello/Dean 1990: 348-349; Bridges *et al*. 2000; Cowgill 2007; Dutour 1986, 1989: 178; Greene/Armelagos 1972: 36; Kennedy 1989: 144; Larson 2007; Martin 1928: 1106-1107; Peterson 1998; Pirnay *et al*. 1987; Rhodes 2006, 2007; Rhodes/Churchill 2009; Steen/Lane 1998; Winkler/Wilfing 1991: 19). Antebrachial shaft bowing probably develops as a reaction to activities involving pro- and supination. Although this hypothesis is not generally accepted, it is only logical to assume that enlarged interosseous borders (*Margines interossei*) of bowed *Radii* and *Ulnae* are the result of both the activities which induce shaft bowing and the increased interosseus space created by the bowing (e.g. Galtés *et al*. 2009; Greene/Armelagos 1972: 38; Henke/Rothe 1994: 489, 496, 499; Peterson 1998; Stringer/Gamble 1994: 79; Trinkaus 1983). The degree of anteroposterior femoral curvature seems to reflect occupational stress levels as well, primarily those induced during locomotion. Pilasters are normally regarded as compensatory structures which counterbalance femoral shaft bowing (e.g. Aiello/Dean 1990: 466; Anderson 1968: 1024; Binder/Uerpmann 2004: 14, 28; Bräuer 1983: 54, 62; Bruns *et al*. 2002; Dalou 2007; Greene/Armelagos 1972: 42-43; Henke/Rothe 1994: 489, 499; Holt 2003; İşcan *et al*. 2000: 229; Kennedy 1989: 149; Krogman/İşcan 1986: 293, 297; Larsen 2002: 128; Martin 1928: 1136, 1142-1143; Ruff *et al*. 1984; Shackelford 2007; Simon *et al*. 2002: 258-263; Stock 2006; Trinkaus 1983, 1997: 13371; Wang *et al*. 2008: 48-52; Weaver 2003). If pathological factors can be ruled out, the interpretation of increased cortical thickness is quite straightforward. Numerous studies have shown that the cortical bone (*Substantia compacta*) of long bones thickens in response to mechanical demands (e.g. Bass 1987: 87; Bridges 1989; Brock/Ruff 1988; Churchill 1998: 52-53; Davee *et al*. 1990; Ericksen 1979; Eshed *et al*. 2004(a): 311; Frisancho *et al*. 1970; Garn *et al*. 1969: 425; Garn/Clark 1976; Hildebrandt 1998: 427; Holt 2003; Hui *et al*. 2003; Klümper 1982: 57; Krogman/İşcan 1986: 382-385; Lanyon *et al*. 1982; Larsen 1995: 191-192, 1997: 206, 208, 223; Lieberman 1996; Loth/İşcan 2000(a): 245-247; Marchi 2008; Martin *et al*. 1985; Mulhern/Van Gerven 1997: 133; Norton *et al*. 1996; Ortner/Putschar, 1985: 39; Pearson/Lieberman 2004: 82; Pfeiffer/Lazenby 1994; Pirnay *et al*. 1987; Ruff *et al*. 1984; Ruff *et al*. 1994: 33, 37-38, 40, 53; Stock 2006; Trinkaus 1997: 13371-13372; Wang *et al*. 2008: 48-52; Wolff 1892). The expression of mandibular robusticity traits like gonial eversion is directly linked to masticatory stress. Musculoskeletal and dental masticatory stress indicators, similar to the ones exhibited by certain members of the Wadi Howar sample, have also been frequently observed in other prehistoric Saharan and Sudanese series (e.g. Alt 1997(c): 707-708; Alt/Pichler 1998: 395-399; Anderson 1968; Brace 1983; Brace *et al*. 1991: 39-40, 46-50; Carlson 1976; Carlson/Van Gerven 1977; Coppa/Macchiarelli 1983: 128-129, 134; Dutour 1989: 204-206; Ferembach *et al*. 1979; Greene/Armelagos 1972; Henke/Rothe 1994: 490-493; Hernández *et al*. 1997; Holt/Formicola 2008; Kaifu 1997; Kemkes-Grottenthaler *et al*. 2002; Lieberman *et al*. 2004; Oettlé *et al*. 2009; Pinhasi *et al*. 2008; Poitrat-Targowla 1977; Pucciarelli *et al*. 1990; Rose *et al*. 1993: 61-62; Sardi *et al*. 2006; Sjøvold 1988: 449-453, 458; Spencer/Ungar 2000; Steen/Lane 1998; Stringer/Gamble 1994: 76-78).



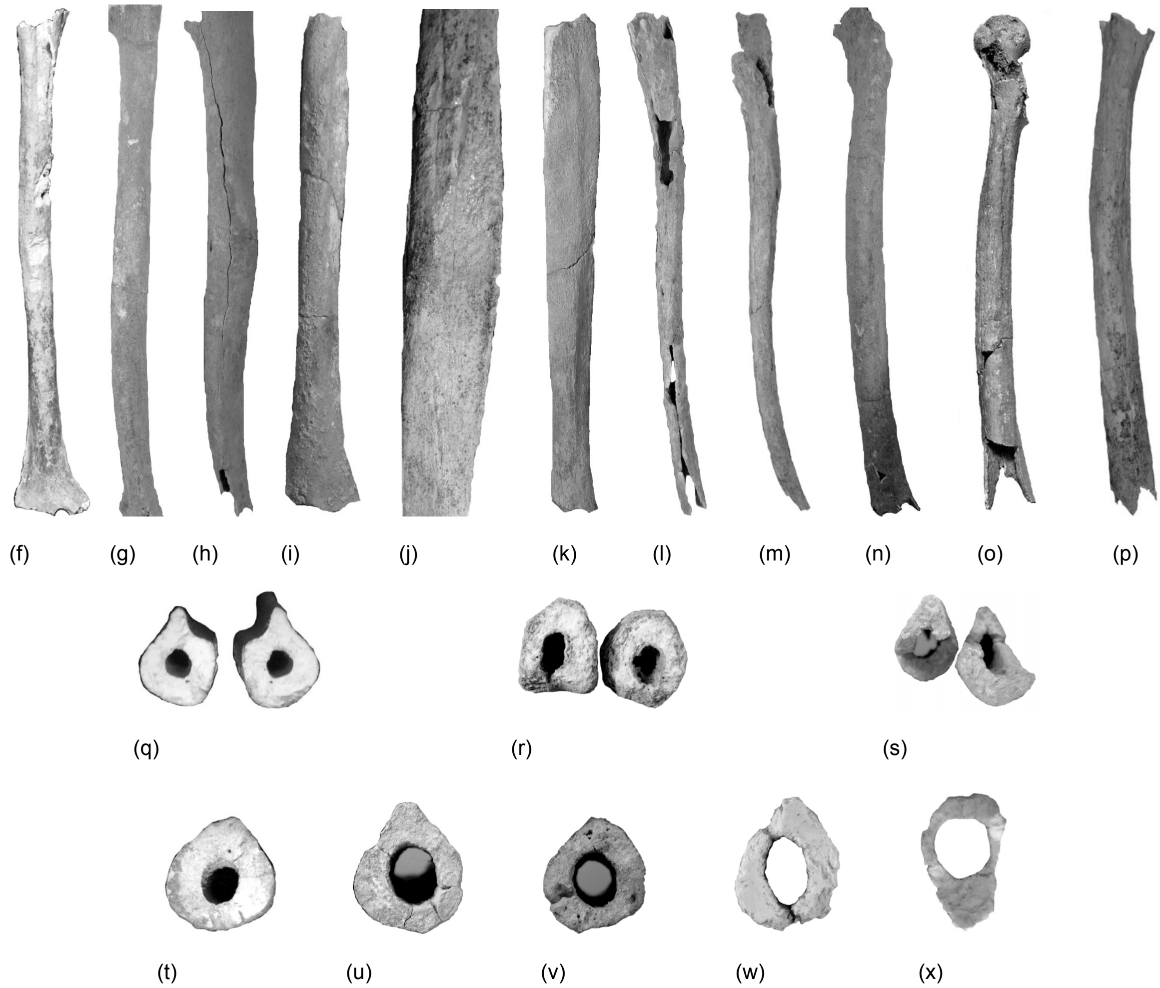


Figure 103: Examples of varying degrees of robusticity. Male glabellar variation in frontal and vertical view (*Norma frontalis et verticalis*): Abu Tabari 02/28-11 (a) and Conical Hill 02/3-4 (b), a prominent external occipital protuberance (*Protuberantia occipitalis externa*): Abu Tabari 02/1-3 (c), robust mandibles (*Mandibulae*): Djabarona 96/1-1 (d) and Abu Tabari 02/28-21 (e), humeral gracility: Abu Tabari 02/1-3 (right *Humerus*) (f), humeral shaft bowing: Abu Tabari 02/1-2 (right *Humerus*) (g) and Abu Tabari 02/28-5 (right *Humerus*) (h), interosseus borders (*Margines interossei*): Abu Tabari 02/1-3 (left *Radius*) (i), Abu Tabari 02/28-22 (right *Radius*) (j) and Abu Tabari 02/28-15 (right *Ulna*) (k), ulnar shaft bowing: Abu Tabari 02/28-3 (left *Ulna*) (l) and Abu Tabari 02/28-22 (left *Ulna*) (m), femoral shaft bowing: Abu Tabari 02/1-2 (right *Femur*, horizontally flipped) (n), Abu Tabari 02/28-5 (left *Femur*) (o) and Abu Tabari 02/28-22 (left *Femur*) (p), ulnar cross sections: Abu Tabari 02/1-2 (right *Ulna*) (q), Abu Tabari 02/28-8 (right *Ulna*) (r) and Abu Tabari 02/28-11 (left *Ulna*) (s), femoral cross sections: Abu Tabari 02/1-2 (left *Femur*) (t), Abu Tabari 02/1-5 (right *Femur*) (u), Abu Tabari 02/28-4 (left *Femur*) (v) and Conical Hill 02/3-4 (right *Femur*) (w) and a tibial cross section: Djabarona 96/4 (right *Tibia*) (x).

The even by biologically sub-Saharan standards large teeth, a number of mandibular traits and the, in a few cases, considerable cranial thickness were most likely genuinely robust features of the Wadi Howar sample (see IV.A.3. and IV.A.11.). In terms of tooth sizes, modern biologically sub-Saharan populations are second only to modern biologically Australo-Melanesian groups. The dimensions of the teeth of the Late Pleistocene series from Jebel Sahaba and Wadi Halfa are similar to those of recent Indigenous Australians. Like the teeth of the Wadi Howar series, the teeth of several other prehistoric Saharan and Sudanese samples are of comparable size. The anterior tooth crowding, the other malalignments and the crown compression observed in several Wadi Howar individuals were clearly mainly caused by the interplay between the sample's megadonty and dental arch (*Arcus dentalis*) dimensions (for geographic variation in tooth size see for example: Alt 1997(c): 708; Brace *et al*. 1991: 38-39; Brown 1987; Hanihara/Ishida 2005; Harris/Lease 2005; İşcan *et al*. 2000: 229; Scott/Turner 1988: 101-102; for tooth sizes of prehistoric Saharan and Sudanese samples see Table 25 and for example: Anderson 1968: 1019, 1035; Calcagno 1986: 360, 362; Chamla 1968: 83;

Coppa/Macchiarelli 1983: 127; Derry 1914: 105; Greene *et al*. 1967; Greene/Armelagos 1972: 11; Irish 2008: 109, 111; for malalignments and crown compression see IV.A.14. and for example: Ackermann *et al*. 2006: 636; Alt/Türp 1998: 102, 117-118; Anderson 1968: 1017, 1020; Bass 1987: 278; Calcagno/Gibson 1988; Forsberg 1988; Greene *et al*. 1967: 53; Greene/Armelagos 1972: 52; Hillson 1996; Radnzic 1988; Scott/Turner 1988: 114, 116).

Table 25: Mean crown lengths and widths of the Wadi Howar series and the prehistoric comparative samples.

	pre-Leiterband sub-sample	Leiterband sub-sample	Wadi Howar sample	Jebel Sahaba/ Tushka	A-Group	Malian Sahara	"Sudanese Hotchpotch"
81. Length UI1	10.0	9.9	9.9	9.4	8.9	9.1	9.6
81. Length UI2	8.6	7.9	8.1	7.3	7.0	7.5	7.2
81. Length UC	8.8	8.1	8.3	8.1	7.7	8.3	7.6
81. Length UP1	7.9	7.7	7.8	7.6	7.1	7.6	7.2
81. Length UP2	7.6	7.3	7.4	7.2	6.9	7.1	7.1
81. Length UM1	12.1	11.7	11.8	11.1	10.9	10.9	11.0
81. Length UM2	11.1	11.2	11.3	10.9	10.4	10.9	10.0
81. Length UM3	10.1	10.1	10.1	9.4	9.2	9.8	9.7
81. Length LI1	5.7	6.1	6.0	6.0	5.4	5.9	5.9
81. Length LI2	6.9	6.6	6.6	6.3	5.9	6.3	5.9
81. Length LC	7.6	7.3	7.4	7.3	6.7	7.4	7.1
81. Length LP1	7.8	7.8	7.7	7.4	7.1	7.8	7.4
81. Length LP2	7.8	7.8	7.8	7.3	7.2	7.7	7.4
81. Length LM1	11.8	11.9	11.9	11.8	11.2	12.0	11.4
81. Length LM2	12.0	11.9	11.9	11.5	10.9	11.7	11.2
81. Length LM3	11.7	11.6	11.6	11.3	10.7	11.1	10.9
81(1). Width UI1	8.1	7.8	7.9	8.0	7.4	7.8	7.6
81(1). Width UI2	7.7	7.0	7.2	7.3	6.4	7.1	6.5
81(1). Width UC	9.0	8.6	8.7	8.9	8.3	8.9	8.0
81(1). Width UP1	10.4	10.1	10.2	10.1	9.5	10.1	9.3
81(1). Width UP2	9.7	10.1	10.0	10.1	9.5	9.9	9.7
81(1). Width UM1	12.0	12.5	12.4	12.5	11.7	12.1	12.0
81(1). Width UM2	12.5	12.6	12.6	12.7	11.7	12.2	11.5
81(1). Width UM3	11.8	12.2	12.1	11.8	11.1	11.5	10.8
81(1). Width LI1	6.3	6.3	6.3	6.8	6.0	6.4	5.5
81(1). Width LI2	6.8	6.6	6.6	7.1	6.2	6.8	5.9
81(1). Width LC	8.1	7.6	7.8	8.3	7.7	8.1	7.5
81(1). Width LP1	8.5	8.5	8.5	8.9	8.1	8.9	8.0
81(1). Width LP2	9.2	8.8	8.9	9.1	8.7	8.8	8.3
81(1). Width LM1	11.3	11.8	11.7	11.6	11.1	11.5	11.0
81(1). Width LM2	11.6	11.3	11.4	11.3	10.6	11.5	11.1
81(1). Width LM3	11.0	10.9	10.9	11.0	10.2	10.5	10.4

In relation to the other cranial remains of this individual, Abu Tabari 02/28-21's mandible (*Mandibula*) was extraordinarily large and robust (Figure 74 and 103). Neither the mandible's (*Mandibula*) expressions of the pertinent musculoskeletal stress traits nor its degree of the dental abrasion matched the overall robusticity (see Appendix XII.A., XIX.A., XX.A.1. and XX.B.). This observation suggested that the peculiar mandibular morphology of this adult female was genetically determined. Judging by its preserved parts, Conical Hill 02/3-4's mandible (*Mandibula*) must have been equally robust (see Figure 42 and 74). In addition, this young male's mandible (*Mandibula*) had much thicker cortical bone (*Substantia compacta*). The lingual surface (*Facies lingualis*) of Abu Tabari 02/1-7's mandibular symphysis (*Symphysis mandibulae*) was characterised by a structure reminiscent of a superior transverse torus (*Torus transversus superior*) (see Figure 77). Given the shape of its remnants, this male's bony chin (*Mentum osseum*) must have been fairly large as well (see Figure 74 and 77). The morphology of Djabarona 96/1-1's mandibular symphysis (*Symphysis mandibulae*) was similar to that of Abu Tabari 02/1-7. The superior transverse torus-like structure was, however, less pronounced in this case (see Figure 103). Superior transverse tori (*Tori transversi superiores*) are comparatively common in *Homo erectus* and *Homo sapiens neanderthalensis* specimens. They can also occur in mandibles (*Mandibulae*) of early anatomically modern and certain modern groups at low frequencies. Interestingly, Nazlet Khater 2 reportedly also displays such a superior transverse torus (*Torus transversus superior*) (e.g. Coon 1962: 349; Henke/Rothe 1994: 122, 1998: 116; Kramer 1991; Liu *et al*. 2010; Rightmire 1991; Rightmire/Lordkipanidze 2009: 44; Storm 1995; Trinkaus 2007: 7370-7371; Tyler 1991; Wolpoff *et al*. 1981). For instance, Conical Hill 95/4 and 02/3-4 exhibited very thick cranial bones (see Appendix XII.A.). Although its expression may also be influenced by overall activity levels, vault thickness is generally seen as a genuine robusticity trait (e.g. Brown 1987; Brown *et al*. 1979; Hatipoglu *et al*. 2008; Henke/Rothe 1994: 399, 404, 410-411, 477-479; Lieberman 1996; Lynnerup 2001; Smith *et al*. 1985; Spencer/Ungar 2000; Tayles 1996: 22).

Table 26: Mean crown lengths and widths of the Wadi Howar series and the modern comparative samples.

	pre-Leiterband sub-sample	Leiterband sub-sample	Wadi Howar sample	Southern Sudan	Chad	Mandinka	Somalis	Haya
81. Length UI1	10.0	9.9	9.9	9.2	8.9	9.3	8.8	8.7
81. Length UI2	8.6	7.9	8.1	7.3	6.9	8.1	6.8	7.3
81. Length UC	8.8	8.1	8.3	7.9	7.7	8.0	7.8	7.9
81. Length UP1	7.9	7.7	7.8	7.6	7.3	7.4	7.2	7.5
81. Length UP2	7.6	7.3	7.4	7.1	6.8	7.0	6.8	7.0
81. Length UM1	12.1	11.7	11.8	11.3	11.1	11.0	10.9	10.9
81. Length UM2	11.1	11.2	11.3	10.7	10.3	10.3	10.3	10.5
81. Length UM3	10.1	10.1	10.1	9.5	9.1	9.2	8.8	9.1
81. Length LI1	5.7	6.1	6.0	5.6	5.5	5.5	5.4	5.7
81. Length LI2	6.9	6.6	6.6	6.2	6.0	6.2	5.9	6.2
81. Length LC	7.6	7.3	7.4	7.2	7.1	6.9	6.6	7.5
81. Length LP1	7.8	7.8	7.7	7.5	7.2	7.1	7.1	7.6
81. Length LP2	7.8	7.8	7.8	7.6	7.4	7.2	7.4	7.7
81. Length LM1	11.8	11.9	11.9	12.0	11.4	11.6	11.4	11.8
81. Length LM2	12.0	11.9	11.9	11.3	10.9	10.7	10.8	11.3
81. Length LM3	11.7	11.6	11.6	11.7	10.9	10.9	10.5	11.3
81(1). Width UI1	8.1	7.8	7.9	7.6	7.4	7.5	7.3	7.6
81(1). Width UI2	7.7	7.0	7.2	6.6	6.4	7.1	6.2	7.1
81(1). Width UC	9.0	8.6	8.7	8.5	8.5	8.3	8.1	8.9
81(1). Width UP1	10.4	10.1	10.2	9.8	9.5	9.5	9.3	9.9
81(1). Width UP2	9.7	10.1	10.0	9.8	9.3	9.5	9.2	10.0
81(1). Width UM1	12.0	12.5	12.4	11.4	11.4	11.4	11.5	11.8
81(1). Width UM2	12.5	12.6	12.6	11.7	11.4	11.7	11.5	12.2
81(1). Width UM3	11.8	12.2	12.1	11.4	11.3	11.8	11.4	11.8
81(1). Width LI1	6.3	6.3	6.3	6.0	5.9	5.9	5.8	6.0
81(1). Width LI2	6.8	6.6	6.6	6.3	6.1	6.2	6.2	6.5
81(1). Width LC	8.1	7.6	7.8	7.8	7.8	7.8	7.4	8.2
81(1). Width LP1	8.5	8.5	8.5	8.5	8.2	8.2	8.1	8.6
81(1). Width LP2	9.2	8.8	8.9	8.7	8.5	8.5	8.4	8.8
81(1). Width LM1	11.3	11.8	11.7	11.0	10.8	10.8	10.7	11.2
81(1). Width LM2	11.6	11.3	11.4	10.6	10.8	10.8	10.4	10.9
81(1). Width LM3	11.0	10.9	10.9	10.6	10.5	10.4	10.2	10.8

V.C.1.k. Occupational stress

Drawing on osteological, medical, ethnographic, archaeological and historical sources made it possible to offer likely interpretations for the Wadi Howar sample's occupational stress markers (see IV.A.12.). Not only the more or less arthrotic articular surfaces (*Facies articulares*) of various *Atlantes* and *Axes* but also the enlarged and often rugged cranial attachment sites of back and neck muscles (*Musculi dorsi et colli*) were most likely caused by the practice of carrying loads on the head (see IV.A.12.). Carrying loads on the head is commonplace all over Africa. It is well-documented ethnographically. Figures carrying objects on their heads have also been depicted at Saharan rock art sites (see I.D.2.b.2.). The consequences of carrying loads on the head have received due attention in a number of medical and osteological publications as well. Additionally, evidence of carrying loads on the head has been mentioned in reports on relevant skeletal series (for relevant ethnographic descriptions see I.D.2.d.2.; for medical research on the consequences of carrying loads on the head see for example: Adeloye 2007; Jäger *et al*. 1997; Kaneda *et al*. 1999; Levy 1968; Scher 1978; for osteological traces of carrying loads on the head see for example: Bridges 1994: 92; Derevenski 2000; Eshed *et al*. 2004(a): 311; Kennedy 1989: 140; Lovell 1994: 162; Wilczak/Kennedy 1998: 472, 477; for evidence indicative of the pratice of carrying loads on the head in relevant skeletal series see for example: Agrilla *et al*. 2008: 372; Anderson 1968: 1014, 1027; Arrighetti *et al*. 2002: 263-266; Binder/Uerpmann 2004: 17-18, 25, 33, 37; Coppa/Macchiarelli 1983: 119, 122; Derry 1949: 32-33; Disi *et al*. 1984; Dutour 1983: 310, 315; Greene/Armelagos 1972: 21, 54; Henke *et al*. 2002: 298-301; Simon *et al*. 2002: 262-265, 268-269).

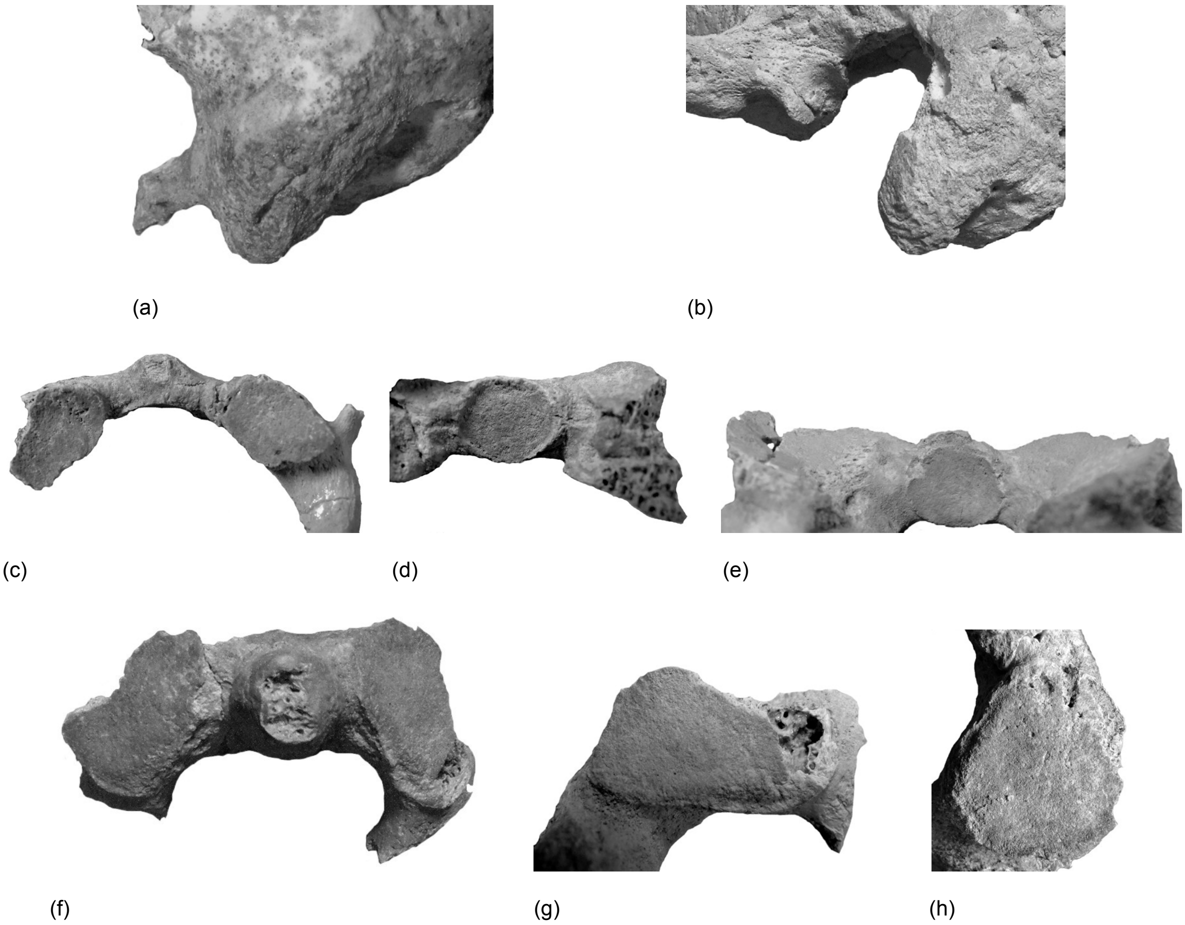
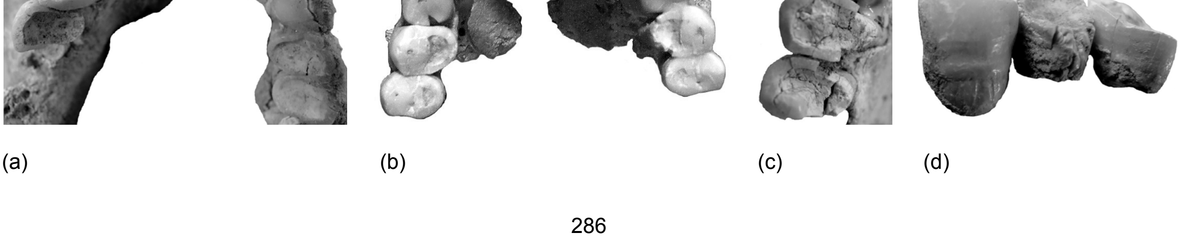


Figure 104: Examples of cranial and cervical occupational stress markers. Abu Tabari 02/1-3: left mastoid process (*Processus mastoideus*) (a), Abu Tabari 02/28-8: left mastoid process (*Processus mastoideus*) (b), Abu Tabari 02/28-8: inferior articular surfaces (*Facies articulares inferiores*) of the *Atlas* (c), Abu Tabari 02/28-8: facet for dens of axis (*Fovea dentis*) (d), Abu Tabari 02/28-21: superior articular surfaces (*Facies articulares superiores*) and facet for dens of axis (*Fovea dentis*) of the *Atlas* (e), Abu Tabari 02/28-8: superior articular surfaces (*Facies articulares superiores*) of the *Axis* (f), Abu Tabari 02/28-8: right articular surface (*Facies articularis superior*) of the *Axis* (g) and Abu Tabari 02/28-15: right articular surface (*Facies articularis superior*) of the *Axis* (h).

It was concluded that the masticatory stress markers can probably be attributed to the consumption of foods with a high grit content and paramasticatory practices (see IV.A.12.). Natural factors, such as airborne sand, and certain food preparation techniques, especially using grinding stones, must have introduced a considerable amount of grit into the food of the prehistoric inhabitants of the Wadi Howar.

Prolonged, unintentional ingestion of grit would certainly explain the generally advanced as well as the angled and cupped wear. Airborne sand is virtually omnipresent in the Wadi Howar and grinding stones are abundant at most prehistoric sites in the region. Moreover, fruit and grass seeds evidently played an extremely important role in the diet of the prehistoric inhabitants of the Wadi Howar. The majority of these seeds would have undoubtedly been ground up using grinding stones. This procedure is still part of the everyday life of many pertinent modern groups (see I.D.2.a.2., I.D.2.d.2., 3. and 7.). Furthermore, humans using grinding stones also feature in certain Saharan rock art scenes (see I.D.2.b.2. and I.D.2.d.7.) (for effects of the consumption of foods with a high grit content see for example: Alt/Pichler 1998: 398; Beckett/Lovell 1994: 233; Eshed *et al*. 2006: 153; Houghton 1978, 1996; Kieser *et al*. 2001(a); Leek 1972, 1984; Lev-Tov Chattah/Smith 2006; for angled and cupped wear see for example: Anderson 1968: 1022; Bernal *et al*. 2007; Binder/Uerpmann 2004: 12; Brothwell/Shaw 1971: 224; Eshed *et al*. 2006; Henke *et al*. 2002: 298-301; Hinton 1981; Irish 2001; Judd 2008(a): 103-104; Kieser *et al*. 2001(a); Lev-Tov Chattah/Smith 2006; Molleson/Jones 1991; Smith 1984; Watson 2008; for the dietary importance of seeds and grinding tools see I.C.3. to I.C.3.b.3. and for example: Abdel-Magid 2003; Cremaschi/Di Lernia 1999; Edwards 2004: 14-15, 34-35, 56, 59; Ehret 2002: 35-39; Garcea 2006; Gronenborn 1998; Haaland 1992, 1995; Haour 2003: 212-213; Hoelzmann *et al*. 2001: 207-212; Holl 1998: 145-146; Jesse 2006(b): 999; Judd 2008(a): 103-104; Keding 2009: 294, 296, 299, 322, 324, 361-362, 419-427, 440, 444; Lange, M., 2008; MacDonald 1998: 42, 2000: 9-10; Marshall/Hildebrand 2002; McIntosh 1993: 214; Ozainne *et al*. 2009; Sadig 2009; Thompson *et al*. 2008: 379; Wendorf/Schild 1998). The more specific wear patterns, like the more pronounced abrasion of the anterior dentition, the labial wear, the broad notches and the chipping, were clearly traces of paramasticatory activities. The often quite strong gonial eversion, the occasionally observed rugose temporal muscle (*Musculus temporalis*) attachment areas and the rare arthrotic changes of heads of mandibles (*Capita mandibularum*) appeared to be best understood in the context of paramasticatory and general masticatory stress as well (see IV.A.11., 12., Appendix XIX.A. and XX.A.1.; for evidence of high levels of masticatory stress in pertinent series see for example: Anderson 1968: 1004, 1011, 1012-1017, 1022, 1035; Binder/Uerpmann 2004: 12-13, 26; Bonfiglioli *et al*. 2004; Brothwell/Shaw 1971: 224; Carlson/Van Gerven 1977; Clark 1989: 395; Coppa/Macchiarelli 1983: 124-125, 128-129, 134; Derry 1949: 32; Dutour 1989: 204-206; Greene *et al*. 1967; Greene/Armelagos 1972: 11, 28, 52; Henke *et al*. 2002: 298-307; Judd 2008(a): 98-100, 103-104; Minozzi *et al*. 2003; Schuck 2002: 251; Simon *et al*. 2002: 258-260; Zuhrt 1967). The anterior teeth of foragers are typically more abraded than their posterior teeth. This phenomenon is, however, not very common in groups relying on other subsistence strategies. That certain hunter-gatherer behaviours remained important throughout the occupation phases of the Wadi Howar is easily imaginable (see I.C.3.a. to I.C.3.b.3.). After all, fishing, gathering and hunting are still integral parts of the lives of most Saharan and Southern Sudanese pastoralists (see I.D.2.d.3.) (for hunter-gatherer-specific dental abrasion patterns see for example: Bernal *et al*. 2007; Deter 2009; Eshed *et al*. 2006: 153; Hinton 1981; Kaifu 1999, 2000; Kennedy 2000: 214; Larsen 2002: 131; Sciulli 1997; for noteworthy levels of anterior abrasion in relevant skeletal samples see for example: Anderson 1968: 1022, 1035; Binder/Uerpmann 2004: 13, 26; Clark 1989: 395; Coppa/Macchiarelli 1983: 125; Greene *et al*. 1967: 47-52; Greene/Armelagos 1972: 52; Henke *et al*.

2002: 298-301; Judd 2008(a): 98-99; Zuhrt 1967). Notched wear is frequently interpreted as a result of fibre processing, for example, in the course of the production of artefacts like baskets, ropes and nets. This is particularly interesting, since the abundance of fish bones at the Abu Tabari site 02/1 suggests that fish must have featured prominently in its inhabitants' diet (see I.C.3.a.1. and I.C.3.b.1.). Nets, strings and baskets could have, obviously, been employed in this context. In addition, Saharan rock art proves that ropes were used as hunting tools (see I.D.2.b.2.). String making remains a popular pastime among many Southern Sudanese mixed economy pastoralists as well (e.g. Evans-Pritchard 1940: 36; Seligman/Seligman 1932: 372, 445). Basketry remains have, for instance, been found in the Libyan Sahara (Cremaschi/Di Lernia 1999: 227). Ancient Egyptian sources associate the "*Nehesiu*" with weaving and basketry (see I.D.2.c.1.). Nets as well as baskets and similar woven object are also still important seed collection, fishing and hunting utensils in Southern Sudan and the Sahara (see I.D.2.d.2.) (for interpretations of notched wear see for example: Alt/Pichler 1998: 397; Bonfiglioli *et al*. 2004: 451-453; Erdal 2008; Eshed *et al*. 2006; Hillson 1996: 251-253; Kennedy 1989: 152; Larsen 1985; Minozzi *et al*. 2003; Molnar 1971: 178-179, 185; Schulz 1977; Scott/Jolie 2008; Wilczak/Kennedy 1998: 482). Labial wear is usually considered to be indicative of activities like holding objects with the anterior dentition and pulling animal or vegetable material through clenched teeth. Softening skins has been identified as a particularly common cause of labial wear patterns. For several reasons, this could have also been the cause of the Wadi Howar individuals' labial wear. Some of the individuals from the Wadi Shaw, for instance, were buried wrapped in leather (see Schuck 2002: 247, 248, 249, 251). Animal skins are one of the primary goods of the "*Nehesiu*" which are mentioned in Ancient Egyptian texts (see I.D.2.c.1.). East African foragers carry what they gather in leather karosses (see I.D.2.d.2.). Leather and fur clothes were a trademark of many Saharan and East African groups (see I.D.2.d.2. and 7). Additionally, leatherwork remains important in the Eastern Sahara and Southern Sudan (see I.D.2.d.7.) (for interpretations of labial wear see for example: Alt/Pichler 1998: 395-399; Eshed *et al*. 2006: 153; Henke/Rothe 1994: 490-493; Hinton 1981; Judd 2008(a): 98-99; Kaifu 1999; Kennedy 1989: 152, 2000: 214; Lozano *et al*. 2008; Molleson 1994; Steen/Lane 1998; Stringer/Gamble 1994: 76-78; Ungar/Spencer 1999: 389-390). For example, using teeth like a vice to hold artefacts while working on them, eating food contaminated with large-grained sand or breaking shells or bones by biting on them can lead to chipping. Since it was only observed in a few, specific teeth, it seemed improbable that contaminated food had induced the chipping in the Wadi Howar dentitions (see Table 6, IV.A.12. and Figure 105). Thus, the chipping was probably the result of paramasticatory practices (for research on chipping see for example: Belcastro *et al*. 2007: 391; Bonfiglioli *et al*. 2004: 449-452; Kennedy 2000: 214; Larsen 1995: 196; Turner 1979: 620-621; Turner/Cadien 1969).



(a) (b) (c) (d)

(e) (f) (g) (h) (i)

Figure 105: Examples of abrasion patterns. Abu Tabari 02/1-2: anterior maxillary abrasion (a), Abu Tabari 02/28-5: asymmetrical anterior maxillary abrasion (b), Abu Tabari 02/28-21: angled wear of the right first and second premolar (*Dens praemolaris superior I et II*) (c), Abu Tabari 02/28-3: left lower canine (*Dens caninus inferior*) with notched and first and second premolar (*Dens praemolaris inferior I et II*) with angled wear (d), Abu Tabari 02/1-2: right upper first and second incisor (*Dens incisivus superior I et II*) with notched wear (e), Abu Tabari 02/1-5: right upper first incisor (*Dens incisivus superior I*) with notched wear (f), Abu Tabari 02/28-3: left upper second incisor (*Dens incisivus superior II*) with virtually no wear and left upper canine (*Dens caninus superior*) with pronounced, wide notched wear (g), Abu Tabari 02/28-3: right upper canine (*Dens caninus superior*) with notched wear and chipping (h) and Abu Tabari 02/28-3: right upper second premolar (*Dens praemolaris superior II*) with chipping (i).

Many bones of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*) displayed enlarged and/or rough attachment sites, enthesiopathic lesions and arthrosis (see IV.A.12.) These observations were, in all likelihood, traces of frequently performed activities such as throwing, using grinding and pounding tools, digging, processing milk, using axes, fishing, milking and making strings, ropes, nets, baskets, leather objects and pots. The stress-induced changes a *Scapula*, several clavicles (*Claviculae*) and many *Humeri* exhibited were associated with movements in the shoulder joint (*Articulatio humeri*) (see IV.A.12.). Changes of this type have been variously described in connection with overhand throwing, grinding or pounding grain and canoeing or kayaking. Moreover, not only these but also several other activities could have caused the stress-induced changes in question. Spears are shown at many Saharan rock art sites (see I.D.2.b.2.). They are the traditional weapon of choice for many Saharan and Southern Sudanese groups as well (see I.D.2.d.2., 5. and 7.). Throwing sticks are probably represented in some Saharan rock paintings (see I.D.2.b.2.). According to the Ancient Egyptian sources, the "*Nehesiu*" were using throwing sticks (see I.D.2.c.1.). Throwing sticks also continue to be part of certain Eastern Saharan and Southern Sudanese hunting weapon arsenals (see I.D.2.d.2. and 7.). Bone harpoon points are typical Wavy Line/Laqiya phase artefacts (see I.C.3.a.1.). Several Southern Sudanese groups still hunt hippopotami and fish with harpoons (see I.D.2.d.2.). Nets could have been cast to catch fish or small animals. They continue to be employed by certain relevant herder and forager groups in this context (see I.D.2.d.2.). "Bola balls" have been found at many sites in the Wadi Howar. They have been interpreted as parts of hunting or herding tools which would have been thrown (see I.C.3.b.1.). Grinding or pounding with grinding stones or large wooden pestles and log mortars is a task which has been performed by both hunter-gatherers and herders for millennia (see I.D.2.a.2., I.D.2.b., I.D.2.d.2. and 7.). Using axes or digging sticks habitually could have induced the observed clavicular, scapular and humeral changes as well. Darfur axes were common during the Leiterband phase (see I.C.3.a.2. and I.D.2.b.2.). Axes in general are still used to collect wood, to hunt and to gather honey (see I.D.2.d.2.). Digging sticks are, of course, one of the most important forager tools (see I.D.2.d.2.). Lifting up loads to place them on the head or taking them down again is another strenuous task which involves movements in the shoulder joint (*Articulatio humeri*). Not least the above-mentioned cranial and cervical stress markers made this one of the possible explanations (see above, I.D.2.b.2. and I.D.2.d.2.). The use of watercrafts could by no means be ruled out either. The imbalance between the occupational stress indicators of the bones of the upper and lower free extremities (*Partes liberae membrorum superiorum et inferiorum*) was undoubtedly compatible with habitual watercraft use (see IV.A.12.). The Wadi Howar region, the Eastern Sahara and the Sahara as a whole were dotted with seasonal and permanent ponds and lakes for millennia. The West Nubian Palaeolake, Lake Chad and the water bodies with which sites like Kobadi and Gobero were associated are famous examples (see I.C.1.b., I.C.3.a., I.C.3.a.1. to 4. and for example: Breunig/Neumann 2002; Hoelzmann *et al*. 2001; Holl 1998: 144-151; Jesse *et al*. 2004: 127-130; Jousse *et al*. 2008; Kröpelin 2007(b); Kröpelin *et al*. 2008; Kuper/Kröpelin 2006; MacDonald 1998: 38, 52-53; Pachur/Altmann 2006; Sereno *et al*. 2008). The presence of the remains of large naked catfish (*Bagrus* sp.) and Nile perch (*Lates niloticus*) specimens at Abu Tabari 02/1 indicates that the inhabitants of this site must have exploited fairly large, permanent, well-oxygenated water bodies (Pöllath/Peters 2003, 2007). Pictures of boats occur at some Saharan rock art sites (see I.D.2.b.2. and I.D.2.d.7.). The Dufuna canoe, which has been dated to the period around 6000 BCE, proves that the people who occupied the shores of Lake Chad used boats (e.g. Breunig/Neumann 2002; Breunig *et al*. 1996). Reed and ambatch rafts, papyrus boats and dugout canoes are still important as means of transport and fishing or hunting platforms for groups like the Anuak, Dinka, Nuer, Shilluk and Buduma (see I.D.2.d.2. and 7.) (for pertinent research on stress-induced changes of the *Scapula*, clavicle (*Clavicula*) and *Humerus* see for example: Agrilla *et al*. 2008: 372, 376; Anderson 1968: 1023; Binder/Uerpmann 2004: 16-17; Binder *et al*. 2005; Cowgill 2007; Davis/Kotowski 2007; Dutour 1986; Eggers *et al*. 2008; Eshed *et al*. 2004(a); Gallis 2006; Greene/Armelagos 1972: 36, Plate 13; Hagemann *et al*. 2004; Hawkey/Merbs 1995; Judd 2004: 41; Kennedy 1989: 141, 144; Lai/Lovell 1992; Larsen 1995: 201, Larson 2007; Lemasters *et al*. 1998; Lieverse *et al*. 2007(b); Lieverse *et al*. 2009; Lovell/Dublenko 1999; Miles 1996; Molleson 1989; Molnar 2006; Oumaoui *et al*. 2004; Peterson 1998; Rempel *et al*. 1992; Rhodes 2006; Rhodes/Churchill 2009; Steen/Lane 1998; Stirland 1998: 355; Stock 2006; Stock/Pfeiffer 2001). A string of observations suggested that many members of the Wadi Howar sample routinely exerted substantial stresses on the bones of the forearms (*Antebrachia*) and hands (*Manus*). The bowed shafts (*Corpora*), the size of the interosseous borders (*Margines interossei*) and the state of the muscle attachment sites of the *Radii* and *Ulnae* were indicative of forceful flexion at the elbow (*Articulatio cubiti*) and, more importantly, vigorous pro- and supination (see IV.A.11., 12. and V.C.1.j.). Grinding and pounding seeds, churning or shaking milk to produce butter and cheese as well as lifting up and carrying objects are the most obvious activities which involve forceful flexion at the elbow (*Articulatio cubiti*) (see above, I.D.2.b.2., I.D.2.d.2. and 3.). Pro- and supination are movements which are intrinsic to picking fruits and grass seeds, casting and hauling in nets and milking. The significance of seeds for prehistoric and modern Eastern Saharan and Southern Sudanese groups has already been underlined (see above). Aquatic resources played a major role during the Wavy Line/Laqiya phase and at Abu Tabari 02/1 (see I.C.3.a.1. and I.C.3.b.1.). Fish still features prominently in the diet of the Buduma and the mixed economy pastoralists of Southern Sudan (see I.D.2.d.2., 3., 5. and 7.). Although milking scenes are not particularly common, milking is a subject of Saharan rock art (see I.D.2.b.2.). Naturally, milk and milk products are nutritionally and socially important parts of the lives of pastoralists (see I.D.2.d.2., 3. and 7.) (for relevant research on radial and ulnar occupational stress markers see for example: Agrilla *et al*. 2008: 372, 379; Aiello/Dean 1990: 364; Arrighetti *et al*. 2002;

Binder/Uerpmann 2004: 13-14, 16-18, 27, 37; Binder *et al*. 2005; Boyle *et al*. 1997; Ciranni/Fornaciari 2003; Davis/Kotowski 2007; Donlon 2000: 355, 363-366; Dutour 1986; Eshed *et al*. 2004(a); Galtés *et al*. 2009; Greene/Armelagos 1972: 38; Henke/Rothe 1994: 489, 496; Kennedy 1983; Lai/Lovell 1992; Lieverse *et al*. 2009; Lovell/Dublenko 1999; Oumaoui *et al*. 2004; Peterson 1998; Rijn *et al*. 2009; Roberts-Thomson/Roberts-Thomson 1999; Steen/Lane 1998; Stringer/Gamble 1994: 79; Stuart-Macadam *et al*. 1998; Winder 1981). The expressions of certain musculoskeletal stress traits of the forearms (*Antebrachia*) as well as the stress-related degenerative, enthesiopathic and arthrotic changes of the bones of the hands (*Ossa manuum*) of a number of individuals were indicative of high levels of occupational stress (see IV.A.12.). Although some of the pertinent stress markers could have partly or wholly reflected normal age related processes and traumatic events, on the whole, it seemed much more likely that they were traces of chronic stress caused by the habitual execution of strenuous, repetitive manual tasks. The state of the insertions (*Insertiones*) of the finger flexor muscles (*Musculi flexores digitorum*) and the apiostosis, i.e. the tufting of the distal phalangeal tuberosity (*Tuberositas phalangis distalis*), of several distal phalanges (*Phalanges distales*) appeared to be especially informative. They were unquestionably the results of activities in which fingers need to be vigorously flexed and fingertips are subjected to shear stresses in the context of forceful palpation.

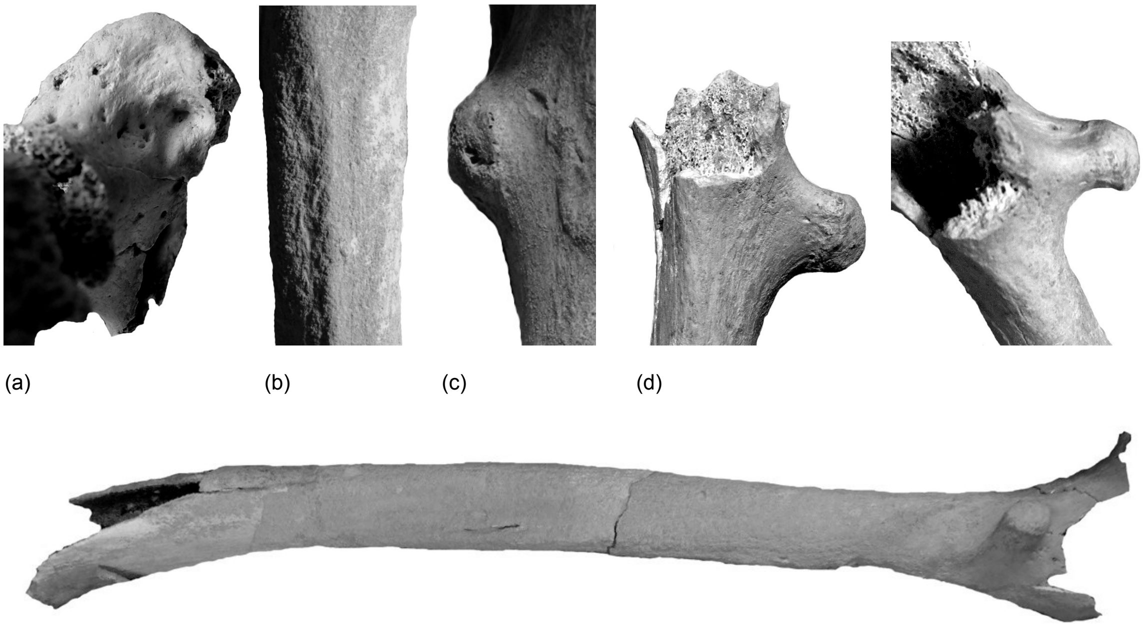
(a) (b)

(c) (d) (e) (f) (g) (h) (i) (j) (k)

Figure 106: Examples of occupational stress markers of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*). Abu Tabari 02/1-2: inferior surface (*Facies inferior*) of the left and right clavicle (*Clavicula*) (a), Abu Tabari 02/28-21: inferior surface (*Facies inferior*) of the acromial end (*Extremitas acromialis*) of the left clavicle (*Clavicula*) (b), Abu Tabari 02/28-5: posterior surface (*Facies posterior*) of the left *Humerus* (c), ulnar tuberosities (*Tuberositates ulnarum*): Abu Tabari 02/1-2 - left (d), Abu Tabari 02/1-3 - left (e), Abu Tabari 02/28-11 - right (f), Abu Tabari 02/28-11 - left (g) and Abu Tabari 02/28-22 - right (h), Abu Tabari 02/1-5: right supinator crest (*Crista musculi supinatoris*) (i), Abu Tabari 02/28-21: left supinator crest (*Crista musculi supinatoris*) (j), Abu Tabari 02/28-11: lateral surface (*Facies lateralis*) of the distal end of the right *Ulna* (k), Abu Tabari 02/1-2: distal phalanx of the left thumb (*Phalanx distalis I*) - dorsal (l), Abu Tabari 02/1-2: distal phalanx of the left index finger (*Phalanx distalis II*) - palmar (m), Abu Tabari 02/28-5: distal phalanx of the left thumb (*Phalanx distalis I*) - radial (n), Abu Tabari 02/28-5: distal phalanx of the left middle finger (*Phalanx distalis III*) - palmar (o), Abu Tabari 02/1-2: middle and distal phalanx of the left middle finger (*Phalanx media et distalis III*) - palmar (p), Abu Tabari 02/28-11: middle and distal phalanx of the right index finger (*Phalanx media et distalis II*) - palmar (q), Abu Tabari 02/28-5: proximal phalanx of the left index finger (*Phalanx proximalis II*) - dorsal (r) and Abu Tabari 02/28-11: head (*Trochlea phalangis*) of the proximal phalanx of the right index, middle and ring finger (*Phalanx proximalis II, III et IV*) - dorsal (s).

Milking and making strings, pots, baskets or leather objects involve flexing fingers and/or forceful palpation. Particularly in view of the other relevant findings, milking and string making appear to be tasks which would have been performed frequently enough to induce such stress-related changes (see above) (for relevant research on stress-related changes of the forearms and hands see for example: Anderson 1968: 1026; Aufderheide/Rodríguez-Martín 1998: 22, 25-27, 93-94, 105-106; Binder/Uerpmann 2004: 17-18, 34; Boyle *et al*. 1997; Carruth *et al*. 2002; Churchill/Morris 1998; Ciranni/Fornaciari 2003; Cope *et al*. 2005; Davis/Kotowski 2007; Domett 1998; Eshed *et al*. 2004(a); Foster 2009; Hadler *et al*. 1978; Hales/Bernard 1996; Herrmann *et al*. 1990: 145-146; Hildebrandt 1998: 126-127, 355, 506, 791, 830, 955, 1059, 1060, 1073, 1525; Kalichman *et al*. 2004; Kalichman *et al*. 2007; Klümper 1982: 201; Kobyliansky *et al*. 1995; Kucera *et al*. 2008(a); Kucera *et al*. 2008(b); Lai/Lovell 1992; Lipscomb *et al*. 2004; Lovell/Dublenko 1999; Marshall *et al*. 2004; Molnar 2006; Munson Chapman 1997: 498, 503; Ortner/Putschar 1981: 64, 420; Oumaoui *et al*. 2004; Pavlovsky/Kobyliansky 1997; Peterson 1998; Punnett/Wegman 2004; Rothschild *et al*. 1999; Solovieva *et al*. 2005; Steen/Lane 1998; Steinbock 1976: 39-43, 289; Tyson/Dyer Alcauskas 1980: 306-307; Waldron, H. A., 1996, 1997; Waldron/Cox 1989; Wilczak/Kennedy 1998: 469). In three cases signs of handedness were so obvious that they were noticed without systematically looking for them. This could be regarded as another indication of rather high levels of stress affecting the bones of the pectoral girdle (*Cingulum pectorale*) and the upper free extremities (*Partes liberae membrorum superiorum*) (e.g. Auerbach/Raxter 2008; Auerbach/Ruff 2006; Bax/Ungar 1999; Bermúdez de Castro *et al*. 1988; Blackburn/Knüsel 2006; Churchill/Formicola 1997; Danforth/Thompson 2008; Faurie/Raymond 2004; Fox/Frayer 1997; Koby 1956; Kujanová *et al*. 2008; Larsen 1995: 202-203; Lieverse *et al*. 2008; Mays *et al.* 1999; Peterson 1998; Pomeroy/Zakrzewski 2009; Raymond/Pontier 2004; Rhodes/Churchill 2009; Steele 2000; Steele/Mays 1995; Wilczak 1998).

Less commonly encountered conspicuous musculoskeletal stress markers, thick cortical bone (*Substantia compacta*), furrows leading into nutrient foramina (*Foramina nutritia*) and bowed shafts characterised a number of bones of the lower free extremities (*Partes liberae membrorum inferiorum*) (see IV.A.11., 12. and V.C.1.j.). These characteristics were probably symptomatic of fairly high levels of locomotory stress. The bowed femoral shafts (*Corpora femorum*), the frequently large pilasters and the increased cortical thickness of a number of *Femora* and *Tibiae* could be fairly confidently interpreted as responses to elevated mechanical demands (see IV.A.11. and V.C.1.j.). Similarly, the grooves which lead into the nutrient foramina (*Foramina nutritia*) of the long bones (*Ossa longa*) of many Wadi Howar individuals were believed to be best explained as impressions of nutrient vessels (*Vasa nutritia*) caused by stress-induced periosteal growth (e.g. Greene/Armelagos 1972: 60, Plate 21; Herrmann *et al*. 1990: 138; Hildebrandt 1998: 1220; Kaufmann *et al*. 1984: 31; Lai/Lovell 1992: 229; Mensforth *et al*. 1978; Mysorekar 1967; Pfeiffer *et al*. 2006; Ruff *et al*. 1994: 37-38; Tortora/Grabowski 2000: 163, 166, 170-171; Van De Graaff/Fox 1999: 190-193; Weston 2008).



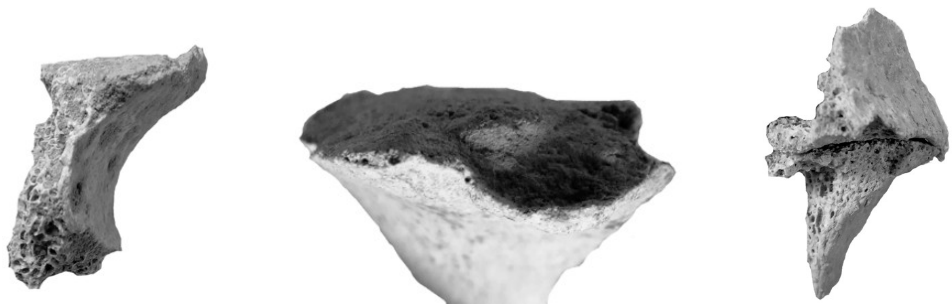
(a) (b) (c) (d)

(e)

Figure 107: Examples of occupational stress markers of the lower free extremities (*Partes liberae membrorum inferiorum*). Abu Tabari 02/28-11: trochanteric fossa (*Fossa trochanterica*) of the right *Femur* (a), Abu Tabari 02/1-2: left gluteal tuberosity (*Tuberositas glutaealis*) (b). Abu Tabari 02/1-2: right lesser trochanter (*Trochanter minor*) (c), Abu Tabari 02/28-5: right lesser trochanter (*Trochanter minor*) (d) and Abu Tabari 02/28-5: right *Femur* in medial view (*Norma medialis*) (e).

The often large and/or rugose lesser trochanteres (*Trochanteres minores*), the cases of pronounced ruggedness of the gluteal tuberosity (*Tuberositas glutaealis*), the occasionally rough medial surfaces (*Facies mediales*) of the distal ends of *Fibulae* and several other observations constituted further evidence of high mobility levels (e.g. Agrilla *et al*. 2008: 372; Aiello/Dean 1990: 463; Anderson 1968: 1024, 1026; Arrighetti *et al*. 2002; Binder/Uerpmann 2004: 14-16; Binder *et al*. 2005; Brock/Ruff 1988; Bronner *et al*. 2003; Carlson *et al*. 2007; Churchill/Morris 1998; Clark 1989: 395; Coppa/Macchiarelli 1983: 119; Drawer/Fuller 2001; Dutour 1986; Holt 2003; Kujala *et al*. 1995; Lai/Lovell 1992; Lievense *et al*. 2001; Lieverse *et al*. 2007(b); Lovell/Dublenko 1999; Maetzel *et al*. 1997; Marchi 2008; Martin 1928: 1140-1141; Pearson 2000; Roberts-Thomson/Roberts-Thomson 1999; Rossignol *et al*. 2005;

Schmitt *et al*. 2004; Simon *et al*. 2002: 268-269; Sparacello/Marchi 2008; Steen/Lane 1998; Stock 2006; Waldron 1997; Wilczak/Kennedy 1998: 473). That the average Wadi Howar *Femur was* platymeric was most likely down to the sample's genetic make-up (see IV.A.3.). Nevertheless, that certain specimens were characterised by severe platymeria probably had environmental reasons as well (see IV.A.12. and V.C.1.l.). Certain populations, for example biologically American groups, appear to be genetically more platymeric than others. However, exposure to increased mechanical and, possibly, nutritional stress seems to lead to less circular subtrochanteric shafts. It was therefore assumed that the cases of extraordinary platymeria were caused by higher stress levels (e.g. Aiello/Dean 1990: 467; Anderson 1968: 1024; Bass 1987: 214; Birkby *et al*. 2008: 31; Bridges *et al*. 2000; Brown 2006; Coppa/Macchiarelli 1983: 118, 122; Dutour 1989: 176; Greene/Armelagos 1972: 42; Judd 2008(a): 89; Kennedy 1989: 148; Krogman/İşcan 1986: 527; Larsen 1995: 192; Martin 1928: 1139; Petit-Maire/Dutour 1987: 277; Ruff *et al*. 1984: 132; Wescott 2006(a); Wescott/Srikanta 2008). Many hunting strategies, hunting or gathering far away from camp sites, driving herds and seasonal or permanent migrations involve prolonged walking and running (see I.C.3.a.1., 2., 3., I.D.2.c.3., I.D.2.d.2., 5. and 6.). That the bones of the lower free extremities (*Partes liberae membrorum inferiorum*) of the Wadi Howar skeletons did not exhibit more occupational stress traits with pronounced expressions was therefore somewhat surprising (see IV.A.11. and 12.). The occasionally encountered tibial retroversion and squatting facets were indicative of habitual squatting (see IV.A.12.). Retroversion of the tibial head (*Caput tibiae*) and squatting facets usually result from customary squatting. Squatting is a common behaviour in many parts of the world and its effects are frequently observed in skeletal series (e.g. Anderson 1968: 1024; Binder/Uerpmann 2004: 37; Binder *et al*. 2005; Boulle 2001; Brothwell 1981: 90, 98; Dlamini/Morris 2005; Greene/Armelagos 1972: 45; Kennedy 1989: 149-150; Martin 1928: 1161-1164; Satinoff 1972; Wilczak/Kennedy 1998: 481).



(a) (b) (c)

Figure 108: Examples of lumbar occupational stress markers. Abu Tabari 02/28-11: lumbar vertebra (*Vertebra lumbalis*) (a), Abu Tabari 02/28-11: base of the sacrum (*Basis ossis sacri*) (b) and Abu Tabari 02/28-21: fifth lumbar vertebra (*Vertebra lumbalis V*) and promontory (*Promontorium*) (c).

Only very few and rather unremarkable traces of *Spondylosis deformans*, *Spondylarthrosis deformans* or other changes affecting thoracic (*Vertebrae thoracicae*) or lumbar vertebrae (*Vertebrae lumbales*) were found (see IV.A.12. and 13.). This was probably due to the extremely poor preservation of the Wadi Howar sample (see IV.A.2. and V.C.1.b.). Since such changes are both age- and stress-related, theoretically, they should have occurred at fairly high frequencies (e.g. Adeloye 2007; Agrilla *et al*. 2008: 372, 375-376; Anderson 1968: 1027; Arrighetti *et al*. 2002: 263-266; Aufderheide/Rodríguez-

Martín 1998: 96-97; Barkey *et al*. 2001: 398; Binder/Uerpmann 2004: 13, 15-18, 33; Brown *et al*. 2008; Coppa/Macchiarelli 1983: 119, 122; Faccia/Williams 2008; Greene/Armelagos 1972: 54; Herrmann *et al*. 1990: 148-149; Hildebrandt 1998: 1168, 1425, 1487, 1489; Jäger *et al*. 1997; Judd 2008(a): 98, 103; Knüsel *et al*. 1997; Larsen 1995: 200-201; Levy 1968; Lovell 1994; Menninger/Waibel 1996: 9-10, 18, 22-24, 36; Ortner/Frohlich 2007: 366; Ortner/Putschar 1981: 431; Rühli *et al*. 2005; Scher 1978; Schmorl/Junghanns 1959; Simon *et al*. 2002: 268-269; Steinbock 1976: 287-289, 303; Stirland/Waldron 1997; Tyson/Dyer Alcauskas 1980: 152-155, 176-178; Ubelaker/Pap 1998: 239, 249, 2009; Van Der Merwe *et al*. 2006; Webb 1995; Wilczak/Kennedy 1998: 477).

Interestingly, the average musculoskeletal stress and postcranial robusticity scores of the main Wadi Howar mean individuals and the Jebel Sahaba/Tushka mean individual did not exhibit many differences (see Appendix XXIV.D.2. and XXIV.E.). This finding suggested that the physical demands of these two populations' everyday lives were probably not overly dissimilar.

Table 27: Comparison of mean postcranial robusticity and musculoskeletal stress scores.

	pre-Leiterband sub-sample	Leiterband sub-sample	Wadi Howar sample	Jebel Sahaba/ Tushka
PR007/8 - Ulnar shaft bowing (m)	7	4	5	5
PR009/10 - Ulnar *Margo interosseus* size (m)	7	5	5	6
PR011a/12a - Femoral shaft bowing (m) - shape	5	5	5	5
PR011b/12b - Femoral shaft bowing (m) - degree	4	3	3	4
PR013/14 - Pilasterism (m)	6	5	6	5
CS004/5 - *Calvarium*; *M. sternocleidomastoideus* (m)	8	7	7	6
PS001/2 - *Humerus*; *M. pectoralis major* (m)	7	7	7	7
PS003/4 - *Humerus*; *M. deltoideus* (m)	5	6	6	6
PS007/8 - *Ulna; M. brachialis* (m)	7	6	6	6
PS011/12 - *Femur*; *M. gluteus maximus* (m)	6	7	7	7
PS015/16 - *Tibia*; *M. soleus* (m)	7	4	5	7

It goes without saying that any evaluation of occupational stress markers has to bear various factors in mind (see V.B.2.f.). There is, however, absolutely no reason to question the validity of the basic assumptions underlying the osteological interpretation of occupational stress markers. This view is fully supported by the plethora of unequivocal medical, osteological and ethnographic evidence. Of course, age, body size and build, sex, diet and pre-existing conditions influence the expression of occupational stress traits. It is also clear that exposure to occupational stress does not automatically induce uniform, observable skeletal changes. Authors like Jurmain (1991), Stirland (1998), Weiss/Jurmain (2007), Weiss (2003, 2004, 2005, 2007) or Wilczak (1998) have rightfully highlighted these facts. Unfortunately, several publications which critically evaluate the potential of research focusing on occupational stress markers are partly or wholly problematic. Some of the publications in question seem to, at least in part, reflect the biased views of privileged academics who are not particularly likely to have ever been in close, personal contact with people who suffer from conditions caused by a life of hard physical work and even less likely to have ever experienced the effects of prolonged hard physical work themselves. Jurmain (1991: 247), for instance, wrote: "… *it is not clear even here that functional stress leads to the onset of degenerative disease. There are, of course, some studies, mostly anecdotal in nature, that point in this general direction. … However, several other, equally well-controlled epidemiological studies have failed to confirm this functional link. … Indeed, in a recent comprehensive clinical review of osteoarthritis it was concluded that, 'very limited epidemiological data exist to show that chronic occupational stress or even acute injuries lead to* *osteoarthritis*". Interpretations put forward in others of these critical publications are clearly based on wrong assumptions. For example, Zumwalt (2006) conducted a study in which she compared the attachment sites of seven muscles in exercised and sedentary control sheep. The exercised animals were made to carry weights while trotting on a treadmill for an hour a day. After 90 days, Zumwalt found no significant differences in attachment site size or complexity and concluded (2006: 444): "*In spite of decades of assumption otherwise, there appears to be no direct causal relationship between muscle size or activity and attachment site morphology, and reconstructions of behavior based on these features should be viewed with caution*". Contrary to the assertions Jurmain (1991) made, virtually all relevant sports and occupational medicine studies emphasise that the cause of the conditions they investigate is unquestionably occupational stress (e.g. Aittomäki *et al*. 2006; Arndt *et al*. 2005; Barb/Barr 2006; Boyle *et al*. 1997; Bronner *et al*. 2003; Carruth *et al*. 2002; Croft *et al*. 1992; Davis/Kotowski 2007; Drawer/Fuller 2001; Gallis 2006; Grieco *et al*. 1998; Hadler *et al*. 1978; Hagemann *et al*. 2004; Hales/Bernard 1996; Hildebrandt 1998: 126-127, 506, 791, 830, 1059-1060, 1073, 1220, 1425, 1487, 1489; Holte *et al*. 2000; Jäger *et al*. 1997; Jensen *et al*. 2000; Kaneda *et al*. 1999; Kucera *et al*. 2008(a); Kucera *et al*. 2008(b); Kujala *et al*. 1995; Kujala *et al*. 2003; Lawrence 1961; Lemasters *et al*. 1998; Levy 1968; Lievense *et al*. 2001; Lipscomb *et al*. 2004; Maetzel *et al*. 1997; Marshall *et al*. 2004; Punnett/Wegman 2004; Rempel *et al*. 1992; Rijn *et al*. 2009; Rossignol *et al*. 2005; Scher 1978; Schmitt *et al*. 2004; Solomonow 2004; Solovieva *et al*. 2005; Stocks *et al*. 2010; Yassi 2000). Furthermore, any author making statements like Jurmain (1991) chooses to ignore the fact that the few studies which question the link between occupational stress and the frequently resulting debilitating conditions are not particularly convincing, conspicuously one-sided and conveniently serve the interests of employers and insurers. As far as Zumwalt's (2006) conclusions are concerned, it needs to be pointed out that the expressions of musculoskeletal stress traits osteological studies analyse usually developed in response to stresses induced by, often prolonged, strenuous activities which were carried out very frequently for many years. Thus, making ten sheep trot for 15 minutes four times a day for 90 days constituted a completely inappropriate experimental design. In the context of remarks like Jurmain's (1991) and conclusions like Zumwalt's (2006) it should not be forgotten either that many osteological studies of occupational stress markers have produced clear, well-contextualised and highly informative results (e.g. Arrighetti *et al*. 2002; Baetsen *et al*. 1997; Belcastro *et al*. 2007; Binder *et al*. 2005; Boulle 2001; Bridges *et al*. 2000; Brock/Ruff 1988; Brown *et al*. 2008; Churchill/Morris 1998; Ciranni/Fornaciari 2003; Cope *et al*. 2005; Derevenski 2000; Deter 2009; Dlamini/Morris 2005; Eggers *et al*. 2008; Erdal 2008; Eshed *et al*. 2004(a); Eshed *et al*. 2006; Hawkey/Merbs 1995; Hinton 1981; Holt 2003; Holt/Formicola 2008; Jurmain 1991: 251; Kennedy 1989; Lai/Lovell 1992; Lanyon *et al*. 1982; Larsen 1995: 194-196, 200-203, 2002: 133-137; Lieberman *et al*. 2004; Lieverse *et al*. 2007(b); Lieverse *et al*. 2009; Lovell 1994; Lovell/Dublenko 1999; Maggiano *et al*. 2008; Marchi 2008; Minozzi *et al*. 2003; Molleson 1989; Molnar 2006; Oumaoui *et al*. 2004; Peterson 1998; Pinhasi *et al*. 2008; Pucciarelli *et al*. 1990; Rhodes/Churchill 2009; Roberts-Thomson/Roberts-Thomson 1999; Sardi *et al*. 2006; Satinoff 1972; Smith 1984; Sparacello/Marchi 2008; Steen/Lane 1998; Stirland/Waldron 1997; Stock 2006; Trinkaus 1997; Ubelaker 1979; Waldron, H. A., 1996; Waldron/Cox 1989; Wanner *et al*. 2007; Webb 1995; Weiss 2007; Wilczak/Kennedy 1998).

As in these conclusive osteological studies, the Wadi Howar sample's noteworthy expressions of occupational stress markers did not appear to be age-, size- or sex-specific (see Table 6, IV.A.3., 11. and 12.). The pertinent observations were not isolated either. Instead, it was possible to identify clear, recurring patterns which could be easily contextualised. It did, therefore, not seem unreasonable to assume that the Wadi Howar sample's expressions of occupational stress traits were, indeed, informative and could be used to draw conclusions about activity patterns.

V.C.1.l. Health

A number of different conceivable diagnoses could be tentatively suggested for most of the observed pathologies. The lingual root (*Radix lingualis*) of Abu Tabari 02/28-23's left upper first molar (*Dens molaris superior I*) had apparently penetrated the maxillary sinus (*Sinus maxillaris*) *intra vitam* (see IV.A.13.). It was not clear whether the distal vestibular root (*Radix vestibularis distalis*) of the same tooth had penetrated the maxillary sinus (*Sinus maxillaris*) *intra vitam* as well. Like the tips (*Apices*) of two other roots (*Radices*) which probably did not penetrate the maxillary sinus (*Sinus maxillaris*) *intra vitam*, it could have only done so due to *post mortem* damage. The *intra vitam* penetration could have occurred in connection with a dental abscess, maxillary sinusitis or an overdevelopment of the root (*Radix lingualis*) in question. The overdevelopment of the roots of teeth (*Radices dentium*) could have been stimulated by masticatory stress. Traces of which were common in the Wadi Howar sample (see IV.A. 11., 12. and V.C.1.k.). Maxillary sinusitis could have resulted from frequently inhaling large amounts of smoke. This smoke could have been produced by regular camp and dung fires, similar to those many Southern Sudanese mixed economy pastoralists still light regularly to keep insects like mosquitoes (*Culicidae*) and black flies (*Simuliidae*) at bay (see I.D.2.d.2., 4. and 7.). A dental abscess was, however, by far the most likely reason for the *intra vitam* penetration. The left upper first molar (*Dens molaris superior I*) was one of several of Abu Tabari 02/28-23's teeth which were affected by abscesses (see Table 6 and IV.A.13.). Lingually, *Cloacae* were observed on either side of this tooth. Furthermore, a structure which appeared to be the remainder of an abscess chamber mesial to the tip (*Apex*) of the lingual root (*Radix lingualis*) of the left upper first molar (*Dens molaris superior I*) was visible from within the left maxillary sinus (*Sinus maxillaris*) (for roots of teeth (*Radices dentium*) penetrating maxillary sinuses (*Sinus maxillares*) see for example: Abrahams/Glassberg 1996; Bomeli *et al.* 2009; Brook 2005; Flood *et al*. 1982; Hassan 2010; Mehra/Jeong 2009; Orschiedt 1996: 113; Stübinger *et al*. 2005; for *post mortem* damage see IV.A.2. and V.C.1.b.; for maxillary sinusitis see for example: Aufderheide/Rodríguez-Martín 1998: 257; Boocock *et al*. 1995; Buhmann/Fuchs 1983: 78-80; Lewis 2002: 213; Maat/Mastwijk 2000: 145; Mark 2007; Merrett/Pfeiffer 2000; Orschiedt 1996: 113; Panhuysen *et al*. 1997; Reuler *et al*. 1995; Roberts 2007).

The opening in the palatine process (*Processus palatinus*) of Abu Tabari 02/28-21's *Maxilla* was difficult to interpret (see IV.A.13.). Should it not just have been *post mortem* damage, it could, for example, have been the remnant of the drain of an abscess, an unusual vessel impression or an enlarged nutrient foramen (*Foramen nutritium*) (for *post mortem* damage see IV.A.2. and V.C.1.b.; for vessel-related structures see for example: Berry/Berry 1967; Brothwell 1981; Feneis 1993: 28-29; Hanihara/Ishida 2001; Hauser/De Stefano 1989; Herrmann *et al*. 1990: 138; Kaufmann *et al*. 1984: 31; Lang/Wachsmuth 1985: 155-156; Paine *et al.* 2009: 200-201; Tortora/Grabowski 2000: 163, 166, 170-

171; Tyrrell 2000; Ubelaker/Angel 1976: 8; Van De Graaff/Fox 1999: 190; for abscess-related structures see for example: Aufderheide/Rodríguez-Martín 1998: 176, 180; Czarnetzki *et al*. 1985: 85; Dias *et al*. 2007; Dias/Tayles 1997; Herrmann *et al*. 1990: 153-156; Hildebrandt 1998: 8; Langsjoen 1998: 408-409; Orschiedt 1996: 112, 121; Steinbock 1976: 66, 69; Tyson/Dyer Alcauskas 1980: 30-31, 66-67, 120-121).

Table 28: Overview of observed pathologies and markers of physiological stress and health.

	pre-Leiterband sub-sample	**Leiterband sub-sample**	**Wadi Howar sample**
Spondylosis* or *Spondylarthrosis deformans	1:8, **12.50%** Abu Tabari 02/1-5	5:21, **23.81%** Abu Tabari 02/28-8, -11, -15, -20, -21	6:32, **18.75%** Abu Tabari 02/1-5, 02/28-8, -11, -15, -20, -21
Eburnation	0:8, **0.00%**	1:21, **4.76%** Abu Tabari 02/28-21	1:32, **3.13%** Abu Tabari 02/28-21
Opening in the *Processus palatinus maxillae*	0:8, **0.00%**	1:21, **4.76%** Abu Tabari 02/28-21	1:32, **3.13%** Abu Tabari 02/28-21
Radix dentis* penetrating the *Sinus maxillaris	0:8, **0.00%**	1:21, **4.76%** Abu Tabari 02/28-23	1:32, **3.13%** Abu Tabari 02/28-23
Traces of infectious diseases	1:8, **12.50%** Abu Tabari 02/1-2	2:21, **9.52%** Abu Tabari 02/28-2, -23	3:32, **9.38%** Abu Tabari 02/1-2, 02/28-2, -23
***Femora* or *Tibiae* with striations**	3:8, **37.50%** Abu Tabari 02/1-2, -5, -8	1:21, **4.76%** Abu Tabari 02/28-15	4:32, **12.50%** Abu Tabari 02/1-2, -5, -8, 02/28-15
***Tibiae* with vessel impressions**	0:8, **0.00%**	2:21, **9.52%** Abu Tabari 02/28-3, -15	2:32, **6.25%** Abu Tabari 02/28-3, -15
Traces of trauma (non-dental)	0:8, **0.00%**	2:21, **9.52%** Abu Tabari 02/28-5, -8	2:32, **6.25%** Abu Tabari 02/28-5, -8
Avulsion of teeth	0:8, **0.00%**	3:21, **14.29%** Abu Tabari 02/28-7, -8, Conical Hill 02/3-4	3:32, **9.38%** Abu Tabari 02/28-7, -8, Conical Hill 02/3-4
Traces of dental calculus	4:8, **50.00%** Abu Tabari 02/1-2, -3, -8, Conical Hill 95/4	8:21, **38.10%** Abu Tabari 02/28-3, -5, -7, -8, -15, -20, -22, -23	12:32, **37.50%** Abu Tabari 02/1-2, -3, -8, 02/28-3, -5, -7, -8, -15, -20, -22, -23, Conical Hill 95/4
Parodontosis and/or parodontitis	2:8, **25.00%** Abu Tabari 02/1-2, -3	6:21, **28.57%** Abu Tabari 02/28-5, -15, -21, -22, -23, Djabarona 96/1-1	8:32, **25.00%** Abu Tabari 02/1-2, -3, 02/28-5, -15, -21, -22, -23, Djabarona 96/1-1
Dental abscesses	2:8, **25.00%** Abu Tabari 02/1-2, -3	3:21, **14.29%** Abu Tabari 02/28-22, -23, Conical Hill 02/3-4	5:32, **15.63%** Abu Tabari 02/1-2, -3, 02/28-22, -23, Conical Hill 02/3-4
Dental caries	1:8, **12.50%** Abu Tabari 02/1-2	4:21, **19.05%** Abu Tabari 02/28-8, -23, 03/34-1, Djabarona 96/1-2	5:32, **15.63%** Abu Tabari 02/1-2, 02/28-8, -23, 03/34-1, Djabarona 96/1-2
Dental caries (lesions larger than “needle point-sized”)	1:8, **12.50%** Abu Tabari 02/1-2	2:21, **9.52%** Abu Tabari 02/28-8, -23	3:32, **9.38%** Abu Tabari 02/1-2, 02/28-8, -23
***Ante mortem* tooth loss**	2:8, **25.00%** Abu Tabari 02/1-2, -3	3:21, **14.29%** Abu Tabari 02/28-7, -8, Conical Hill 02/3-4	5:32, **15.63%** Abu Tabari 02/1-2, -3, 02/28-7, -8, Conical Hill 02/3-4
***Ante mortem* tooth loss (unintentional)**	2:8, **25.00%** Abu Tabari 02/1-2, -3	0:21, **0.00%**	2:32, **6.25%** Abu Tabari 02/1-2, -3
Enamel hypoplasia	5:8, **62.50%** Abu Tabari 02/1-2, -3, -7, -8, Conical Hill 95/4	16:21, **76.19%** Abu Tabari 02/28-2, -3, -5, -7, -8, -11, -14, -15, -20, -21, -22, -23, 03/34-1, Conical Hill 02/3-4, Djabarona 96/1-1, -2	22:32, **68.75%** Abu Tabari 02/1-2, -3, -7, -8, 02/28-2, -3, -5, -7, -8, -11, -14, -15, -20, -21, -22, -23, 03/34-1, Conical Hill 95/4, 02/3-4, Djabarona 96/1-1, -2, 96/120-3
Cribra orbitalia	0:8, **0.00%**	5:21, **23.81%** Abu Tabari 02/28-5, -7, -8, -22, Djabarona 96/1-1	5:32, **15.63%** Abu Tabari 02/28-5, -7, -8, -22, Djabarona 96/1-1
Affected individuals[1]	4:8, **50.00%** Abu Tabari 02/1-2 (6), -3 (3), -5 (2), -8	13:21, **61.90%** Abu Tabari 02/28-2, -3, -5 (3), -7, -8 (4), -11, -15 (4), -20, -21 (4), -22 (3), -23 (5), Conical Hill 02/3-4, Djabarona 96/1-1 (2)	17:32, **53.13%** Abu Tabari 02/1-2 (6), -3 (3), -5 (2), -8, 02/28-2, -3, -5 (3), -7, -8 (4), -11, -15 (4), -20, -21 (4), -22 (3), -23 (5), Conical Hill 02/3-4, Djabarona 96/1-1 (2)
Observations[1]	12:8, **150.00%**	31:21, **147.62%**	43:32, **134.38%**

[1] *Spondylosis* or *Spondylarthrosis deformans*, eburnation, opening in the *Processus palatinus maxillae*, *Radix dentis* penetrating the *Sinus maxillaris*, traces of infectious diseases, *Femora* or *Tibiae* with striations, *Tibiae* with vessel impressions, traces of non-dental trauma, parodontosis and/or parodontitis, dental abscesses, dental caries (lesions larger than “needle point-sized”), *ante mortem* tooth loss (unintentional), *Cribra orbitalia*

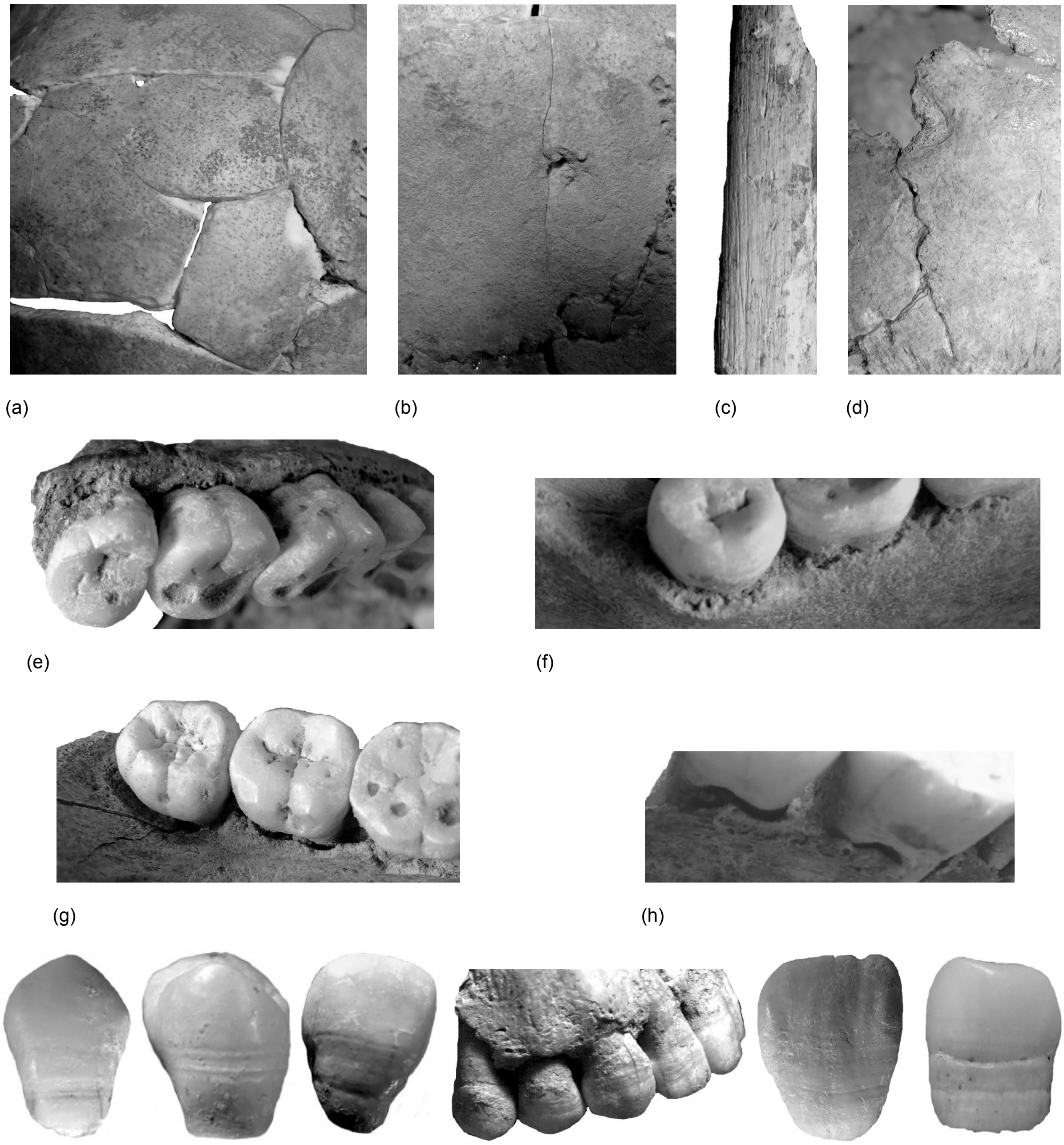
The eburnation (*Facies eburnea*) on the superior articular surface (*Facies articularis superior*) of Abu Tabari 02/28-21’s right *Tibia* and the various traces of *Spondylosis* or *Spondylarthrosis deformans* were, in all probability, age-related phenomena exacerbated by regularly performed activities, like carrying heavy loads (see IV.A.13.). Not least the occupational stress markers of the cervical vertebrae (*Vertebrae cervicales*), the bones of the pectoral girdle (*Cingulum pectorale*) and the bones of the upper free extremities (*Partes liberae membrorum superiorum*) made this explanation seem convincing (see V.C.1.k. and for example: Agrilla *et al*. 2008: 372, 375; Anderson 1968: 1027; Arrighetti *et al*. 2002; Aufderheide/Rodríguez-Martín 1998: 93-97; Baetsen *et al*. 1997; Barkey *et al*. 2001; Brown *et al*. 2008; Derevenski 2000; Faccia/Williams 2008; Ferembach *et al*. 1979: 21; Greene/Armelagos 1972: 54; Herrmann *et al*. 1990: 145-146, 148-149; Hildebrandt 1998: 122-127, 392, 1425, 1487, 1489; Judd 2008(a): 96-98, 100, 103; Jurmain 1991: 248-249; Kennedy 1989: 139-140; Knüsel *et al*. 1997; Kölbl 1996: 42-44; Menninger/Waibel 1996: 9-10, 18, 22-24, 36; Miles 1999(b); Nielsen 1970: 109; Paine *et al*. 2009: 197, 199; Roberts-Thomson/Roberts-Thomson 1999; Rösing *et al*. 2007: 83-85; Schultz 1988; Shepstone *et al*. 1999; Steinbock 1976: 277-289, 303; Stevens/Viðarsdóttir 2008; Stirland/Waldron 1997; Tyson/Dyer Alcauskas 1980: 152-155, 176-178, 222-223, 250-251; Van Der Merwe *et al*. 2006; Waldron 1997).

Chronic varicose veins probably left the vessel impressions on the *Tibiae* of Abu Tabari 02/28-3 and -15 (see IV.A.13.). Particularly in the case of Abu Tabari 02/28-15, the impressions could have been the result of an inflammatory process. The *Tibiae* of this individual were also characterised by faint *Striae* (see Table 6, IV.A.13. and below). Such striations can be indicative of an infection or high levels of locomotory stress. Incidentally, similar to the furrows leading into many nutrient foramina (*Foramina nutritia*), these vessel impressions might have been a side effect of cortical thickening in response to locomotory stress as well (see V.C.1.k. and for example: Herrmann *et al*. 1990: 138; Hildebrandt 1998: 1220; 1641, 1643; Kaufmann *et al*. 1984: 31; Mensforth *et al*. 1978; Paine *et al.* 2009: 200-201; Ubelaker/Angel 1976: 8).

Treponemal disease could have produced the patches of small pits on the outer surface (*Tabula externa*) of the *Cranium* of a sub-adult individual, Abu Tabari 02/28-2 (see IV.A.13. and Brothwell 2009: personal communication). Yaws, i.e. *Framboesia tropica*, and bejel, i.e. endemic syphilis, frequently afflict children. Bejel occurs in the Sahel, particularly among nomadic groups. Yaws is common among groups like the Dinka and Nuer. Of course, it is also possible that the patches of small pits were merely the result of *post mortem* damage (e.g. Aufderheide/Rodríguez-Martín 1998: 155-157, 166-169; De Melo *et al*. 2010; Harper *et al*. 2008; Hildebrandt 1998: 524-525, 1544; Lang/Löscher 2000; Lefort/Bennike 2007; Mitchell 2003; Ortner/Putschar 1981: 180-182, 210-218; Pace/Csonka 1984; Rothschild 2005; Smith 2008; Steinbock 1976: 138-160; Steyn/Henneberg 1995; for *post mortem* damage see IV.A.2. and V.C.1.b.).

The results of the histological analyses performed by Prof. Dr. Dr. M. Schultz at the University of Göttingen indicated that the thinning of Abu Tabari 02/28-23's frontal bone (*Os frontale*) was brought about by a form of acquired hydrocephalus (see IV.A.13. and Schultz 2010: personal communication). Hydrocephalic skulls have, for example, been observed in Roman period Egyptian and first millennium CE Nubian series. In any case, the condition of Abu Tabari 02/28-23's frontal bone (*Os frontale*) did not appear to be comparable to the thinning of Ancient Egyptian parietal bones (*Ossa parietalia*) (for hydrocephalus see for example: Aschoff *et al*. 1999; Aufderheide/Rodríguez-Martín 1998: 57; Beyerl/Black 1984; Hildebrandt 1998: 707-708; Jensen/Jensen 1979; Mori 2000; Murphy 1996; Ortner/Putschar 1981: 355; for parietal thinning see for example: Cederlund *et al*. 1982; Dastugue 1967: 166; Graham 2006: 248-249; Ortner/Frohlich 2007: 366; Phillips 2007; Wilms *et al*. 1983).

Early stage spinal tuberculosis was one of the three most probable causes of the osteolytic lesions in one, possibly two, cervical vertebrae (*Vertebrae cervicales*) of Abu Tabari 02/1-2 (see IV.A.13 and Brothwell 2009: personal communication). Brucellosis and a herniation of the adjacent intervertebral disk (*Discus intervertebralis*) were the other two. Tuberculosis is fairly common in Africa (see I.D.2.d.4.). Cases in which the spine (*Columna vertebralis*) is affected are not overly rare either. Indeed, the frequency of spinal tuberculosis is reported to be particularly high among Southern Sudanese mixed economy pastoralists (see I.D.2.d.4.). That the close contact between pastoralists and their cattle increases the risk of contracting bovine tuberculosis appears to be a factor which contributes to the high incidence of tuberculosis in herding groups (see I.D.2.b.2. and I.D.2.d.2.). Most brucellosis sufferers get this zoonosis by ingesting infected milk, milk products and meat or by being in close contact with infected animals. Goats, sheep and cattle are the primary sources of the infection in humans. Of course, milk and milk products play a very important role in the diet and social life of African pastoralists (see I.D.2.a.2., I.D.2.b.2., I.D.2.d.3. and 7.). Not only the already pronounced importance of cattle at Abu Tabari 02/1 but also the presence of *Striae* on Abu Tabari 02/1-2's *Tibiae* were compatible with a cattle-related infection (see I.C.3.b.1., IV.A.13. and below). Several Wadi Howar individuals exhibited osseous changes suggestive of occupational stress due to carrying loads on the head (see IV.A.12. and V.C.1.k.). A hernia of an intervertebral disk (*Discus intervertebralis*) affecting a cervical vertebra (*Vertebra cervicalis*) did therefore not seem too implausible. Although early stage spinal tuberculosis, brucellosis or a herniated intervertebral disk (*Discus intervertebralis*) were regarded as the most likely causes of the lesions, a secondary tumour, an aneurismal bone cyst, a solitary cyst, a chordoma, a chondroma or a chondrosarcoma were not entirely unimaginable either (for tuberculosis see for example: Adeloye 2007; Ayele *et al*. 2004; Bosch 2010; Daniel 1998; Delafosse *et al*. 2002; Demelash *et al*. 2009; Ernst *et al*. 2007; Evans *et al*. 2007; Fritsche *et al*. 2004; Grange 2001; Gray *et al*. 2003; Gutierrez *et al*. 2005; Hershkovitz *et al*. 2008; Lee 1978; Marcotty *et al*. 2009; Matos/Santos 2006; Newman 1970: 102-104; O'Rear 1947; Ortner 1979: 592-593; Roberts/Buikstra 2003; Roberts/Ingham 2008: 601; Sirugo *et al*. 2008; Suzuki *et al*. 2008; Wirth *et al*. 2008; Zink *et al*. 2007; for brucellosis see for example: Aufderheide/Rodríguez-Martín 1998: 192-193; Curate 2006; D'Anastasio *et al*. 2009; Delafosse *et al*. 2002; Gidel *et al*. 1974; Hildebrandt 1998: 235; Kunda *et al*. 2007; Marcotty *et al*. 2009; Mays 2007; McDermott/Arimi 2002; Ortner 1979: 592-593; Ortner/Frohlich 2007: 366; Ortner/Putschar 1981: 138-139; Suzuki *et al*. 2008: 359; Thimm/Wundt 1976; Weber/Rutala 1999; for herniations of intervertebral disks (*Disci intervertebrales*) see for example: Aufderheide/Rodríguez-Martín 1998: 96-97; Bullough/Boachie-Adjei 1994: 54, 65; Faccia/Williams 2008; Herrmann *et al*. 1990: 148-149; Hildebrandt 1998: 1425; Kennedy 1989: 139; Ortner/Putschar 1981: 431; Schmorl/Junghanns 1959; Tyson/Dyer Alcauskas 1980: 152-153; Wilczak/Kennedy 1998: 472; for secondary tumours, aneurismal bone cysts, solitary cysts, chordomas, chondromas and chondrosarcomas see for example: Aufderheide/Rodríguez-Martín 1998: 371-372, 379-380, 388-391; Davies 1961; Herrmann *et al*. 1990: 137-138, 170-171; Hildebrandt 1998: 830-832, 1167, 1169, 1172-1173; Kaufmann *et al*. 1984: 38; Klümper 1982: 134-135, 139, 148, 160-162, 186-188, 190-191, 196-197; Luna *et al*. 2008; Ortner/Putschar 1981: 391-398; Sěfčáková *et al*. 2001; Steinbock 1976: 316-397; Waldron, T., 1996).



(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n)

Figure 109: Miscellaneous pathologies and stress indicators. Abu Tabari 02/28-2: patches of lesions on the left parietal bone (*Os parietale*) (a), Abu Tabari 02/28-2: pseudo-pathology of the left parietal bone (*Os parietale*) (b), Abu Tabari 02/1-5: right *Tibia* with striations (c), Abu Tabari 02/28-5: right parietal bone (*Os parietale*) with a possible healed depressed fracture (d), parodontitis: Abu Tabari 02/28-15 - right upper posterior dentition (e), Abu Tabari 02/28-15 - left lower posterior dentition (f), Abu Tabari 02/28-23 - right lower posterior dentition (g) and Abu Tabari 02/28-23 - left upper posterior dentition (h) and different intensities of enamel hypoplasia: Abu Tabari 02/1-8 - right upper canine (*Dens caninus superior*) (i), Abu Tabari 02/1-8 - left upper first premolar (*Dens praemolaris superior I*) (j), Abu Tabari 02/28-3 - left upper second incisor (*Dens incisivus superior II*) (k), Abu Tabari 02/28-5 - right upper anterior dentition (l), Abu Tabari 02/28-14 - left upper first incisor (*Dens incisivus superior I*) (m) and Djabarona 96/1-1 - right upper canine (*Dens caninus superior*) (n).

Infections and locomotory stress probably induced the observed femoral and tibial periosteal reactions (see IV.A.13.). Especially tibial periosteal reactions are widely used as markers of overall physiological stress. They can be indicative of both non-specific infections and specific infectious diseases, like treponematosis. They can, however, also result from traumta or stress. Periostitis of the medial border (*Margo medialis*) of the *Tibia*, for instance, is a well-known response to excessive exercise in runners. Moreover, taphonomic processes may produce striations on bone surfaces which look like periosteal reactions. Given the observed traces of locomotory stress, it seemed most plausible to interpret the majority of the striations as occupational stress markers (see IV.A.12. and V.C.1.k.). Nonetheless, at least in Abu Tabari 02/1-2's case they appeared to be better explained as a symptom of an infection (for periosteal striations see for example: Barkey *et al*. 2001; Belcastro *et al*. 2007; Buzon 2006(b); Buzon/Judd 2008; De Melo *et al*. 2010; Herrmann *et al*. 1990: 143; Hildebrandt 1998: 1220; Holt/Formicola 2008: 83; Klaus/Tam 2009: 360; Larsen 1995: 198-199, 2002: 123-126; Lewis/Roberts 1997; Mensforth *et al*. 1978; Mosothwane/Steyn 2009: 70; Rothschild 2005: 1454; Šlaus 2008: 466; Weston 2008; for *post mortem* damage see IV.A.2. and V.C.1.b.).

The structures on the inner surface (*Tabula interna*) of Abu Tabari 02/28-8's left parietal bone (*Os parietale*) were possibly traces of tuberculous meningitis (see IV.A.13. and Brothwell 2009: personal communication). They could have also been explained as the result a haematoma. Although *post mortem* damage had obscured the structures, it did not appear to be responsible for their presence. However, as a result of this damage, it was not possible to decide whether tuberculous meningitis or a trauma-induced intracranial haematoma, maybe with a connected inflammation, was the more likely underlying cause of the pathology. Neither tuberculosis nor a cranial trauma would have been surprising (for meningitis see for example: Adeloye 2007; Gray *et al*. 2003; Herrmann *et al*. 1990: 143; Hildebrandt 1998: 1007-1008; Holck 2008; Lewis 2004: 84-86; Mays *et al.* 2002: 31-33; Nadel 1947: 517-520; Newman 1970: 102-104; Ortner/Putschar 1981: 92-93, 141, 164; Schultz 2001: 107, 121, 123, 128-130; Schultz *et al*. 2007; for *post mortem* damage see IV.A.2. and V.C.1.b.; for cranial trauma see V.C.1.b. and below; for intracranial haematoma see for example: Aufderheide/Rodríguez-Martín 1998: 249-250, 310-311; Hildebrandt 1998: 614-615; Kaplan *et al*. 2008; Kotil/Akçetin 2006; Lewis 2004: 87; Maat/Mastwijk 2000: 145; Moon *et al*. 2003; Ortner/Putschar 1981: 71, 101-102; Schultz 1988: 489, 2001: 106, 123-125, 128, 131, 134-135, 138-139).

Abu Tabari 02/28-5's right parietal bone (*Os parietale*) exhibited three round depressions, each approximately 1 cm in diameter (see IV.A.13). At least the lower two seemed to be healed depressed fractures resulting from blunt force injuries (Brothwell 2009: personal communication). Still, because *post mortem* damage, parietal thinning and even treponematosis could have theoretically caused similar lesions, the exact nature of these depressions could not be determined with absolute certainty. Inter- and intra-tribal violence was and remains widespread among Saharan, Southern Sudanese and East African groups (see I.D.2.b.2., I.D.2.c.1., 3., I.D.2.d.4.-7.). Traces of inter-personal violence have also been reported for various relevant skeletal samples. It was thus not at all unlikely to find such traces (for depressed fractures see for example: Aufderheide/Rodríguez-Martín 1998: 23-24; Barbian/Sledzik 2008; Buckley 2000: 139; Calce/Rogers 2007; Czarnetzki *et al*. 1985: 45; Geldhauser *et al*. 1996: 184-185, 192-193; Herrmann *et al*. 1990: 125, 127; İşcan/Quatrehomme 2000: 273-274; Kanz/Grossschmidt 2006; Lessa *et al*. 2004: 380; Lovell 1997(b): 149-150, 153-157; Mitchell 2006: 498; Owens 2007; Paine *et al*. 2009: 199; Steinbock 1976: 24; Steyn/İşcan 2000: 222; Tyson/Dyer Alcauskas 1980: 6-7, 12-13, 14-15, 58-59; Wells 1967: 7; Williamson *et al*. 2003: 117; for *post mortem* damage see IV.A.2. and V.C.1.b.; for parietal thinning and treponemal disease see above; for traces of inter-personal violence in other pertinent series see for example: Alvrus 1999; Anderson 1968: 1025, 1035, 1039-1040; Buzon/Richman 2007; Greene/Armelagos 1972: 59-60, 63; Judd 2006; Nielsen 1970: 111-112; Thorpe 2003: 152-153; Wendorf 1968: 990, 992-993; Wendorf *et al*. 1986).

The lower central incisors (*Dentes incisivi inferiores I*) of Abu Tabari 02/28-7, -8 and Conical Hill 02/3-4 had evidently been artificially removed *intra vitam* (see IV.A.13.). Abu Tabari 02/28-7 and -8 probably had their upper lateral incisors (*Dentes incisivi superiores II*) avulsed as well. The youths of many Nilo-Saharan-speaking groups in Chad, Sudan, Uganda, Kenya and Tanzania still have incisors, most commonly the lower first incisors (*Dentes incisivi inferiores I*), ritually removed. This custom is often associated with wearing lip plugs. Interestingly, lip plugs were found in the Abu Tabari 02/28 graves 20 and 23. Osteological evidence of tooth avulsion has also been discovered in several relevant skeletal series. Bearing the state of Abu Tabari 02/28-7's and Abu Tabari 02/28-8's dentition in mind, it is without a doubt especially noteworthy that KBD89/H37 and KBD89/H97, two female skeletons which were also part of the Malian Sahara sample, had not only their lower central (*Dentes incisivi inferiores I*) but also their upper lateral incisors (*Dentes incisivi superiores II*) removed *intra vitam* (for ritual removal of teeth see for example: Buchta 1881; Cote *et al*. 2004: 739; Crognier 1973: 13; Hassanali/Amwayi 1993; Humphreys 1954; Jones 1992; Manji *et al*. 1988; Morris 1998; Pindborg 1969; Reichart *et al*. 2007; Sanya *et al*. 2004; Seligman/Seligman 1932: 296-304; Seligman 1910; for lip plug use see for example: Buchta 1881; Courtin 1965: 148-149; Crognier 1973: 13; Cybulski 1974: 33-34; Derry 1914: 105-106; Honegger 2005: 103, 2004(a): 33; Krzyżaniak 1991: 518; Munizaga 1967; Ness 1928: 12-13; Santoni *et al*. 2006; Seligman 1910; Torres-Rouff 2003; for avulsion of teeth in other skeletal series see for example: Anderson 1968: 1033; Caillard 1978; Clark 1989: 395; Coppa/Macchiarelli 1983: 119, 122; Derry 1914: 105-106, 1949: 32; Eshed *et al*. 2006: 156; Ferembach *et al.* 1962: 60; Finucane *et al*. 2008(a): 632-633; Georgeon *et al*. 1993: 38; Greene *et al*. 1967: 53; Greene/Armelagos 1972: 53; Hadjouis 2002: 352-356, 365-366; Humphrey/Bocaege 2008; L'Abbé *et al*. 2008(b); Lubell 2001: 132; Morris 1998; Poitrat-Targowla 1977; Simon *et al*. 2002: 258-264, 269-271; Tayles 1996(b); Turner 1979: 620-621).

Table 29: Overview of the frequencies of three systematically scored health traits.

	Tooth loss (all examined individuals[1])	**Caries - presence (all examined individuals[1])**	**Hypoplasia - presence (all examined dentitions[2])**	**Hypoplasia - presence (all examined individuals)**
pre-Leiterband sub-sample	2:5, **40.0%**	1:5, **20.0%**	5:7, **71.4%**	5:7, **71.4%**
Leiterband sub-sample	3:15, **20.0%**	4:16, **25.0%**	16:20, **80.0%**	16:18, **88.9%**
Wadi Howar sample	5:23, **21.7%**	5:24, **20.8%**	22:30, **73.3%**	22:28, **78.6%**

[1] without sub-adults; [2] including deciduous dentitions

The consumption of sticky fruits and ground, carbohydrate-rich seeds were probably to blame for the observed tooth decay (see IV.A.13.). Ground seeds and seasonally available fruit unquestionably formed an important part of the diet of all prehistoric inhabitants of the Wadi Howar (see I.D.2.a.2., I.D.2.d.2., 3., 7. and V.C.1.k.). It was therefore rather unremarkable that dental caries was occasionally encountered, despite the considerable abrasion rates. Furthermore, tooth decay is by no means absent in other relevant prehistoric skeletal series (for dental caries see for example: Bernal *et al*. 2007; Brothwell 1963(b): 273-280; Caselitz 1998; Cucina/Tiesler 2003; Czarnetzki *et al*. 1985:14-15; Etter/Locher 1993: 36-37; Herrmann *et al*. 1990: 154; Hillson 1996: 269-284; Holt/Formicola 2008: 83; L'Abbé *et al*. 2008(b); Langsjoen 1998: 402-404; Larsen 1995: 187-189, 2002: 123; Lingström/Borrman 1999; Littleton/Fröhlich 1993; Nelson *et al*. 1999; Orschiedt 1996: 111-112; Ortner/Putschar 1981: 438-442; Papathanasiou *et al*. 2000; Powell 1985; Ruffer 1920; Schmid *et al*.

1988; Schultz 1988: 494; Sciulli 1997; Tyson/Dyer Alcauskas 1980: 46-47, 66-67, 120-121; Watson 2008; for dental caries in other relevant series see for example: Anderson 1968: 1023; Beckett/Lovell 1994; Clark 1989: 395; Coppa/Macchiarelli 1983: 125; Derry 1914: 105; Greene *et al*. 1967: 52-53; Greene/Armelagos 1972: 51-52; Hillson 1979; Judd 2008(a): 98-100, 103; Poitrat-Targowla 1977; Rose *et al*. 1993: 61-65).

Even the less varied diet of the Leiterband/Herringbone phase was probably still reasonably balanced in terms of relative carbohydrate and protein content (see I.C.3.a.2. and I.C.4.b.1.). The varying but generally moderate amounts of calculus were therefore to be expected (see IV.A.13. and for example: Belcastro *et al*. 2007; Dobney/Brothwell 1987; Herrmann *et al*. 1990: 153-155; Hildebrandt 1998: 1708-1709; Hillson 1979; Judd 2008(a): 99-100, 103; Lieverse 1999; Littleton/Fröhlich 1993; Manzi *et al*. 1999; Orschiedt 1996: 111-113; Pechenkina *et al*. 2002; Polo-Cerdá *et al*. 2007; Prowse *et al*. 2008; Schultz 1988: 493; Tyson/Dyer Alcauskas 1980: 120-121).

Different combinations of calculus and masticatory stress clearly caused the cases of parodontitis (see IV.A.13.). For example, while Abu Tabari 02/28-22's alveolar recession was apparently mainly due to the build up of calculus, severe attrition was almost certainly the driving force behind the development of Abu Tabari 02/1-3's parodontitis. The parodontitis of members of other pertinent series appears to have had similar causes (for periodontal disease see for example: Czarnetzki *et al*. 1985: 83-85; Herrmann *et al*. 1990: 153, 155-156; Hillson 1979; Holt/Formicola 2008; Langsjoen 1998: 396, 399-402; Lieverse *et al*. 2007(a); Orschiedt 1996: 112-113; Ortner/Putschar 1981: 442-444; Polo-Cerdá *et al*. 2007; Ruffer 1920; Schultz 1988: 491-493; Tyson/Dyer Alcauskas 1980: 8-9, 28-29, 50-51, 66-67, 76-77, 104-105, 120-121; for periodontal disease in other relevant samples see for example: Anderson 1968: 1023; Binder/Uerpmann 2004: 16-18, 23; Coppa/Macchiarelli 1983: 125; Derry 1914: 105; Dutour 1983: 311-312, 316; Greene/Armelagos 1972: 51-52; Hillson 1979; L'Abbé *et al*. 2008(b); Poitrat-Targowla 1977; Rose *et al*. 1993: 62-63).

Dental caries was most likely to blame for Abu Tabari 02/1-2's, severe attrition for Abu Tabari 02/1-3's and parodontitis for Abu Tabari 02/28-22's and -23's dental abscesses (see IV.A.12., 13. and V.C.1.k.). What could have caused Conical Hill 02/3-4's tooth root abscess remained unclear. Masticatory stress, parodontitis and caries have also been identified as the causes of dental abscesses in other samples (for dental abscesses see for example: Clarke/Hirsch 1991; Dias *et al*. 2007; Dias/Tayles 1997; Kieser *et al*. 2001(b); Langsjoen 1998: 396, 399-404, 408-409; Leek 1972: 126; Molnar 2008; Nelson *et al*. 1999; Orschiedt 1996: 111-113; Ortner/Putschar 1981: 438-444, 454-455; Rose *et al*. 1993: 61-63; Ruffer 1920: 377-378; Schultz 1988: 491-493; Tyson/Dyer Alcauskas 1980: 30-31, 66-67, 120-121; Watson 2008; for dental abscesses in other pertinent series see for example: Anderson 1968: 1023; Beckett/Lovell 1994; Binder/Uerpmann 2004: 12, 14-16; Clark 1989: 395; Coppa/Macchiarelli 1983: 118; Derry 1914: 105; Dutour 1983: 311-312, 316, 1989: 227; Greene *et al*. 1967: 52; Greene/Armelagos 1972: 51-52; Judd 2008(a): 98-100, 103; Nielsen 1970: 110; Rose *et al*. 1993: 61-65).

Only Abu Tabari 02/1-2 and -3 had unquestionably lost permanent teeth (*Dentes permanentes*) unintentionally (see IV.A.13.). Caries was regarded as the reason why Abu Tabari 02/1-2's right upper first molar (*Dens molaris superior I*) was lost *intra vitam*. Parodontitis had undoubtedly led to the *ante mortem* loss of Abu Tabari 02/1-3's right lower wisdom tooth (*Dens serotinus*). Theoretically, this individual's right upper first premolar (*Dens praemolaris superior I*), left upper second premolar (*Dens praemolaris superior II*), left upper first molar (*Dens molaris superior I*) and left upper second molar (*Dens molaris superior II*) could have been lost for the same reason. Yet, excessive masticatory stress was identified as a far more likely ultimate cause of these *ante mortem* losses (e.g. Beckett/Lovell 1994; Bernal *et al*. 2007; Brothwell 1963(b): 273-280; Clarke/Hirsch 1991; Coppa/Macchiarelli 1983: 125; Cucina/Tiesler 2003; Czarnetzki *et al*. 1985: 83-85; Dutour 1983: 311-312, 316; Herrmann *et al*. 1990: 153-156; Langsjoen 1998: 399, 400-402; Larsen 1995: 187-189; Littleton/Fröhlich 1993; Lukacs 2007; Nelson *et al*. 1999; Orschiedt 1996; Ortner/Putschar 1981: 438-444, 454-455; Rose *et al*. 1993: 61-65; Ruffer 1920: 377-378; Tyson/Dyer Alcauskas 1980: 8-9, 28-29, 50-51, 66-67, 76-77, 104-105; Watson 2008).

Comparatively speaking, most frequencies of individually described pathological changes and relevant expressions of systematically assessed health traits were rather low and unremarkable (see IV.A.13., Table 28 and for example: Anderson 1968: 1023, 1025, 1027, 1035, 1039-1040; Barkey *et al*. 2001; Beckett/Lovell 1994; Belcastro *et al*. 2007; Blau 2001; Buzon 2006(b); Crognier 1973; Dutour 1983: 309-312, 316, 1989: 226-227; Gray *et al*. 2003; Greene/Armelagos 1972: 51-52, 54, 63; Hill *et al*. 2007; Hillson 1979; Holt/Formicola 2008: 83; Judd 2008(a): 96-100, 103; L'Abbé *et al*. 2008(b); L'Abbé/Steyn 2007; Lee 1978; Lieverse *et al*. 2007(a); Littleton/Fröhlich 1993; Maat/Mastwijk 2000: 145; Manzi *et al*. 1999; Mosothwane/Steyn 2009; Nadel 1947: 517-520; Newman 1970: 102-104; Nielsen 1970: 109-113; Ortner/Frohlich 2007; Paine *et al*. 2007; Paine *et al*. 2009: 198; Papathanasiou *et al*. 2000; Pechenkina *et al*. 2002; Šlaus 2008: 466; Sugiyama 2004; Ubelaker/Pap 1998, 2009). To a degree, this finding probably indicated that the prehistoric inhabitants of the Wadi Howar were actually in fairly good health. It did, however, also reflect sample-specific and general methodological problems. Firstly, the Wadi Howar sample's extremely poor state of preservation undoubtedly led to an extensive loss of information (see IV.A.2. and V.C.1.b.). Secondly, due to the fact that different researchers rely on different methods, comparisons with data published for other series were surely at least partly misleading. A closer look at the striking rarity of traces of trauma and the high incidence of enamel hypoplasia can be used to illustrate the relevant issues (see IV.A.13.). It appeared most likely that the rarity of traces of trauma was an artefact. The small size of the sample, the sample's poor preservation and violence-related burial customs could have been the underlying causes of this situation (see I.D.2.d.8., IV.A.2., V.A., V.B.3.b.1., V.C.1.b. and c.). All germane ethnographic and epidemiological sources strongly suggest that close contact with domesticated animals, hunting, the Wadi Howar region's demanding terrain, dangerous tribal sports and rituals as well as inter- and intra-tribal violence should have led to numerous injuries (see I.D.2.d.2., 4., 5., 6. and 7.). Not surprisingly, evidence of trauma caused by both inter-personal violence and accidents is anything but rare in other relevant skeletal series (e.g. Alvrus 1999; Anderson 1968: 1025, 1035, 1039-1040; Blau 2001; Buzon/Richman 2007; Clark 1989: 395; Dutour 1983: 309-310, 1989: 191-196, 226; Greene/Armelagos 1972: 48, 53-54, 59-60, 63; Judd 2002(b), 2004, 2006, 2008(a): 98, 100, 103; Jurmain 2001; Kilgore *et al*. 1997; L'Abbé/Steyn 2007; Larsen 2002: 128-131; Lessa *et al*. 2004; Lukacs 2007; Nielsen 1970: 111-112; Ortner/Frohlich 2007; Owens 2007; Roksandic *et al*. 2006; Thorpe 2003; Waldron 2000; Wendorf 1968: 990, 992-993).

Table 30: Comparison of the Wadi Howar and Jebel Sahaba/Tushka enamel hypoplasia data[1].

	pre-Leiterband sub-sample	**Leiterband sub-sample**	**Wadi Howar sample**	**Jebel Sahaba/Tushka**
Hypoplasia - presence (all examined teeth)	35:65, **53.8%**	149:190, **78.4%**	294:430, **68.4%**	44:477, **9.2%**
Hypoplasia - presence (UI1, 2, UC)	12:24, **50.0%**	51:56, **91.1%**	63:80, **78.8%**	12:79, **15.2%**
Hypoplasia - presence (LI1, 2, LC)	9:20, **45.0%**	42:61, **68.9%**	51:81, **63.0%**	8:83, **9.6%**
Hypoplasia - presence (UI1, 2, UC, LI1, 2, LC)	21:44, **47.7%**	93:117, **79.5%**	114:161, **70.8%**	20:162, **12.3%**
Hypoplasia - presence (UI1, 2)	7:16, **43.8%**	31:35, **88.6%**	38:51, **74.5%**	9:49, **18.4%**
Hypoplasia - presence (LI1, 2)	3:12, **25.0%**	21:38, **55.3%**	24:50, **48.0%**	0:49, **0.0%**
Hypoplasia - presence (UI1, 2, LI1, 2)	10:28, **35.7%**	52:73, **71.2%**	62:101, **61.4%**	9:98, **9.2%**
Hypoplasia - presence (UC)	5:8, **62.5%**	20:21, **95.2%**	25:29, **86.2%**	3:30, **10.0%**
Hypoplasia - presence (LC)	6:8, **75.0%**	21:23, **91.3%**	27:31, **87.1%**	8:34, **23.5%**
Hypoplasia - presence (UC, LC)	11:16, **68.8%**	41:44, **93.2%**	52:60, **86.7%**	11:64, **17.2%**
Hypoplasia - intensity (all examined teeth)	2.157	2.508	2.412	1.109
Hypoplasia - intensity (UI1, 2, UC)	2.042	2.964	2.688	1.215
Hypoplasia - intensity (LI1, 2, LC)	1.800	2.426	2.271	1.096
Hypoplasia - intensity (UI1, 2, UC, LI1, 2, LC)	1.932	2.684	2.478	1.154
Hypoplasia - intensity (UI1, 2)	1.813	2.629	2.373	1.245
Hypoplasia - intensity (LI1, 2)	1.250	1.895	1.740	1.000
Hypoplasia - intensity (UI1, 2, LI1, 2)	1.571	2.247	2.059	1.122
Hypoplasia - intensity (UC)	2.500	3.524	3.241	1.167
Hypoplasia - intensity (LC)	2.625	3.304	3.129	1.235
Hypoplasia - intensity (UC, LC)	2.563	3.409	3.183	1.203

[1] excluding data collected from milk teeth (*Dentes decidui*)

The high enamel hypoplasia frequencies seemed to be indicative of genuinely elevated levels of physiological stress (see IV.A.13.). Still, that they were really remarkably high in comparison with the frequencies presented for other series clearly had methodological reasons as well (see Table 29, 30 and 31). For instance, Anderson (1968: 1020, 1023) only mentioned enamel hypoplasia in the context of one Jebel Sahaba individual. The author, on the other hand, observed enamel hypoplasia lesions in 14 of the 21 individuals of the Jebel Sahaba/Tushka comparative sample. Starling/Stock (2007) also reported much higher frequencies for 38 dentitions of Anderson's (1968) Late Pleistocene Nubian sample. Furthermore, Starling/Stock's (2007) Jebel Sahaba and the author's Jebel Sahaba/Tushka hypoplasia data were quite similar. This example merely underlines how severely inter-observer differences can distort inter-sample comparisons. Nevertheless, it was clear that the frequency and severity of the Wadi Howar individuals' enamel hypoplasia lesions demonstrated that the members of the Wadi Howar sample regularly experienced, often prolonged, episodes of considerable physiological stress. Saharan, Southern Sudanese, Ethiopian and Kenyan pastoralists are frequently undernourished and are regularly faced with periods of very serious food shortages (see I.D.2.d.3., 4., 5. and 6.). Conversely, the dietary status of African hunter-gatherers is usually appreciably better. Additionally, these forager groups are usually less affected by environmental fluctuations. The results of the Wadi Howar material's isotope analyses and the zooarchaeological results also suggested that the breadth of the Leiterband phase diet had become more limited (see I.C.3.a.1., 2. and I.C.4.b.1.). It was therefore foreseeable that many members of the Wadi Howar sample would be characterised by enamel hypoplasia and that the enamel hypoplasia frequencies of the Leiterband sub-sample would be higher than those of the pre-Leiterband sub-sample. Several other findings also supported the view that the Wadi Howar enamel hypoplasia data really reflected comparatively high levels of physiological stress (see IV.A.12. and 13). Some specimens exhibited pronounced dental asymmetry, the cortical bone (*Substantia compacta*) of the long bones of several individuals was surprisingly thin and platymeria was extreme in some cases, to mention only three examples (for enamel hypoplasia frequencies observed in other series see for example: Anderson 1968: 1020, 1023; Binder/Uerpmann

2004: 16-17, 24; Blakey *et al*. 1990; Brothwell 1963(b): 273-280; Buzon 2006(b); Cucina *et al*. 1999; Hillson 1979: 159; Holt/Formicola 2008: 83; Hoover *et al*. 2005; Judd 2008(a): 99-100, 103; Keita/Boyce 2001; L'Abbé *et al*. 2008(b); Lewis 2002; Lieverse *et al*. 2007(a); Lovell/Whyte 1999; Manzi *et al*. 1999; Mosothwane/Steyn 2009; Paine *et al*. 2009: 198; Palubeckaitė *et al*. 2002; Papathanasiou *et al*. 2000; Pechenkina *et al*. 2002; Rose *et al*. 1993: 65; Saunders/Keenleyside 1999: 521; Šlaus 2008: 466; Starling/Stock 2007: 524; Ubelaker/Pap 1998, 2009; for dental asymmetry see for example: Bollini *et al*. 2009; Hillson 1996: 75-79; Hoover *et al*. 2005; Kieser 1992; Kieser *et al*. 1997; Kieser/Groeneveld 1988; Kujanová *et al*. 2008: 466-478; Larsen 2002: 126-128; Scott/Turner 1988: 117; for interpretations of cortical thinness in connection with nutritional deficiencies see for example: Agarwal/Grynpas 1996; Armelagos *et al*. 1972; Brock/Ruff 1988; Dewey *et al*. 1969; Larsen 1995: 191-192, 1997: 206, 208, 223; Martin *et al*. 1985; Martin/Armelagos 1979, 1986; Pfeiffer/Lazenby 1994; Suby/Guichón 2009; Zaki *et al*. 2009; for causes and presence of platymeria see V.C.1.k. and for example: Aiello/Dean 1990: 466-467; Anderson 1968: 1024; Brown 2006; Coppa/Macchiarelli 1983: 118, 122; Greene/Armelagos 1972: 41-42; Judd 2008(a): 86-87, 89; Kennedy 1989: 148; Larsen 1997: 222; Martin 1928: 1136, 1139, 1142; Perzigian *et al*. 1984; Ruff *et al*. 1984; Simon et al. 2002: 274; Wescott 2006(b); Wescott/Srikanta 2008: 359).

Table 31: Selected enamel hypoplasia frequencies.

	Hypoplasia - presence (all examined individuals)	**Hypoplasia - presence (all examined teeth)**	**Hypoplasia - presence (incisors, canines)**	**Hypoplasia - presence (incisors)**	**Hypoplasia - presence (canines)**
pre-Leiterband sub-sample	71%	54%	48%	36%	69%
Leiterband sub-sample	89%	78%	80%	71%	93%
Wadi Howar sample	79%	68%	71%	61%	87%
Jebel Sahaba/Tushka	67%	9%	12%	9%	17%
Jebel Sahaba[1]	-	7%	-	11%	10%
R12[2]	3%	-	-	-	-
Kerma[1]	-	6%	-	0%	17%
Kerma[3]	21%	-	-	21%	31%
C-Group[3]	17%	-	-	9%	12%
Geili - Meroïtic[4]	-	-	78%	-	-
Geili - Christian[4]	-	-	82%	-	-
Badari[1]	-	17%	-	18%	40%
Naqada[1]	-	15%	-	50%	43%
Mendes - Old Kingdom[5]	63%	-	-	-	-
Mendes - First Intermediate Period[5]	47%	-	-	-	-
Mendes - Greco-Roman Period[5]	44%	-	-	-	-
Botswana - Early Iron Age[6]	9%	-	-	11%	27%
Southwest France - Late Upper Palaeolithic[7]	29%	-	-	-	-
Italy - 1st to 4th century CE[8]	81-95%	-	-	-	-

[1] Starling/Stock 2007: 524; [2] Judd 2008(a): 98; [3] Buzon 2006(b): 33; [4] Blakey *et al*. 1990; [5] Lovell/Whyte 1999: 74; [6] Mosothwane/Steyn 2009: 70-71; [7] Holt/Formicola 2008: 83; [8] Šlaus 2008: 466

V.C.2. Intra-observer error

Repeating each measurement as often as deemed necessary to ensure that its right value had been determined and seriating trait expressions twice, i.e. in the laboratory and photographically, were distinctly obsessive and enormously time-consuming strategies (see III.B.1.b.1. and III.B.1.b.2.a.). They did, however, bring the intra-observer error down to a remarkably low level (see IV.B.). Means below 1 or 2 mm are usually regarded as acceptable as far as craniometric intra-observer error is concerned. In odontometrics, 0.1 and 0.5 mm are commonly used benchmarks. For example, Irish (2008), Kieser/Groeneveld (1988), Kieser/Groeneveld (1991) and Lease/Sciulli (2005) reported measurement errors of 0.2, 0.05, 0.032 to 0.298 and 0.11 to 0.3 mm respectively (for osteometric error see for example: Albrecht 1983; Buikstra/Ubelaker 1994: 183-184; Cramon-Taubadel *et al*. 2007; Gapert *et al*. 2009: 386; Heathcote 1981; Howells 1973: 33-38; Kragh *et al*. 2010; Morris/Ribot 2006: 17; Perini *et al*. 2005; Ross/Williams 2008; Utermohle *et al*. 1983; Utermohle/Zegura 1982; White 2000: 305, 307; for odontometric error see for example: Bräuer 1988: 186; Goose 1963: 126; Hillson 1996: 71-72; Hillson *et al*. 2005: 423-424; Kieser 1990: 9-14; Kieser *et al*. 1990; Mays 2002: 863; Pinhasi 1998: 3-4; Stojanowski 2007; Teschler-Nicola/Prossinger 1998: 484; Willems *et al*. 2002; Wolpoff 1971; Wood/Abbott 1983: 199-202).

Table 32: Overview of the mean absolute differences between original and control measurements.

	No. of pairs	Mean difference
All cranial measurement pairs	130	0.371 mm (0.99%)
Neurocranial measurement pairs	8	0.563 mm (0.47%)
Viscerocranial measurement pairs	122	0.359 mm (1.12%)
All dental measurement pairs	160	0.028 mm (0.30%)
All crown length pairs	81	0.030 mm (0.33%)
All crown width pairs	79	0.027 mm (0.28%)
All postcranial measurement pairs	190	0.930 mm (1.92%)
All PMs[1] (without long bone length pairs)	173	0.308 mm (1.26%)
All long bone length measurement pairs	17	7.265 mm (2.48%)

[1] PMs = postcranial measurements

The mean absolute differences between the cranial and dental original and control measurements which could be calculated in the course of the intra-observer-error analyses were decidedly smaller than these recommended maximum average differences (see IV.B. and Table 32). This was unquestionably due to the fact that all measurements were repeated again and again to ensure that correct values were entered into the data matrices (III.B.1.b.1.). Dental measurements, for instance, were perceived to be especially difficult to take precisely. It was thus assumed that they had to be repeated even more often than other measurements to determine sufficiently accurate values. Consequently, due to the higher number of repeated measurements, the dental measurements ended up being more reliable than all other measurements. As underlined before, the relatively large discrepancies between the original and control postcranial measurements were caused by the inclusion of various data pairs which consisted of *in situ* measurements and laboratory estimates of long bone lengths in the intra-observer error analyses (see III.B.1.b.1.c. and IV.B.). The initial direct seriation of non-metric trait expressions in the laboratory and the later, second photographic seriation proved to be highly effective (see III.B.1.b.2.a. and IV.B.). Both the comparatively and absolutely high degree of agreement between the original and control scores was unquestionably a result of this strict two-step procedure (e.g. Haeussler *et al*. 1988; Irish 1997: 461; Kemkes-Grottenthaler *et al*. 2002: 103, 105, 109; Temple 2007: 1038-1039; Walker 2005: 388-389; Williams/Rogers 2006: 731, 734). It is definitely also worth highlighting that the high reliability with which the newly defined or modified measurements and traits could be re-measured and re-scored strongly suggested that these measurements and traits were fully usable (see III.B.1.b.1.a., c., III.B.1.b.2.b., c., V.B.3.a.1. and 2.). Despite all these very positive results, it should, however, be borne in mind that the data which were collected from the comparative samples were unlikely to be as reliable as the Wadi Howar data. Unfortunately, the collection of the comparative data was subject to time restrictions imposed by logistical constraints (see II.B. and V.A.2.). As a result, measurements could frequently not be repeated as often as would have been considered desirable and trait expressions could not be directly seriated at the host institutions (see III.B.1.b.1. and III.B.1.b.2.a.).

Table 33: Maximum and mean absolute differences between the original and control data of the sets of data pairs with differences which were either significantly or in tendency different from zero.

	No. of pairs	Maximum difference	Mean difference
CMs[1] - 02/1-3	34	2.00 mm (5.76%)	0.412 mm (1.19%)
All dental measurement pairs	160	0.15 mm (1.61%)	0.028 mm (0.30%)
All crown length pairs	81	0.15 mm (1.64%)	0.030 mm (0.33%)
All crown width pairs	79	0.10 mm (1.05%)	0.027 mm (0.28%)
DMs[2] - 02/1-3	18	0.10 mm (1.11%)	0.042 mm (0.47%)
DMs - 02/28-5	32	0.10 mm (1.06%)	0.030 mm (0.32%)
PM015/16 - H1. *Humerus* - Max. length (m)	6	12.50 mm (4.10%)	5.583 mm (1.83%)
PM075/76 - U12. Transverse shaft diameter (m)	5	0.50 mm (3.18%)	0.300 mm (1.91%)
PM130/131 - T1a. *Tibia* - Max. length (m)	6	25.00 mm (7.68%)	11.667 mm (3.59%)
PM150/151 - T10b. Min. shaft circumference (m)	6	1.25 mm (2.16%)	0.583 mm (1.01%)
All postcranial measurement pairs	190	25.00 mm (51.59%)	0.930 mm (1.92%)
All long bone length measurement pairs	17	25.00 mm (8.52%)	7.265 mm (2.48%)
PMs[3] - 02/1-3 (without long bone lengths)	27	2.00 mm (7.52%)	0.481 mm (1.81%)
PMs - 02/1-7 (without long bone lengths)	25	2.00 mm (9.84%)	0.380 mm (1.87%)
PMs - 02/1-3	30	12.50 mm (22.20%)	1.183 mm (2.10%)
PMs - 02/1-7	27	10.00 mm (23.72%)	1.093 mm (2.59%)
All postcranial robusticity score pairs[4]	27	1.00 mm (19.93%)	0.111 mm (2.21%)

[1] CMs = cranial measurements; [2] DMs = dental measurements; [3] PMs = postcranial measurements; [4] Remarks: 4 (14.8%) of 27 pairs of scores differed by 0.5; 1 (3.7%) of 27 pairs of scores differed by 1; 5 (18.5%) of 27 pairs of scores differed from each other

That the differences between the original and control data of 17 of the 428 tested sets differed either significantly or in tendency from zero has to be put into context. Apart from those variables which contained sets with pairs consisting of *in situ* measurements and laboratory estimates, the average and maximum absolute differences between the original and control data of these 17 variables were low or very low (see Table 33). Furthermore, none of the un-paired tests performed to detect differences between original and control data yielded any significant results (see IV.B.). These two facts are undoubtedly much more meaningful than the few significant results of the paired tests (see V.B.3.b.2.). Attention also needs to be drawn to the number of ties, i.e. data pairs in which the original and control value did not differ from each other, in the 17 variables in question (see Table 34). As, for example, Knußmann (1988(d): 674) has pointed out, the Wilcoxon test is sensitive to high percentages of ties and likely to produce a Type I error, i.e. reject a true null hypothesis, as a result. A paired t-test relies on the mean of pair differences and its standard deviation. Theoretically, the result of a paired t-test should thus be influenced by a large number of ties as well. Accordingly, at least some of the detected significant differences were probably in fact statistical artefacts (for information on the Wilcoxon test see for example: Knußmann 1988(d): 673-674; Lienert 1973; Madrigal 1998: 144-147; Wilcoxon 1945; Zöfel 1992: 151-155; for information on the paired t-test see for example: Knußmann 1988(d): 670-671; Madrigal 1998: 105-109; McDonald 2009: 191-197).

It is clear that the extensive *post mortem* damage must have had a considerable effect on all performed osteological, metric and non-metric analyses (see IV.A.2. and V.C.1.b.). The work-intensive measuring and scoring techniques were mainly employed to make sure that these distortions were not exacerbated by intra-observer error (see III.B.1.b.1., III.B.1.b.2.a., V.B.3.a.1. and 2.). Unfortunately, unlike the intra-observer error, the error introduced by the excessive *post mortem* damage and other characteristics of the Wadi Howar sample remained unquantifiable. Moreover, it is highly likely that this error was far greater than the intra-observer error. It can probably also be safely assumed that this error would have still been far greater than the intra-observer error, even if a decidedly less stringent data collection approach had been adopted.

Table 34: Number of tied pairs in the sets with differences which were either significantly or in tendency different from zero.

	Tied pairs	Mean difference[1]	Diff. S.D.
CMs[2] - 02/1-3	14:34, **41.18%**	-	-
All dental measurement pairs	92:160, **57.50%**	-	-
All crown length pairs	45:81, **55.56%**	-	-
All crown width pairs	47:79, **59.49%**	0.013 mm	0.043
DMs[3] - 02/1-3	7:18, **38.89%**	0.025 mm	0.052
DMs - 02/28-5	16:32, **50.00%**	0.017 mm	0.041
PM015/16 - H1. *Humerus* - Max. length (m)	2:6, **33.33%**	-	-
PM075/76 - U12. Transverse shaft diameter (m)	1:5, **20.00%**	-	-
PM130/131 - T1a. *Tibia* - Max. length (m)	1:6, **16.67%**	-	-
PM150/151 - T10b. Min. shaft circumference (m)	2:6, **33.33%**	-	-
All postcranial measurement pairs	92:190, **48.42%**	-	-
All long bone length measurement pairs	5:17, **29.41%**	7.265 mm	7.332
PMs[4] - 02/1-3 (without long bone lengths)	13:27, **48.15%**	-	-
PMs - 02/1-7 (without long bone lengths)	13:25, **52.00%**	-	-
PMs - 02/1-3	13:30, **43.33%**	-	-
PMs - 02/1-7	13:27, **48.15%**	-	-
All postcranial robusticity score pairs[5]	22:27, **81.48%**	-	-

[1] means of values of differences, not means of absolute values of differences as given elsewhere; [2] CMs = cranial measurements; [3] DMs = dental measurements; [4] PMs = postcranial measurements; [5] Remarks: 4 (14.8%) of 27 pairs of scores differed by 0.5; 1 (3.7%) of 27 pairs of scores differed by 1; 5 (18.5%) of 27 pairs of scores differed from each other

V.C.3. Diachronic differences

V.C.3.a. Interpretation

The results of the systematic statistical comparisons and the summary of the relevant individual osteological findings revealed the same pattern (see IV.A.3., 11., 12., 13., IV.C., V.C.1.j., k. and l.). The members of pre-Leiterband sub-sample appeared to have been physically more active and healthier than their Leiterband successors. This evidence was difficult to reconcile with a scenario in which the more flexible pre-Leiterband subsistence strategies were abandoned in response to worsening circumstances (see V.C.3.b.2.). On the contrary, the observed diachronic differences in expressions of occupational stress and health traits indicated that the specialised herding-gathering economy of the Leiterband/Herringbone phase itself had negative side effects. If the economic specialisation of the Leiterband/Herringbone phase had indeed been a reaction to environmental stimuli, the change should have been preceded by a period characterised by malnutrition, poor health and low life expectancies. Instead, the Leiterband, not the pre-Leiterband, individuals had slightly more pathologies, significantly more and more severe enamel hypoplasia lesions and distinctly lower mean ages at death (see IV.C. and V.C.1.l.). Moreover, if the people of the Wadi Howar had already changed their way of life to better their situation, they would have surely responded to the problems of the Leiterband/Herringbone phase by stepping up their efforts to at least maintain the pre-Leiterband standard of living. Yet, the Leiterband sub-sample's higher enamel hypoplasia frequencies and lower mean ages at death were accompanied by less pronounced expressions of occupational stress and robusticity traits (see IV.C.). The anthropological evidence was, however, entirely compatible with the scenario both the archaeological and the pertinent ethnographic facts strongly suggest (see V.C.3.b.2. and 3.). In this scenario, the prehistoric inhabitants of the Wadi Howar were not forced to adopt animal husbandry. They did not have to become specialised herder-gatherers either. They chose to do so for socio-cultural reasons when the changing climate made this decision possible.

Most of the pre-Leiterband sub-sample's expressions of the relevant occupational stress and robusticity traits could have been the result of activities typically performed by either hunter-gatherer-fishers or herder-gatherers (see IV.A.11., 12., V.C.1.j. and k.). Still, in sum, they were more consistent with a forager or predominantly forager-like lifestyle. Not only the degree, the distribution and the types of dental wear but also the more pronounced expressions of the robusticity and musculoskeletal stress traits of the *Cranium* and the upper limbs (*Membra superiora*) supported this interpretation.

Finally, that no further or more pronounced diachronic differences between the pre-Leiterband and Leiterband sub-sample could be detected may not only have reflected the poor preservation the Wadi Howar sample (see V.B.3.b.3.). This situation could in fact have been due to the similarities between the daily lives of "delayed-return" hunter-gatherer-fishers/hunter-gatherer-fisher-herders and herder-gatherers (see V.C.3.b.2. and 3.).

V.C.3.b. Contextualisation

V.C.3.b.1. Anthropological context

Many researchers have compared pre- and post-Neolithic transition samples from specific areas. Most of the regional shifts from an earlier extractive to a later productive subsistence economy which have been studied in this manner were apparently accompanied by adverse side effects. Compared to their pre-transition counterparts, post-transition samples are usually characterised by more common and more pronounced traces of physiological stress, higher pathology frequencies and lower mean ages at death (e.g. Cohen/Armelagos 1984; Eshed *et al*. 2004(a); Eshed *et al*. 2004(b); Johansson/Horowitz 1986; Judd 2008(a): 102-103; Larsen 1995, 2002; Lieverse *et al*. 2007(a); Lieverse *et al*. 2007(b); Lieverse *et al*. 2009; Littleton/Fröhlich 1993; Marchi 2008; Starling/Stock 2007; Wood *et al*. 1992; Zilhão 1998). Obviously, the pre-Leiterband and Leiterband sub-sample were not pre- and post-Neolithic transition samples. Nevertheless, that the search for diachronic differences between the two sub-samples revealed a similar situation did certainly not come as a surprise (see IV.C., V.B.3.b.3. and V.C.1.l.). The significant diachronic differences in enamel hypoplasia frequencies and severity spoke for themselves (see III.B.1.b.2.b.6., IV.C. and V.C.1.l.). They clearly indicated that the members of the Leiterband sub-sample experienced a lot more physiological stress than the pre-Leiterband individuals. Theoretically, the Leiterband sub-sample's lower mean ages at death could have been caused by an increase in population growth (see V.C.1.d.). This did, however, not seem likely. The pre-Leiterband sub-sample included a higher proportion of sub-adults. Moreover, the sub-adult frequencies of the two sub-samples were neither significantly nor in tendency different from each other (see Appendix XXIII.B.6.). The pre-Leiterband frequency of post-adults, on the other hand, was significantly higher (see Figure 110). Consequently, the Leiterband sub-sample's considerably lower mean ages at death did, in all probability, also show that life during the Leiterband phase was less secure and more stressful. In addition, the Leiterband sub-sample contained 11.90% more specimens with one or more pathological conditions than the pre-Leiterband sub-sample (see Table 28). This was obviously not a significant difference. It is worth being mentioned in this context all the same. It was almost certainly the rather over-specialised Leiterband herding-gathering economy which brought about the higher levels of physiological stress, the shorter lives and the slightly increased morbidity. This specialisation evidently led to a less varied and probably generally poorer diet (see I.C.4.b.1., I.D.2.d.3. and below). The unhygienic and unhealthy conditions which both the more intensive contact with livestock and various widespread herding practices must have created did in all likelihood not improve the lives of the Leiterband herder-gatherers either (see I.D.2.d.4. and V.C.1.l.).

Post-adults per phase (counting individuals with an analysis age of 40 years as post-adults):

+ Leiterband post-adult frequency - 2 / 21 = 9.5%
+ pre-Leiterband post-adult frequency - 3 / 8 = 37.5%

expected frequencies based on Leiterband frequencies (larger sample):

- Pearson's: $\chi^2 = ((5 - 7.240)^2 / 7.240) + ((3 - 0.760)^2 / 0.760) = 0.693 + 6.602 = 7.295$

very significant (post-adult frequencies differ very significantly), remarks: one expected frequency under 5

- Yates's: $\chi^2 = ((|5 - 7.240| - 0.5)^2 / 7.240) + ((|3 - 0.760| - 0.5)^2 / 0.760) = 0.418 + 3.984 = 4.402$

significant (post-adult frequencies differ significantly)

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(adult or younger)	5	0.625
(post-adult)	3	0.375
All	8	1.000

expected (adult or younger) frequency for the pre-Leiterband sub-sample: 7.240 (8 · 0.905 = 7.240)
expected (post-adult) frequency for the pre-Leiterband sub-sample: 0.760 (8 · 0.095 = 0.760)

Leiterband frequencies:

	f	p
(adult or younger)	19	0.905
(post-adult)	2	0.095
All	21	1.000

expected (adult or younger) frequency for the Leiterband sub-sample: 13.125 (21 · 0.625 = 13.125)
expected (post-adult) frequency for the Leiterband sub-sample: 7.875 (21 · 0.375 = 7.875)

Post-adults per phase (not counting individuals with an analysis age of 40 years as post-adults):

+ Leiterband post-adult frequency - 1 / 21 = 4.8%
+ pre-Leiterband post-adult frequency - 1 / 8 = 12.5%

expected frequencies based on Leiterband frequencies (larger sample):

- Pearson's: $\chi^2 = ((7 - 7.616)^2 / 7.616) + ((1 - 0.384)^2 / 0.384) = 0.050 + 0.988 = 1.038$

not significant (post-adult frequencies do not differ significantly), remarks: one expected frequency under 5

- Yates's: $\chi^2 = ((|7 - 7.616| - 0.5)^2 / 7.616) + ((|1 - 0.384| - 0.5)^2 / 0.384) = 0.015 + 0.035 = 0.050$

not significant (post-adult frequencies do not differ significantly)

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(adult or younger)	7	0.875
(post-adult)	1	0.125
All	8	1.000

expected (adult or younger) frequency for the pre-Leiterband sub-sample: 7.616 (8 · 0.952 = 7.616)
expected (post-adult) frequency for the pre-Leiterband sub-sample: 0.384 (8 · 0.048 = 0.384)

Leiterband frequencies:

	f	p
(adult or younger)	20	0.952
(post-adult)	1	0.048
All	21	1.000

expected (adult or younger) frequency for the Leiterband sub-sample: 18.375 (21 · 0.875 = 18.375)
expected (post-adult) frequency for the Leiterband sub-sample: 2.625 (21 · 0.125 = 2.625)

Figure 110: Comparison of the pre-Leiterband and Leiterband post-adult frequencies.

Post-Neolithic transition tendencies towards more physiological stress, higher morbidity rates and lower life expectancies were observed in most relevant case studies. However, the kind and degree of post-transition changes in occupational stress were found to be far less predictable. Depending on the environmental determinants and the predominant pre- and post-transition subsistence strategies, overall occupational stress levels went up or down and evidence suggestive of specific activity patterns remained unchanged, appeared or vanished (e.g. Bridges *et al*. 2000; Churchill/Morris 1998; Deter 2009; Eshed *et al*. 2004(a); Hinton 1981; Holt 2003; Larsen 1995, 2002; Lieverse *et al*. 2007(b);

Lieverse *et al*. 2009; Marchi 2008; Sparacello/Marchi 2008; Stock 2006; Suby/Guichón 2009; Zilhão 1998). The occupational stress markers which distinguished the members of the pre-Leiterband sub-sample from the Leiterband individuals were most consistent with those usually associated with foragers. This was an especially interesting finding since six, i.e. 75%, of the eight pre-Leiterband individuals were excavated at Abu Tabari 02/1, a hunter-gatherer-fisher-herder rather than a hunter-gatherer-fisher site (see I.C.3.b.1. and III.B.2.c.). It drew attention to the fact that it might be more appropriate to describe the inhabitants of Abu Tabari 02/1, just like various relevant modern and historic groups, as foragers with livestock, instead of categorising them as pastoralists for whom fishing, hunting and gathering remained important (see I.D.2.d.5.). For instance, unlike the tooth wear of the Leiterband sub-sample, the pre-Leiterband sub-sample's dental abrasion patterns, matched those typically encountered in hunter-gatherer dentitions (see IV.C. and V.C.1.k.). The frequencies of traces of paramasticatory tooth use also highlighted this fact (see Table 6, IV.A.12. and V.C.1.k.). 71.43% (five) of the seven pre-Leiterband individuals with teeth whose degree of abrasion could be scored but only 33.33% (six) of their 18 Leiterband counterparts displayed traces of paramasticatory tooth use. The respective frequencies for cupped wear were 42.86%, i.e. three out of seven, and 5.56%, i.e. one out of 18. Similarly, the greater robusticity and the more pronounced expressions of the musculoskeletal stress traits of the pre-Leiterband *Humeri*, *Radii* and *Ulnae* were most likely a direct result of strenuous pre-Leiterband hunting, fishing and gathering activities the Leiterband/Herringbone phase herder-gatherers probably engaged in less frequently or had given up altogether (see IV.C., V.C.1.j. and k.). Moreover, the weaker expressions of the Leiterband sub-sample's musculoskeletal stress traits as a whole pointed towards generally lower activity levels among the Wadi Howar's herder-gatherers (see IV.C.). Particularly in view of the archaeological evidence and the attitudes of most modern and historic African pastoralists, it was tempting to explain this development in connection with a subsistence strategy which takes full advantage of domestic animals but consciously ignores most of the less prestigious wild food sources (see I.C.3.a.2., I.C.3.b.2. and I.D.2.d.5.). Gracilisation is an ongoing global phenomenon. It is usually assumed to reflect decreasing overall activity levels and weaker selection pressures associated with physically less and less demanding daily lives. The trend towards increasingly gracile dental and skeletal traits is well-documented throughout the Late Pleistocene and the entire Holocene. The craniodental reduction in A-Group and later series from the Nubian Nile Valley, for instance, is just one popular example of this process (e.g. Brace 1983; Brace *et al*. 1991: 39-40, 46-50; Calcagno 1986; Carlson/Van Gerven 1977; Frayer 1980; Holt/Formicola 2008: 76-79, 83-86; Lahr 1996: 248-263; Lahr/Wright 1996; Larsen 1997: 218, 225; Lieberman 1996; Pinhasi *et al*. 2008; Rose *et al*. 1993: 67-69; Sardi *et al*. 2006; Van Gerven *et al*. 1977). That the Leiterband sub-sample's expressions of an unspecific robusticity trait like cranial thickness were less pronounced could thus be interpreted as further evidence of an on average less active herder-gatherer life (see IV.A.11., IV.C. and V.C.1.j.). The expressions of virtually all musculoskeletal and robusticity traits of the bones of the lower free extremities (*Partes liberae membrorum inferiorum*) did not differ noticeably in the two sub-samples. This was perhaps not impossible to anticipate (see IV.C.). After all, the distances which needed to be travelled in the context of gathering expeditions and herding activities were probably similar to those which had to be covered on pre-Leiterband gathering, fishing and hunting trips (see I.C.3.a.1., 2. and I.D.2.d.2.).

The results of the isotope analyses of the Wadi Howar remains lend support to the interpretations presented above (see I.C.4.b.1.). Grupe's (2002: written communication, 2004: written communication) and Schmitz's (2008) analyses showed that both the carbon and the strontium isotope signatures of the Leiterband individuals were more homogeneous than those of their pre-Leiterband predecessors. The former finding clearly indicated that the Leiterband diet was less varied. The latter finding mirrored the results reported for the Late Acacus hunter-gatherer and Early to Middle Pastoral phase herder material from the Libyan Fezzan (see I.D.1.b.1.). Tafuri *et al*. (2006) pointed out that high levels of residential mobility during the Late Acacus and stable transhumance patterns during the Early to Middle Pastoral phase would explain the diachronic differences in the variability of $^{87}Sr/^{86}Sr$ values. It would undoubtedly make sense to interpret the Wadi Howar strontium isotope signatures along the same lines.

V.C.3.b.2. Archaeological context

The adoption of cattle herding and its intensification in the Wadi Howar were most likely not reactions to environmental changes. The oldest cattle remains from the Wadi Howar have been dated to 4200 to 4100 BCE (Jesse *et al*. 2007: 47). Thus, in the Wadi Howar, cattle herding was adopted during a time of very favourable environmental conditions. At this time, the region was more than sufficiently wet but no longer too wet to raise livestock (see I.C.1.b., I.C.3.a.1. and 2.). For example, Keding's (2009: 784) comprehensive analysis of the situation led her to conclude that the drier climate at the end of the Wavy Line/Laqiya period enabled but certainly did not force the people of the Wadi Howar to become herder-gatherers. In view of these findings, it seems only reasonable to assume that climate change played the same role in the context of the intensification of animal husbandry during the Leiterband/Herringbone period. It undoubtedly also deserves to be mentioned that, as far as the earliest African cattle sites, such as Bir Kiseiba and Nabta Playa in the Southern Egyptian Sahara, Wadi el Arab in the Kerma Basin, Enneri Bardagué in the Tibesti or Ti-n-Torha and Adrar Bous in the Central Sahara, are concerned, the relevant environmental evidence is indicative of similarly good conditions (e.g. Clutton-Brock 2000; Di Lernia 2006; Finucane *et al*. 2008(b); Hassan 2000: 69-78; Honegger/Dubosson 2011; Le Quellec 2006: 176-177, 180; MacDonald 2000: 2-9; Marshall/Hildebrand 2002: 109-111; Sadig 2009: 243-247; Smith 1992; Wendorf/Schild 1998, 2003: 132; Wendorf *et al*. 1984). Moreover, it is generally difficult to imagine what environmental incentive people in the then still quite wet Wadi Howar or in the Nile Valley could have had to take up cattle herding. Keeping cattle had certainly not become a necessity. The early pastoralists of the Central Sudanese Nile Valley, for instance, continued to exploit aquatic and other wild resources. The same is true for the inhabitants of Abu Tabari 02/1, Gobero, Kobadi and countless other Saharan sites (see I.C.3.b.1. and for example: Edwards 2004: 57-59; Garcea 2006; Haaland 1992; Haour 2003: 212-213; Hoelzmann *et al*. 2001: 210-212; Holl 1998: 144-153; Jousse *et al*. 2008; MacDonald 1998: 40-41; McIntosh 1993: 213-215; Sadig 2009: 262-263; Sereno *et al*. 2008: 11). In fact, it is still perfectly possible for people to survive as hunter-gatherer-fishers along the Nile (see I.D.2.d.3., 5. and 6.). In addition, as not least the prehistory of the Western Butana and the African foragers of the ethnographic present underline, it is by no means necessary to produce food to be able to survive in rather arid regions either (see I.D.2.d.2., 3., 4., 5. and for example: Edwards 2004: 48, 62; Marks *et al.* 1985).

The Wadi Howar sites provided evidence which draws attention to possible socio-cultural reasons for the adoption and intensification of animal husbandry. The pits filled with cattle bone and pottery typical of many Leiterband/Herringbone phase sites are probably best interpreted in the context of competitive feasting or similar practices in which individuals or families destroy part of their wealth to increase their prestige (see I.C.3.a.2. and Keding 2009: 296-299, 307-308, 330-337). For example in the Nuba Mountains, such rituals are mainly associated with those groups for whom cattle are predominantly a means of accumulating and displaying wealth (see I.D.2.d.7.). Most pastoralists only exploit food sources not considered prestigious enough for herders in times of crises (see I.D.2.d.3. and 5.). The differences between the zooarchaeological assemblages of Leiterband/Herringbone and Handessi sites are, perhaps, indicative of similar attitudes among the prehistoric inhabitants of the Wadi Howar (see I.C.3.a.2. and 3.). The Leiterband herder-gatherers could apparently afford not to systematically hunt the wild animals with which they shared the Wadi Howar. Hunting animals, which must have been much more abundant during the wetter Leiterband/Herringbone period, did, however, make a comeback when the increasing aridification during the Handessi phase created a situation in which relying almost entirely on animal husbandry was simply no longer an option (see I.C.3.a.3.).

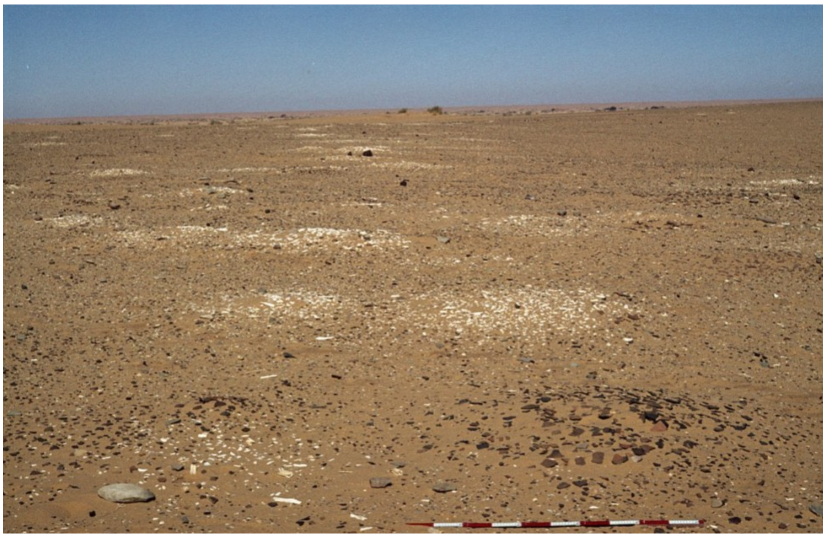


Figure 111: Eroding pits at Djabarona 84/13 (Keding 2009: 298; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

The relevant archaeological evidence leaves little doubt which developments led to the diachronic differences the intra-sample comparisons revealed. Unlike the faunal remains recovered at Wavy Line/Laqiya sites or at Abu Tabari 02/1, the zooarchaeological assemblages from Leiterband/Herringbone sites usually consist primarily of bones of domesticated animals (see I.C.3.a.1., 2., I.C.3.b.1., 2. and 3.). It can thus be deduced that the Leiterband/Herringbone phase herder-gatherers no longer carried out most hunting, fishing and gathering tasks their pre-Leiterband predecessors must have performed on a daily basis. The numerous continuities between the Wavy Line/Laqiya and the Leiterband/Herringbone phase, on the other hand, suggest that most other activity patterns did not change significantly (Keding 2009: 304-447).

V.C.3.b.3. Ethnographic context

Coming up with logical interpretations of the results of the intra-sample comparisons was not difficult (see V.C.3.a. and V.C.3.b.1.). Moreover, the archaeological evidence corroborates most of these interpretations (see V.C.3.b.2.). Still, both the anthropological and the archaeological findings only make full sense in the light of the information which the germane ethnographic sources provide (see I.D.2.d.2.-7.).

That herders can subsist almost entirely on livestock products, that herds of cattle, goats, sheep or camels can be used to exploit marginal environments and that herding economies can support quite large populations are indisputable facts (see I.D.2.d.1.-3., 5. and 6.). Furthermore, the ethnographic evidence strongly suggests that these advantages of pastoralism were the ultimate reasons why it became so successful in Africa. The ethnographic evidence does, however, also strongly suggest that the proximate reasons for the adoption, intensification and spread of pastoralism were probably of an entirely different nature (see I.D.2.d.5.). Livestock plays a crucial role in the social life of pastoralists. The socio-cultural value of livestock, cattle in particular, usually far outweighs its importance as a food source (see I.D.2.d.3. and 5.). Attempts to survive on the products of one's own livestock alone are, in most cases, nothing but thinly disguised attempts to demonstrate socio-economic superiority, especially in fairly rich habitats like the well-watered parts of Southern Sudan (see I.D.2.d.5.). Cattle are status symbols. They offer the opportunity to increase one's prestige, to gain access to women and to accumulate wealth. It is for these socio-cultural reasons that efforts made to acquire, own and stay in possession of cattle can, at times, be largely nonsensical from an economic point of view (see I.D.2.d.2. and 5.). Herders avoid reverting to hunting and gathering for as long as possible during crises because of the loss of prestige that is associated with this economically sensible step (see I.D.2.d.5.). The historically documented occasions on which foragers have experimented with keeping livestock or have taken up pastoralism, on the other hand, can by no means be described as times of crises (see I.D.2.d.5.). Taking the anthropological and archaeological findings as well as these ethnological conclusions into account, a scenario in which the adoption and intensification of animal husbandry in the prehistoric Wadi Howar were not merely reactions to environmental changes can undoubtedly be regarded as very credible (see V.C.3.a., V.C.3.b.1. and 2.).

Extractive subsistence strategies have advantages and disadvantages. Whereas foragers usually do not need to invest much time into acquiring the food they need to survive, the techniques they use in the process can be quite taxing physically (see I.D.2.d.2.). For the hunter-gatherers and hunter-gatherer-fishers of Africa's ethnographic present, strenuous activities like throwing spears, harpoons or sticks, casting nets, using bows and arrows, digging up roots or tubers and processing and eating hard or tough foods are part of everyday life. African herders, on the other hand, do normally not perform any of these or similarly arduous tasks involving arms or teeth regularly (see I.D.2.d.2.). Having generally more possessions than foragers, they are presumably also more likely to use tools in situations in which foragers might choose to simply rely on their teeth. Consequently, it seems reasonable to suppose that the upper bodies and dentitions of African foragers have to cope with decidedly more occupational stress than those of African pastoralists (see V.C.1.k. and V.C.3.b.1.). Depending on the group-specific daily herding routines and annual transhumance cycles, pastoralists do not automatically cover larger distances in the course of a normal year than foragers (see

I.D.2.d.2.). It is thus to be expected that certain herders and hunter-gatherers experience similar levels of locomotory stress (see V.C.1.k. and V.C.3.b.1.). On average, African foragers are better nourished than African pastoralists (see I.D.2.d.3.). They consume more calories and have more varied diets. In addition, their subsistence economies are comparatively crisis resistant (see I.D.2.d.3., 5. and 6.). Conversely, the situation of herders is often precarious. They depend on reasonably good and stable environmental conditions and are prepared to go to considerable lengths to save their livestock. As a result, herders are often faced with severe food shortages (see I.D.2.d.3.). It therefore stands to reason that pastoralists are in all probability more affected by enamel hypoplasia than foragers (see V.C.1.l. and V.C.3.b.1.). The average life expectancies of modern African pastoralists exceed those of modern African foragers (see I.D.2.d.4.). It can, however, be assumed that mixed economy pastoralists fare better than the more specialised herders of Africa's arid regions in this regard (see V.C.3.b.1.). Many herder customs, such as collecting and burning dung, consuming raw milk and blood or caring for and spending much time in close proximity to livestock, are either insanitary or dangerous (see I.D.2.d.2. and 4.). Hunter-gatherers are, of course, not exposed to such herding-specific hazards. This difference should, at least theoretically, produce rather dissimilar health profiles (see V.C.1.l. and V.C.3.b.1.).

The boundaries between foragers and pastoralists can be blurry (see I.D.2.d.5.). Foragers may own livestock without giving up their basic subsistence strategy. Pastoralists may resort to hunting and gathering after loosing their livestock. Groups can also rely on a mix of herding and foraging. Thus, automatically classifying foragers who own livestock as pastoralists is certainly not helpful (see I.D.2.d.5. and V.C.3.b.1.). It should also be borne in mind that the lifestyles of the relevant foragers and pastoralists are actually not that dissimilar (see I.D.2.d.2.). This fluidity and the potentially considerable overlap between the activities typically performed by herders and hunter-gatherers do not appear to be recent phenomena. On the contrary, numerous prehistoric Saharan petroglyphs and pictographs as well as many Ancient Egyptian reports make it seem likely that both are intrinsic to the relationship between sub-Saharan foragers and pastoralists (see I.D.2.b.2. and I.D.2.c.1.). The lack of more and more pronounced differences between the pre-Leiterband and Leiterband sub-sample was believed to be best understood against this background (see IV.C., V.C.3.a. and V.C.3.b.1.).

V.C.4. Metric and non-metric affinities

V.C.4.a. Interpretation

The classification patterns the 234 core discriminant function analyses produced were interpreted in the context of a theory which is supported by virtually all of the available pertinent anthropological, archaeological, linguistic, historical and ethnographic evidence.

All relevant results of the osteological analyses clearly showed that the Wadi Howar sample consisted of the remains of people of biologically sub-Saharan ancestry (see IV.A.9. and V.C.1.h.). Additionally, not a single Wadi Howar individual or group was found to be most similar to either the A-Group or the Somali sample, the only core comparative samples with appreciable frequencies of biologically non-sub-Saharan morphological characteristics (see IV.D.). Therefore, the Wadi Howar's prehistoric inhabitants were evidently members of a biologically sub-Saharan population complex. As far as the prehistoric comparative samples were concerned, the Wadi Howar material shared the greatest affinities with the Malian Sahara sample (see IV.D.). That the affinities between the two samples were a coincidence was unlikely. It was similarly unlikely that, by coincidence, the comparative material included a sample to which the Wadi Howar series was linked by a single, small-scale prehistoric migration. Accordingly, it was deduced that the populations from which the Wadi Howar and the Malian Sahara sample were drawn were connected by a chain of populations occupying the area between the Sudanese and the Malian part of the Sahara. Furthermore, the obvious affinities between the Wadi Howar series and the material from sites like Jebel Sahaba, Khartoum Hospital, Saggai and Kadero strongly suggested that this chain of populations, both the Wadi Howar's and the Malian Sahara's inhabitants were part of, also included certain groups in the Sudanese Nile Valley (see I.C.4.a.1., 2. and IV.D.). Taking all of this into account, it had to be assumed that the biologically sub-Saharan population complex the Wadi Howar population belonged to consisted of a chain of populations which occupied an area stretching, at least, from the southern part of the Central Sahara to the Sudanese Nile Valley. It thus seemed appropriate to refer to this chain of populations as the Saharo-Nilotic population complex.

Like the majority of their members, as groups, the two main site-specific sub-samples, i.e. the Abu Tabari 02/1 and the Abu Tabari 02/28 sub-sample, and the two main occupation phase-specific sub-samples, i.e. the pre-Leiterband and the Leiterband sub-sample, were most similar to the Malian Sahara sample (see IV.D.). In fact, just like the Abu Tabari 02/1 and the Abu Tabari 02/28 sub-sample, the pre-Leiterband and the Leiterband sub-sample were more similar to the Malian Sahara sample than they were to each other. Nevertheless, there were no significant differences between the individual classification frequencies of the members of the pre-Leiterband and the Leiterband sub-sample (see IV.D.). The Wadi Howar sample as a whole was not characterised by an unusually high level of intra-sample variability or noticeable morphological discontinuities either (see IV.A.9. and V.C.1.h.). This combination of facts pointed towards a common Saharo-Nilotic descent of the members of both the pre-Leiterband and the Leiterband sub-sample, a period of relative isolation during which the Wadi Howar's pre-Leiterband population and the ancestors of the Leiterband herder-gatherers grew apart and a degree of pre-Leiterband-Leiterband/Herringbone phase population continuity in the Wadi Howar. In the group discriminant function analyses which relied on non-metric data, the Abu Tabari 02/1 sub-sample was closest to the Jebel Sahaba/Tushka sample and the pre-Leiterband sub-sample approached the Jebel Sahaba/Tushka sample (see I.C.4.a.1., 2. and IV.D.). It seemed reasonable to assume that this result was indicative of an ancestor-descendant relationship. Gracilisation could have easily obscured these two sub-sample's metric affinities with the ancient Jebel Sahaba/Tushka sample (see V.B.3.a., V.C.1.j. and V.C.3.b.1.). The expressions of the Abu Tabari 02/1 and the pre-Leiterband sub-sample's non-metric traits, on the other hand, could have retained the relevant phylogenetic signal despite this process (see V.B.3.b.4.b.3.). The inhabitants of the Late Pleistocene sites Jebel Sahaba 117 and Tushka 8905 were most likely the ancestors of one of the original Saharo-Nilotic core populations which expanded into the Sahara when it became inhabitable again at the beginning of the Holocene (see V.C.4.b.1. and 2.). In view of these two conclusions, it appeared probable that the Wadi Howar's pre-Leiterband inhabitants were descendants of an eastern source population of the Saharo-Nilotic population complex and that they reached the

Wadi Howar region during or soon after the original expansion of the Saharo-Nilotic population complex. The Abu Tabari 02/28 and the Leiterband sub-sample were exceptionally similar to the Malian Sahara sample in all of the group analyses. They were also closest to the Malian Sahara sample in the non-metric group discriminant function analyses which positioned the Abu Tabari 02/1 and the pre-Leiterband sub-sample near the Jebel Sahaba/Tushka sample (see IV.D.). The results of the individual and these group discriminant function analyses provided the basis for the assumption that the Leiterband herder-gatherers came from the west. That there was evidence of pre-Leiterband-Leiterband/Herringbone phase continuity implied that the Leiterband people absorbed large parts of their pre-Leiterband relatives when they entered the Wadi Howar. The arrival of the Leiterband herder-gatherers and the subsequent partial absorption of the Wadi Howar's pre-Leiterband population could have been a consequence of a pastoralist-driven secondary Saharo-Nilotic expansion during the Middle Holocene (see V.C.4.b.1.-3. and 6.).

None of the results of the analyses of the Handessi phase material were deemed reliable (see IV.D.). Therefore, they were difficult to interpret. Yet, it seemed clear that the classifications of the Djabarona 96/120 and the Handessi sub-sample, which consisted of the same three extremely badly preserved individuals, were almost certainly not indicative of post-Leiterband/Herringbone phase population continuity. The affinities between the Djabarona 96/120 and the Abu Tabari 02/28 sub-sample as well as the affinities between the Handessi and the Leiterband sub-sample in the group analyses were primarily artefacts. The numerous missing Djabarona 96/120 values were replaced with the values of the Wadi Howar sample's mean individual (see III.B.2.d.2.b. and V.B.3.b.4.b.2.). Due to the composition of the Wadi Howar sample, its mean individual primarily reflected the dimensions and trait expressions of the Leiterband sub-sample (see Table 1, III.B.2.c. and V.B.3.b.3.). Additionally, the results of the χ^2 tests which were performed to compare the occupation phase-specific classification frequencies were indicative of a possible population discontinuity (see IV.D. and Appendix XXV.B.). Three of the eight analyses in which the Leiterband/Herringbone and the Handessi phase-specific classification frequencies were compared revealed significant or very significant differences. Finally, both the variability of the known Handessi phase material as a whole and the results of Simon *et al.*'s (2002) principal component analysis of three Handessi period skulls from the Wadi Shaw suggest that the people of the Handessi phase cannot be considered a biologically homogeneous group (see I.C.3.a.3. and I.D.1.a.1.c.).

The Wadi Howar individuals typically displayed combinations of trait expressions which are more or less peculiar to Nilo-Saharan speakers, particularly those encountered in Southern Sudan and Chad. This was already noted in the course of the osteological analyses (see IV.A.9.). The results of the later systematic search for the Wadi Howar material's affinities with modern comparative samples were therefore anything but unexpected (see IV.D.). The modern comparative material the Wadi Howar series was closest to was the sample from Southern Sudan. The Wadi Howar material was second closest to the Chad sample. Apart from certain weak links with the Haya material (see below), the discriminant function analyses revealed no other affinities between the Wadi Howar series and the modern comparative samples. These results lent support to the hypotheses which posit that most of the Wadi Howar's prehistoric inhabitants migrated south and west when increasing aridification forced them to leave the Southeastern Sahara (see I.D.2.a.3. and I.D.2.d.6.). They also made it appear probable that the majority of the Nilo-Saharan-speaking pastoralists of today's Southern Sudan and Eastern Chad are descended from the Wadi Howar's prehistoric inhabitants or groups closely related to them.

That several analyses allied Wadi Howar individuals and mean individuals with the Haya sample was interesting (see IV.D.). Since no overall result based on the analyses in question could be considered reliable, this situation was not overinterpreted. All the same, it was not believed to be entirely inconceivable that this situation was a consequence of contacts between the ancestors of the Haya, or the Haya themselves, and Nilo-Saharan-speaking pastoralists somewhere in a more southerly region of the African continent (see I.D.2.a.1., 3., I.D.2.d.5., II.B.2.e and for example: Bräuer 1983: 24; Clutton-Brock 2000; Fage/Tordoff 2002; Lahr 2008: personal communication; Marshall/Hildebrand 2002: 110, 116-119; Poloni *et al*. 2009; Tishkoff *et al*. 2007: 36).

In order to contextualise the results of the inter-sample comparisons further, it was necessary to interpret the positions which were assigned to the prehistoric comparative samples as well. Not only the results of the discriminant function analyses but also the results of various pertinent anthropological studies suggested that both the Early and Middle Holocene population of the Malian Sahara and the Late Pleistocene Jebel Sahaba/Tushka population belonged to the proposed Saharo-Nilotic population complex, just like the prehistoric inhabitants of the Wadi Howar (see I.D.1.a.2.c., I.D.1.a.3.c., IV.D. and V.B.3.a.). Moreover, it was concluded that the prehistoric biologically North African populations which lived north of the Sahara and these clearly biologically sub-Saharan groups could not have shared any direct ancestors (see I.D.1.a.2.c., I.D.1.a.3.c., IV.D. and V.B.3.a.). Conversely, neither the results of the discriminant function analyses nor the results of the pertinent anthropological studies suggested that the A-Group was part of the Saharo-Nilotic population complex (see I.D.1.a.3.c. and IV.D.). When considered together, the germane information provided by studies of human skeletal remains, ancient and modern DNA, linguistic data, Saharan rock art, Ancient Egyptian sources and historic reports produced a fairly coherent picture of the population history of the Sudanese Nile Valley and most of the Sahara (see I.D.1.a.2.c., I.D.1.a.3.c., I.D.1.c., I.D.2.a.1., 3., I.D.2.b.3., I.D.2.c.1. and 2.). Relying on this information and the results of the inter-sample comparisons, the following scenario was developed. After its original Saharo-Nilotic inhabitants had adopted Neolithic subsistence strategies, the population of the Northern Sudanese Nile Valley was reshaped by substantial gene flow from and migrations of groups of wholly or partly biologically North African descent. While some of the Saharo-Nilotes of the Northern Sudanese Nile Valley were replaced by these incomers, others founded new groups together with them. As a consequence, the Northern Sudanese Nile Valley eventually ceased to be a Saharo-Nilotic periphery. The new non-Saharo-Nilotic population of the Northern Sudanese Nile Valley comprised the A-Group and the inhabitants of sites like Kadruka. The Saharo-Nilotes who lived further south along the Nile and in the adjacent areas of the Sahara, on the other hand, remained largely unaffected by these changes, as, for instance, the material from the Wadi Howar or Kadero demonstrates. The developments in the Saharan territory of the Saharo-Nilotes were similar to those in the Sudanese Nile Valley. The northern parts of this area ultimately witnessed the arrival of partly or wholly biologically North African groups. These groups replaced or interbred with the northern Saharo-Nilotes. This process did, however, have little impact on the southern parts of the Saharo-Nilotic population complex.

V.C.4.b. Contextualisation

V.C.4.b.1. Anthropological context

Animal populations grow when they colonise suitable new habitats. If predators are absent and sufficient food is present, the size such a newly established population can reach mainly depends on the size of the new habitat. The Saharan habitat which became available after the abrupt northward shift of the tropical rainfall belt around 8500 BCE was enormous. Landscapes associated with large bodies of water, such as the Ounianga Serir Palaeolake, the West Nubian Palaeolake or Lake Chad, areas characterised by smaller permanent and seasonal palaeolakes, like the Wadi Howar or the western foreland of El Atrun, countless smaller wadis comparable to, for example, the Wadi Hariq and mountain regions such as the Ennedi Mountains could, and obviously did, serve as refugia during times of drought. Even if the Early and Middle Holocene Sahara had never been more than a mosaic of such refugial areas, it stands to reason that, as a whole, it would have still had a carrying capacity far larger than the Nile Valley. The humans living in the Sahara did, however, apparently not have to limit themselves to the use of refugia for millennia. There was certainly no a lack of water between 8500 and 5300 BCE. The following period, from 5300 to 3500 BCE, was still quite wet in the more southerly parts of the Sahara. In addition, many Saharan regions remained perfectly inhabitable until about 2000 BCE. In sum, the ecological conditions in this vast area were favourable or very favourable for 5000 to 6500 years. Given the initially more or less unrestricted population growth in the vast “green Sahara”, the population of the Southern Sahara must have soon been much larger than that of the narrow Sudanese Nile Valley. This much larger population was spread out over the entire Southern Sahara. There are no reasons to assume that the prehistoric Saharans considered those stretches of the Nile which form a linear oasis in today’s Eastern Sahara to be intrinsically more attractive than any other large body of water elsewhere in the Sahara. Southern Saharans would thus not have had any special motivation to visit the Sudanese Nile Valley or stay in contact with its inhabitants. As a consequence of all this, as far as the prehistoric population of the entire Southern Sahara is concerned, the Nile Valley was in all probability geographically and biologically a periphery. Therefore, the biological interactions between the smaller population of the Sudanese Nile Valley and the much larger population of the Southern Sahara must have been dominated by isolation by distance and centre/edge phenomena. Assuming that these basic biological conclusions are correct, it is actually not surprising that the Wadi Howar material was closer to a prehistoric sample from a part of the Sahara from which the Wadi Howar is separated by present-day Chad and Niger than to the selected prehistoric series from the close-by Nile Valley (for the relevant concepts of population ecology see for example: Birg 1994: 217-223; Dorit *et al*. 1991: 960-974, 976; Grupe *et al*. 2005: 213-270; Knußmann 1996: 470-472; Landers 1992; Meindl 1992; Vogel/Angermann 1992: 237-245, 266-267; for Saharan climate change, refugia and bodies of water see for example: Breunig/Neumann 2002; Hoelzmann *et al*. 2001; Holl 1998: 144-151; Jesse *et al*. 2004: 127-130; Jousse *et al*. 2008; Kröpelin 2007(b); Kröpelin *et al*. 2008; Kuper/Kröpelin 2006; MacDonald 1998: 38, 52-53; Pachur/Altmann 2006; Sereno *et al*. 2008; for isolation by distance and centre/edge phenomena see for example: Atherly *et al*. 1999: 644, 672-673; Cavalli-Sforza *et al*. 1994: 15-16, 21, 28, 52-54; Dorit *et al*. 1991: 175; Knußmann 1996: 264, 405-406; Lewontin 1982: 114-115; Mayr 1963: 361-366, 386-393, 510; Vogel/Angermann 1995: 504-507; Wolpoff/Caspari 1996: 257-264, 283, 289-292).

The initially virtually empty expanse with its rather uniform environment and new subsistence strategies evidently made a fairly quick recolonisation of the Sahara possible. The retreating desert most likely drew people from all along its southern fringe into the new Southern Saharan habitats. The groups of hunter-gatherers who exploited aquatic resources and used pottery as well as grinding stones must have grown especially fast. Their success seems to have enabled them to replace, absorb or acculturate other early Saharan foragers. Many of these pottery-using hunter-gatherer-fishers appear to have entered the Sahara from or via the eastern parts of its southern fringe and various stretches of the Nile Valley (e.g. Brooks/Smith 1987; Garcea 2006; Haaland 1992, 1995, 2009; Henke/Rothe 1998: 232; Kuper/Kröpelin 2006; MacDonald 1998; Ozainne *et al*. 2009; Sutton 1974; Turchin *et al*. 2006). These expansions into the Early Holocene Sahara apparently led to the formation of a fairly homogeneous population complex, the Saharo-Nilotic population complex. Not only the results of the inter-sample comparisons but also the results of certain earlier evaluations of other relevant human skeletal material indicate that this fairly homogeneous Saharo-Nilotic population complex did actually exist. In her landmark study of Early and Middle Holocene Saharan remains, Chamla (1968: 81-82, 90-96) stressed that the robust specimens of the first and, by far, largest group she recognised display features highly reminiscent of those characteristic of Sudanese Early Khartoum material (see I.D.1.a.2.c.). The skeletons in this robust sub-group were found all over the Sahara. El Guettara 2, Tamanrasset II, Tamaya Mellet 24.128 and Homme du Tchad 24.385, for instance, were discovered in Mali, Algeria, Niger and Chad respectively. Since the trait expressions Chamla (1968: 81-83) used to distinguish between robust and gracile representatives of her first group have little or no value as population markers, it appears highly likely that both the gracile and robust individuals of this group belonged to the same population complex (see V.B.3.a.). Furthermore, the specimens in Chamla's (1968: 82) second group, for example Oued Inamoulay 1 and Yao 1, would perhaps be better placed in her first group for similar reasons. Pointing out the same similarities as Chamla (1968), Rightmire (1984: 194-195) also drew attention to the resemblance between Early Khartoum remains and prehistoric material from Northern Kenya, such as that from Lothagam. Irish/Turner (1990) found that the dental epigenetic traits of the Late Pleistocene material from Jebel Sahaba were extraordinarily similar to those of a modern Ashanti sample from Ghana. In view of this finding, Irish/Turner (1990: 50) referred to Chamla's (1968) discussion of Saharo-Nilotic affinities and hypothesised that a trans-Saharan connection could be the underlying cause of this similarity. Finally, the mandibles (*Mandibulae*) of Dutour's (1989) Hassi el Abiod, Chamla's (1968) Early and Middle Holocene Saharan, Anderson's (1968) Jebel Sahaba and Greene/Armelagos's (1972) Wadi Halfa sample were identified as biologically sub-Saharan and formed a cluster in Pinhasi's (2002: 311-312, 328) multivariate statistical analysis of the dimensions of a large number of African and Levantine Middle Pleistocene to recent specimens (see I.D.1.a.3.c. and V.B.3.a.).

Relying on aquatic resources, grinding stones and pottery, some of the hunter-gatherers who recolonised the Sahara apparently outcompeted other early Saharans. Their descendants who later adopted and intensified animal husbandry obviously went on to outcompete those who chose to stay "delayed-return" foragers. Using livestock to exploit the abundant grasses in the increasingly drier

Sahara more effectively, the Saharan herder-gatherer populations must have been able to increase their growth rates considerably. It is highly likely that this new subsistence strategy was decidedly better suited for the Saharan grasslands than the Sudanese Nile Valley. It can therefore be assumed that the new herding and gathering economy induced more substantial population growth in the Sahara. Ultimately, this more substantial Saharan population growth probably led to a secondary expansion of the Saharo-Nilotic population complex, this time out of its by then long established Saharan core. Presumably, the Leiterband herder-gatherers reached the Wadi Howar in the context of this secondary expansion of the Saharo-Nilotic population complex. This scenario would also be consistent with a western origin of the Wadi Howar's Leiterband groups (for the interdependence of subsistence strategies and population growth rates see for example: Bentley *et al*. 1993; Bentley *et al*. 2001; Blurton Jones *et al*. 1992; Blurton Jones *et al*. 1996; Bocquet-Appel/Naji 2006; Kremer 1993; Landers 1992; Leslie *et al*. 1999(a); Leslie *et al*. 1999(b); Marlowe 2005; Mulder 1992; O'Connell 2006; Pennington 1996, 2001; Roth 1993; Testart 1982; Walker *et al*. 2006; Watson *et al*. 1996; Watson *et al*. 1997; for the spread of Saharan pastoralism see for example: Clutton-Brock 2000; Di Lernia 2006; Finucane *et al*. 2008(b); Hanotte *et al*. 2002; Hassan 2000; Honegger/Dubosson 2011; Jesse *et al*. 2007; Keding 2009; Le Quellec 2006: 176-177, 180; MacDonald 2000; Marshall/Hildebrand 2002; Sadig 2009; Smith 1992; Wendorf *et al*. 1984; Wendorf/Schild 1998, 2003).

Table 35: Classifications of the mean individual of the Malian Sahara sample (see Appendix XXV.A.2.a.2.b.2.).

	Malian Sahara mean individual
Prehistoric series - Metric data	***Jebel Sahaba/Tushka*** *100.0% (D^2: 1.980), A-Group (D^2: 12.873)*
Prehistoric series - Scaled metric data	***A-Group*** *100.0% (D^2: 1.801), Jebel Sahaba/Tushka (D^2: 18.705)*
Prehistoric series - Non-metric data	***Wadi Howar*** *100.0% (D^2: 3.017), A-Group (D^2: 56.966)*
Modern series - Metric data	***Southern Sudan*** *98.1% (D^2: 6.915), Chad (D^2: 12.599)*
Modern series - Scaled metric data	***Chad*** *97.2% (D^2: 1.834), Southern Sudan (D^2: 12.630)*
Modern series - Non-metric data	***Somalis*** *98.1% (D^2: 8.588), Southern Sudan (D^2: 22.567)*

Bold: classification; normal: classification accuracy; in brackets: squared Mahalanobis distance to nearest centroid; fine: second closest centroid; fine and in brackets: squared Mahalanobis distance to second closest centroid

That the A-Group mean individual was classified as a member of the Malian Sahara sample and the Malian Sahara mean individual was classified as a member of the A-Group sample was startling (see IV.D.). This fact could, however, have been down to methodological problems. Especially the Malian Sahara mean individual's erratic classification pattern made this seem likely (see Table 35). Entering only one individual, in these two cases mean individuals, into a set of discriminant function analyses could have caused distortions (see V.B.3.b.4.b.1. and V.B.3.b.4.c.). That no attempts were made to optimise the classification accuracies manually might have exacerbated these problems (see III.B.2.d.3. and V.B.3.b.4.c.). Still, it is noteworthy that the modern comparative specimens to whom the Malian Sahara mean individual was most similar were members of the Southern Sudan sample, not the West African Mandinka sample. In any case, it is clear that the Early and Middle Holocene inhabitants of the Malian Sahara cannot be described as Saharan "Mechtoids", regardless of the results of the analyses of the mean individual of the Malian Sahara sample. Their morphology speaks for itself. Except for, perhaps, a few specimens, the members of the Malian Sahara sample were obviously biologically sub-Saharan Saharo-Nilotes (see IV.D., V.A.2., V.B.3.a. and above). Moreover, not only the morphology of the Early and Middle Holocene inhabitants of the Malian Sahara but also the skeletal evidence indicative of a Middle and Late Holocene influx of partly or wholly biologically

North African groups into the more southerly parts of the Central Sahara can be used in support of the offered interpretations (see I.D.1.a.2.c.).

It has been repeatedly highlighted that the currently known Late Pleistocene Nubians were biologically sub-Saharan (see I.D.1.a.3.c., V.B.3.a. and above). As could therefore be expected, the Jebel Sahaba/Tushka mean individual was assigned to the Southern Sudanese comparative sample (see IV.D.). That the A-Group mean individual was classified as a member of the Somali comparative sample could be anticipated as well (see IV.D.). After all, the Somali sample was drawn from a population whose members often exhibit biologically non-sub-Saharan characteristics and the similarities between the bearers of the A-Group culture and their Upper Egyptian contemporaries have been pointed out by various researchers (see I.D.1.a.3.c., II.B.2.d. and below). The discriminant function analyses into which the mean individual of the "Sudanese Hotchpotch" sample was entered as an ungrouped case showed that this mean individual was most similar to the specimens in the A-Group and the Somali comparative sample (see IV.D.). This resemblance between the "Sudanese Hotchpotch" and the A-Group mean individual strongly suggested that most of the remains which were processed to compile the "Sudanese Hotchpotch" sample had already been affected by gene flow from partly or wholly biologically North African groups (see I.D.1.a.3.c., I.D.1.c.1.b., I.D.1.c.2.b., V.A.2. and V.C.4.a.). This was obviously the reason why there were no stronger affinities between the Wadi Howar and the "Sudanese Hotchpotch" sample (see IV.D.). Both these results and the proposed theory are corroborated by the conclusions the vast majority of the researchers who have studied relevant samples have drawn. The models these authors have presented also explain the prehistoric changes and continuities in the Sudanese Nile Valley in connection with Neolithic or later gene flow and migrations in the north, on the one hand, and persistence of older, biologically fully sub-Saharan populations in the south, on the other hand (see I.D.1.a.3.c.). Only one model is in total disagreement with the assumed scenario. It posits that the diachronic changes in the Nubian Nile Valley were the result of *in situ* evolution caused by changing selection pressures (see I.D.1.a.3.b. and c.). The evidence of gracilisation in the Nubian Nile Valley is indisputable (see I.D.1.a.3.b.). In fact, most of the differences between the Jebel Sahaba/Tushka, Wadi Howar and Southern Sudan sample are, in all probability, due to gracilisation (see I.C.4.a.2., V.C.1.j. and V.C.3.b.1.). Nevertheless, this *in situ* evolution model is simply not compatible with all pertinent facts. This shortcoming has also been emphasised by various other researchers (see I.D.1.a.3.b.). For instance, it is clear that neither the frequencies of the expressions of traits like *Sella nasi* shape, interorbital projection, *Processus frontales maxillae* orientation, relative nasal breadth, *Margo infranasalis* type and degree of alveolar prognathism nor the frequencies of the expressions of dental epigenetic traits could have been seriously affected by craniodental reduction (see V.B.2.e., V.B.3.a. and V.B.3.b.4.b.3.). The Jebel Sahaba/Tushka and the A-Group material do, however, exhibit substantial differences in the frequencies of the expressions of such traits which are relevant to the estimation of biological ancestry (see IV.D., Appendix XXIV.B. and XXIV.C.2.). Hence, it can be ruled out that the bearers of the A-Group culture were primarily and directly descended from Late Pleistocene Nubians (see I.D.1.a.3.c.). Other differences between prehistoric populations of the Sudanese Nile Valley, which were unquestionably not the result of gracilisation either, are not as pronounced as the ones between Late Pleistocene and Neolithic Nubian samples. Yet, that they can still be clearly detected leaves little doubt that gene flow and migrations played an important role in the population history of the Sudanese Nile Valley (see I.D.1.a.3.c., I.D.1.c.1.b. and I.D.1.c.2.b.).

The developed scenario is fully supported by the results of the relevant DNA analyses focusing on the populations of the Nile Valley and Sudan (see I.D.1.c.1.b. and I.D.1.c.2.b.). Both the revealed clinal variation along the Nile and the distinctiveness of the biologically sub-Saharan, Nilo-Saharan-speaking Southern Sudanese groups are in total agreement with the offered interpretations. Conversely, some conclusions which have been drawn from analyses of genetic data from the Chad Basin cannot be reconciled with the interpretations of the results of this study (see I.D.1.c.2.a.). The genetic data from the Chad Basin themselves, however, do seem to corroborate the proposed theory. Firstly, the most salient Chad Basin mtDNA clades, L3f3 and L3e5, appear to have been shaped by demographic expansions (see I.D.1.c.2.a. and Černý *et al*. 2007; Černý *et al*. 2009). There seem to have been two main expansion events. Although they have been differently dated, the dates which have been assigned to these two expansion events are compatible with the recolonisation of the Sahara and a later expansion in connection with the spread of specialised Saharan herder-gatherers. This evidence thus lends support to the offered interpretations. Secondly, that 92.4% of the Chad Basin's mtDNA variation is encountered within populations and only 3.4% can be attributed to linguistic affiliations is suggestive of a population history dominated by ethnic fluidity (see I.D.1.c.2.a. and Černý *et al*. 2007; Černý *et al*. 2009). Expansions and ethnic fluidity, mainly due to absorptions, are an integral part of the developed scenario. Thirdly, the likely East African origin of L3f, from which L3f3 is descended, suggests that the majority of the Chad Basins inhabitants originally came from the east (e.g. Černý *et al*. 2007; Černý *et al*. 2009; Hájek *et al*. 2008). This could be indicative of a primarily eastern origin of the most successful recolonisers of the Sahara. Fourthly, that a multidimensional scaling analysis based on F_{ST} distances between HVS-I sequences placed the cluster of Chad Basin samples closer to groups from Ethiopia and Somalia than to populations from North Africa is hardly surprising (see I.D.1.c.2.a. and Černý *et al*. 2009). Contrary to Černý *et al*.'s (2009) interpretation, this situation does certainly not provide support for Blench's (1999) "Inter-Saharan Hypothesis" (see I.D.2.a.3.). Moreover, unlike Blench's (1999) "Inter-Saharan Hypothesis", Černý *et al*.'s (2009) results are entirely consistent with the suggested origin of the Wadi Howar's Leiterband groups. Černý *et al*.'s (2009) biologically sub-Saharan Chad Basin samples were predictably closer to partly or wholly biologically sub-Saharan Ethiopian and Somali groups than they were to biologically North African populations from North Africa. The gene flow from Nilo-Saharan-speaking inhabitants of the Chad Basin, Southern Sudan and Ethiopia provides another obvious link between populations from Ethiopia and the Chad Basin. Chadian and Southern Sudanese as well as Southern Sudanese and Ethiopian groups have interacted time and time again: as a result of prehistoric or historical migrations, in raids and wars, inside various historical states and in the context of long-standing trade networks. The Nilo-Saharan-speaking Kanembu, Kanuri and Songhai, for instance, were also part of Černý *et al*.'s (2009) Chad Basin cluster. Furthermore, the speakers of Nilo-Saharan languages who live in Ethiopia migrated there from Sudan. As could thus be expected, the comparative Ethiopian Oromo sample which Hassan *et al*. (2008) used in their study of the Y chromosomes of 445 males from 15 Sudanese populations was placed inside the distinct cluster of Nilo-Saharan-speaking Southern Sudanese populations (see I.D.1.c.2.b.). The comparative Ethiopian Amhara sample they also employed was positioned in between the Southern Sudanese cluster and the cluster formed by partly or wholly biologically non-sub-Saharan Sudanese groups. It therefore appears much more probable that the results of Černý *et al*.'s (2009) multidimensional scaling analysis reflect general differences between biologically sub-Saharan and biologically North African populations, on the one hand, and gene flow from speakers of Nilo-Saharan languages, on the other hand. Consequently, it seems that, if these results are indicative of migrations, they are indicative of migrations of speakers of Nilo-Saharan languages, not of Blench's (1999) proposed proto-Chadic-speaking Nile Cushites (for relevant genetic studies involving North African populations see for example: Arredi *et al*. 2004; Bosch *et al*. 2001; Cruciani *et al*. 2004; Cruciani *et al*. 2007; Flores *et al*. 2001; González *et al*. 2003; Lefevre-Witier *et al*. 2006; Lucotte *et al*. 2000; Luis *et al*. 2004; Rando *et al*. 1998; for relevant genetic studies involving Ethiopian and Somali populations see for example: Arredi *et al*. 2004; Cruciani *et al*. 2004; Cruciani *et al*. 2007; Olivieri *et al*. 2006; Passarino *et al*. 1998; Poloni *et al*. 2009; Sanchez *et al*. 2005; Semino *et al*. 2002; Tartaglia *et al*. 1996; Underhill *et al*. 2000; for the origin of Nilo-Saharan-speaking groups in Ethiopia and contacts between Chadian, Southern Sudanese and Ethiopian groups see I.D.1.c.2.b., I.D.2.a.1., 3., I.D.2.c.1., 3., I.D.2.d.1., 5., 6. and for example: Hassan 1968, 1973; Hassan *et al*. 2008: 319; Levine 2000; Passarino *et al*. 1998: 423).

V.C.4.b.2. Archaeological context

The use of Wavy Line pottery, grinding stones and aquatic resources was an Early and Middle Holocene pan-Saharan phenomenon. Of course, there were regional sub-traditions and specific local ecological adaptations. Nonetheless, given the far-flung distribution and long-term persistence of these three cultural traits, their relative uniformity is remarkable. The core of the geographic distribution of these cultural traits, roughly between the 12th and 25th parallel from the Nile Valley in the east to Central Mali in the west, is identical to the area the proposed Saharo-Nilotic population complex must have primarily occupied. Moreover, the appearance and spread of these cultural traits could easily be interpreted in the context of the recolonisation of the Sahara by the different groups of "delayed-return" foragers who, as the developed theory assumes, went on to form the Saharo-Nilotic population complex (see I.C.3.a.1. and for example: Arkell 1962; Braunstein-Silvestre 1980; Camps 1974; Clark 1980; Edwards 2004: 26, 33; Haaland 1992, 1995, 2009: 217-221; Hays 1974; Jesse 2003(b): 283-290, 2004(a); Kuper 1978; MacDonald 1998: 33-34, 42-43; McIntosh 1993; Mohammed-Ali/Khabir 2003; Ozainne *et al*. 2009; Sutton 1974). The pre-Leiterband sub-sample's retention of certain eastern affinities within a larger Saharan context is mirrored by archaeological findings (see IV.D.). Jesse (2003(b): 283, 289, 2004(a): 302-305) pointed out that the Wadi Howar's Wavy Line pottery belonged to an eastern sub-tradition. The distribution of Laqiya pottery is limited to the Wadi Howar and areas north and south of it as well. Abu Tabari 02/1, finally, was the first Sudanese site outside the Nile Valley at which caliciform beakers were discovered (see I.C.3.a.1., I.C.3.b.1. and for example: Hoelzmann *et al*. 2001: 206-210; Jesse 2003(b): 289, 2004(a): 300, 302-305, 2004(c): 101-102; Jesse *et al*. 2004: 123, 151-152; Keding 2009: 294-295).

The geographic distributions of Saharan pottery decorations and artefacts immediately before and during the period when the Wadi Howar was inhabited by Leiterband/Herringbone herder-gatherers are worth examining. Although this was undoubtedly a period of marked regionalisation, widespread

Saharan traditions were still common (e.g. Edwards 2004; Ehret 2002; MacDonald 1998; Phillipson 2005; Smith 1980). For instance, nine of the 13 most distinctive pottery decorations encountered at the Wadi Howar site Djabarona 84/13 either have a true pan-Saharan distribution or occur in several Saharan regions and the Nile Valley (Keding 1997(a): 147-166). Whereas Incised Herringbone decorations appear to be a rather more regional development, Leiterband pottery has been found in a large area which includes the Wadi Howar, the Jebel Tageru, the Erg Ennedi, the Borkou Plateau and the Ennedi Mountains. In addition, sites in Niger and Mali have yielded ceramics highly reminiscent of Leiterband pottery (see I.C.3.a.2. and Keding 1997(a): 156, 158, 160-163). Although Darfur axes, typical Leiterband/Herringbone phase artefacts, have not been documented in the Nile Valley, specimens are known from sites in, for example, the Laqiya region, the Nukheila area, the Wadi Howar, Darfur, the Tibesti Mountains, the Ennedi Mountains, the Borkou region, the Ténéré Basin, the Aïr Mountains, Mali, Nigeria, Cameroon and the Central African Republic (see I.C.3.a.2. and for example: Jesse *et al.* 2004: 153; Keding 1997(a): 191-195). Evidence like this, indicative of continued Middle Holocene far-flung Saharan interactions, provides support for the assumption that gene flow must have maintained the integrity of the chain of populations which formed the proposed Saharo-Nilotic population complex.

It can be argued that, if they are put into perspective, the pertinent data produced by archaeological activities in the Sahara do corroborate the thesis that the prehistoric Sahara was inhabited by a population of considerable size. Contrary to popular belief, a large amount of Saharan human skeletal material has actually already been excavated (see I.D.1.a.1.a. and I.D.1.a.2.a.). It should not be forgotten that the Sahara is a vast area which has attracted comparatively little archaeological interest. This fact is therefore particularly noteworthy. In sharp contrast to this, countless teams of archaeologists have combed the narrow Sudanese Nile Valley for decades. The relative wealth of skeletal material from the Sudanese Nile Valley must therefore not be overinterpreted (see I.D.1.a.3.a.).

	All sites	**Small sites**	**Medium/large sites**	**Very large sites**
Ennedi Erg	336:1569, 21%	23%	67%	10%
Middle Wadi Howar	870:1569, 55%	28%	65%	7%
Lower Wadi Howar	100:1569, 6%	7%	28%	66%
Jebel Tageru	263:1569, 17%	41%	40%	19%

(a)

	All sites	**Small sites**	**Medium/large sites**	**Very large sites**
Wavy Line/Laqiya phase	173:1310, 13%	8%	61%	31%
Leiterband/Herringbone phase	504:1310, 39%	15%	68%	17%
Handessi phase	633:1310, 48%	22%	66%	12%

(b)

Figure 112: Overview of the greater Wadi Howar region sites discovered by ACACIA teams until the year 2000. Site and site size frequencies by area (Keding 2009: 301, 319) (a) and site and site size frequencies by occupation phase (Keding 2009: 302, 319) (b). Site size categories: small (≤ 100 m^2), medium (101-1000 m^2), large (1001-10 000 m^2), very large (≥ 10 001 m^2) (Keding 2009: 318). By 2006, the number of sites discovered in the Lower Wadi Howar had risen to 440. Two thirds of these 440 sites are larger than 10 000 m^2. Some exceed 500 000 m^2 (Jesse 2008(a): 54-55).

Similarly, if it is put into perspective, the relevant evidence from the Wadi Howar appears to be indicative of large population sizes. There are many tumuli in the Wadi Howar region. Far more importantly, however, the prehistoric inhabitants of the Wadi Howar evidently mainly interred their dead at the sites they occupied and there are numerous large or very large prehistoric occupation sites in the Wadi Howar region. Unfortunately, the *B.O.S.* and ACACIA surveys could only record burials at occupation sites if human remains had been exposed by wind erosion. Moreover, no site in the Wadi Howar has ever been systematically excavated in its entirety. The comparatively small number of excavated graves and sites where graves have been observed can thus not be used as a yardstick in this context (see I.C.2., I.C.3.b., I.C.3.b.1., 2., 3., V.C.1.a. and Jesse/Keding 2002). For example, Abu Tabari 02/1 and 02/28, the two occupation sites at which most of the members of the Wadi Howar sample were excavated, would unquestionably easily yield a three-figure number of skeletons each (see I.C.3.b.1. and 2.). Unlike other sites, Abu Tabari 02/1 and 02/28 were visited with the intention to recover human skeletons. Still, due the logistical and time constraints in the field, even there human skeletal remains could only be excavated on purpose if parts of bones had become visible on the surface. This was primarily the case close to the edges of the elevated sites where the effects of wind erosion were more pronounced. Abu Tabari 02/1 and 02/28 are very large sites and there is no reason to believe that their edges are characterised by higher grave densities than their centres. Consequently, it is certainly not unreasonable to expect a three-figure number of burials at each one of the two sites. Taking all these considerations into account, it also makes sense to assume that graves can be anticipated at many of the large and most of the very large greater Wadi Howar region sites. The size of 1383 of the 1569 sites which had been discovered in the Wadi Howar region until the year 2000 was recorded. 364, i.e. 26.32%, and 184, i.e. 13.30%, of these 1383 sites are large and very large respectively. These numbers speak for themselves (see Figure 112 and Jesse 2008(a): 54-55; Keding 2009: 301, 319).

Of the 1310 greater Wadi Howar region sites which could be classified until the year 2000, 173 are Wavy Line/Laqiya phase and 504 Leiterband/Herringbone phase sites (see Figure 112). It goes without saying that this almost threefold increase is in part the result of the effect of taphonomic and subsistence strategy-specific factors. Nevertheless, it can undoubtedly also be attributed to Leiterband/Herringbone phase population growth (Keding 2009: 308-310, 329). This is in full agreement with the developed theory. These numbers probably reflect the continuation of the growth of Saharan herder-gatherer groups which caused the second expansion of the Saharo-Nilotic population complex, the expansion which most likely brought the specialised Leiterband pastoralists to the Wadi Howar.

That the results of the inter-sample comparisons suggested that the Wadi Howar's Leiterband herder-gatherers came from the west could, perhaps, have been predicted (see IV.D.). The characteristics the material culture of the Wadi Howar's prehistoric inhabitants, especially that of the Leiterband/Herringbone phase pastoralists, and the cultures of the Sudanese Nile Valley have in common have received a lot of attention (e.g. Blench 1999; Edwards 2004: 66; Jesse 2004(c): 102-105, 2006(a): 49, 2006(b): 999-1000, 2008(a): 67-70; Jesse/Keding 2002: 280-281; Jesse *et al*. 2004: 156-158; Keding 1997(a): 178, 184, 190, 1998; 2000; 2009: 296, 298-299, 306, 360, 363, 366-367; Keding/Vogelsang 2001: 268-270; MacDonald 1998: 41). This Nile Valley-centrism can, however, be misleading. The Leiterband/Herringbone phase herder-gatherers' material culture was undoubtedly first and foremost an independent, regional Eastern Saharan development with fairly strong western affinities (see I.C.3.a.2.). For example, Keding (1997(a)) emphasised two observations which are indicative of a link between the Wadi Howar's Leiterband pottery, in particular that of the site Djabarona 84/13, and the Nile Valley's Khartoum Shaheinab ceramics. Firstly, the motif element which most likely gave rise to Leiterband patterns, the so-called "wolf tooth" motif, is a typical feature of "Khartoum Neolithic" pottery (Keding 1997(a): 156). Secondly, especially Djabarona 84/13's earlier ceramics share several features with those of Khartoum Shaheinab assemblages (Keding 1997(a): 178). Yet, Keding (1997(a): 184) herself underlined that not even Djabarona 84/13's "Phase I" ceramics are identical to or can be considered a direct continuation of "Khartoum Neolithic" pottery. Not surprisingly, her comparison of the frequencies of pottery decoration motif elements recorded at Djabarona 84/13 and at selected Khartoum Shaheinab sites showed very pronounced differences (see Figure 113 and Keding 1997(a): 168-173). Additionally, the motif element which formed the basis upon which Leiterband patterns were probably developed has also been found at sites in Southern Algeria, Niger and Northern Chad. The oldest pottery bearing this motif element comes from Tagalagal in the Aïr Mountains, in Niger. The assemblage it is part of has been dated to ca. 7500 to 7200 BCE. The oldest Khartoum Shaheinab examples of this motif element are at least 2700 years younger (Keding 1997(a): 152-153, 156-157, 184). It also bears repeating that Leiterband pottery itself is unknown in the Nile Valley and its geographic distribution shows clear western tendencies (see I.C.3.a.2.). The ceramics which appear to be the oldest examples of Leiterband pottery have been discovered west of the Wadi Howar, in the Borkou region in Chad (see I.C.3.a.2. and Keding 1997(a): 156-157, 160-163). Furthermore, the similarities between the Leiterband/Heringbone phase and "Khartoum Neolithic" artefacts are more or less limited to pottery. The stone tool inventories from the Wadi Howar, for instance, do not resemble those from the Nile Valley (see I.C.3.a.2. and for example: Edwards 2004: 66; Keding 1997(a): 173-174, 190-191, 2009: 364-365). Only the frequent occurrence of Incised Herringbone patterns in the Lower Wadi Howar and the occasional presence of caliciform beakers in the same region may be regarded as more concrete, but still not particularly strong, archaeological links between the Wadi Howar's Leiterband/Herringbone phase culture and its Nile Valley contemporaries (see I.C.3.a.2.).

	Djabarona 84/13	**Geili**	**Kadero (North)**	**Kadero (South)**	**Direiwa**	**Zakiab**
Motif element 2	3.3%	0.9%	1.4%	2.3%	1.4%	1.6%
Motif element 3	14.5%	16.2%	14.6%	13.0%	11.9%	18.4%
Motif element 4	5.5%	4.0%	2.1%	2.5%	5.5%	6.5%
Motif element 5, 6	2.0%	20.4%	21.4%	23.7%	23.6%	24.2%
Motif element 7, 8, 9	4.8%	-	-	-	-	-
Motif element 15	15.0%	-	-	-	-	-
Motif element 20	11.5%	1.6%	-	-	8.0%	3.6%
Motif element 21	12.3%	-	-	-	-	-

(a)

	Djabarona 84/13	**Geili**
Motif element 2	12.7%	1.9%
Motif element 3	20.4%	24.2%
Motif element 4	15.6%	3.4%
Motif element 5, 6	2.0%	21.7%
Motif element 7, 8, 9	25.0%	-
Motif element 18	2.2%	1.0%

(b)

Figure 113: Comparison of frequencies of typical motif elements at Djabarona 84/13 and selected "Khartoum Neolithic" sites (after Keding 1997(a): 169, 170). Rim zone motif elements (a) and wall zone motif elements (b). Motif elements 2 and 3 have been found all over the Sahara. Motif element 4 probably evolved into Leiterband motif elements. Motif elements 7, 8 and 9 are Leiterband motif elements (Keding 1997(a): 150-151, 154-156, 158-160).

The transition from the Wavy Line/Laqiya to the Leiterband/Herringbone phase seems to have been a gradual one which did not involve major discontinuities. Except for the obvious change, the adoption of a new subsistence strategy, virtually all changes appear to be regional developments based on previously established traditions (see I.C.3.a.2. and: Keding 1997(a): 187, 2009: 297, 360, 363-364, 379, 446-447). The transition from the Leiterband/Herringbone to the Handessi phase, on the other hand, was characterised by fairly pronounced discontinuities. The observed changes are suggestive of the arrival of new populations and the co-existence of different groups (see I.C.3.a.3. and for example: Edwards 2004: 109-110; Jesse 2004(b): 54-55, 2004(c): 105-106, 2006(b): 992-993, 999-1000; Jesse/Keding 2002: 281, 2007; Jesse *et al*. 2004: 156-158; Keding 2009: 299, 305, 324, 362, 369; Keding/Vogelsang 2001: 274-276). That the Wadi Howar's prehistoric material culture does not appear to have been much affected by the former transition lends support to the hypothesis that the bearers of the Leiterband culture were the descendants of the Wadi Howar's pre-Leiterband inhabitants (see Keding 2009: 297; Keding/Vogelsang 2001: 270). This situation is, however, equally compatible with the developed scenario in which Leiterband groups entered the Wadi Howar from the west and gradually absorbed large parts of its pre-Leiterband population. The archaeological conclusions about the latter transition are in agreement with what can be deduced from the scant relevant anthropological evidence (see I.D.1.a.1.c., IV.D. and V.C.4.a.).
From around 2000 BCE onwards, pastoralists of Saharan origin started to appear in various parts of the Sahel. It is commonly believed that these movements of Saharan herders were a response to the increasing aridification of the Sahara (e.g. Breunig 2004, 2005; Breunig/Neumann 2002: 146-147; Edwards 2004: 9-13; Haour 2003: 214-217; MacDonald 1998: 44, 52-57; Mayor *et al*. 2005; Ozainne *et al*. 2009). The gradual southward migration of Handessi groups is a particularly well-documented example of this Saharan exodus (see I.C.3.a.3. and for example: Jesse 2006(b); Jesse *et al*. 2004). This evidence does, of course, make scenarios, like the suggested one, in which the Wadi Howar's herder-gatherers eventually migrated south appear particularly convincing.

V.C.4.b.3. Linguistic context

The reconstructions of the early history of Nilo-Saharan and the geographic distribution of the extant Nilo-Saharan languages suggest that the recolonisation of the Sahara did indeed lead to the formation of a Saharo-Nilotic population complex. The pan-Saharan traces of Early Holocene pottery-using hunter-gatherer-fishers have been variously associated with the initial spread of Nilo-Saharan (see I.D.2.a.1.). Both the relevant findings of this study and the morphological affinities of the Early Holocene human skeletal remains from Saharan sites add credibility to this scenario (see I.D.1.a.2.c., IV.D., V.B.3.a. and V.C.4.b.1.).
The hypothesis that there was another, later Saharo-Nilotic expansion as well is corroborated by the internal structure of the Nilo-Saharan phylum. The diversity of those branches of Nilo-Saharan which yield linguistic evidence of an early adoption of animal husbandry is considerably greater than that of the other branches of the phylum (see I.D.2.a.1. and 2.). This diversification probably reflects an overall increase in population sizes. Furthermore, Ehret (2006(b)) drew attention to linguistic evidence which makes it seem likely that much of the evolution of Chadic was shaped by multiple episodes during which Chadic-speaking splinter groups were incorporated into larger pre-existing Nilo-Saharan

societies (see I.D.2.a.3.). This evidence is also indicative of an expansion of the Saharo-Nilotic population complex which postdates its original Early Holocene expansion.

It is difficult to reconcile the results of the discriminant function analyses which were performed to reveal the Wadi Howar sample's affinities with Blench's (1999) "Inter-Saharan Hypothesis" (see I.D.2.a.3.). The speakers of extant Cushitic languages belong to populations which are characterised by a mosaic of biologically sub-Saharan and more or less pronounced biologically North African trait expressions (see I.D.2.a.1. and V.C.4.b.1.). The ancient Nile Valley populations which are believed to have spoken Cushitic languages can also be described as, in this sense, biologically "mixed" groups (see I.D.1.a.3.c., I.D.2.c.1. and below). It thus stands to reason that the Cushitic ancestors of the proto-Chadic speakers who, according to Blench (1999), left the Nile Valley and migrated westward through the Wadi Howar were groups exhibiting both biologically North African and biologically sub-Saharan trait expressions. Blench (1999: 71-73) suggested that these Cushitic ancestors of the Chad Basin's proto-Chadic speakers were probably the Wadi Howar's Leiterband people. The Wadi Howar sample primarily consisted of Leiterband/Herringbone phase specimens (see Table 1 and III.B.2.c). Yet, not a single member of the clearly biologically sub-Saharan Wadi Howar sample was characterised by a combination of biologically Noth African and biologically sub-Saharan trait expressions. Additionally, the Leiterband sub-sample exhibited strong western rather than eastern affinities (see IV.D., V.C.1.h. and V.C.4.a.). Not only its incompatibility with the results of this study but also a number of other facts indicate that the "Inter-Saharan Hypothesis" is unlikely to be correct. Contrary to their interpretation, modern genetic data from the Chad Basin do not lend support to Blench's (1999) model (see I.D.1.c.2.a. and V.C.4.b.1.). The archaeological evidence of a connection between Leiterband and Khartoum Shaheinab pottery, which Blench (1999: 71-72) cited, is by no means unambiguous (see V.C.4.b.2.). There is ample linguistic evidence that various groups entered the Sudanese Nile Valley. Conversely, there is virtually no evidence that any prehistoric groups migrated into the Sahara from the Sudanese Nile Valley after the Early Holocene recolonisation of the Sahara (see I.D.2.a.1. and 3.). Most importantly, Blench's (1999) linguistic data are unconvincing. The examples of Afro-Asiatic livestock-related loanwords in Nilo-Saharan languages which he provided are not suggestive of a scenario in which the Wadi Howar's prehistoric Nilo-Saharan speakers borrowed these terms from Cushitic ancestors of the speakers of proto-Chadic. The proto-languages which gave rise to some of the Nilo-Saharan languages Blench employed, for instance Ik or Tepeth, have almost certainly not been spoken anywhere near the Wadi Howar during the relevant period (see I.D.2.a.1.). Some of the used livestock terms, such as "*donkey*" and "*pig*", are completely irrelevant. The inhabitants of the Wadi Howar kept neither donkeys nor pigs during the Leiterband/Herringbone phase (see I.C.3.a.2.). Finally, all of the presented livestock-related loanwords appear to be much better explained in the context of later contacts between Afro-Asiatic and Nilo-Saharan speakers.

Unlike the "Inter-Saharan Hypothesis", Ehret's (2006(b)) model of the origins of Chadic languages is compatible with the results of the inter-sample analyses (see I.D.2.a.3., IV.D. and V.C.4.a.). As pointed out above, it appears reasonable to interpret the fission-fusion process, for which Ehret (2006(a)) presented evidence, in connection with an expansion, most likely the secondary expansion of the Saharo-Nilotic population complex. According to Ehret's (2006(a)) model, smaller groups of Chadic speakers were repeatedly absorbed by larger Nilo-Saharan-speaking populations.

Consequently, Chadic speakers and their descendants would have soon been morphologically indistinguishable from Nilo-Saharan speakers. It is improbable that this fission-fusion process always led to language shifts. Therefore, various Nilo-Saharan-speaking populations of the Chad Basin must have also included descendants of Chadic speakers. Not least the fact that only 3.4% of the Chad Basin's mtDNA variation can be attributed to linguistic affiliations suggests that these are reasonable assumption (see I.D.1.c.2.a. and V.C.4.b.1.). It is thus certainly not inconceivable that Nilo-Saharan-speaking groups which included descendants of Chadic speakers and Chadic-speaking populations entered the Wadi Howar from the west. This is an especially interesting possibility because the Leiterband herder-gatherers appear to have originated west of the Wadi Howar as well. Moreover, a fission-fusion expansion is consistent with the proposed spread of the producers of Leiterband pottery. In this scenario, their expansion involved the absorption of large parts of the Wadi Howar's pre-Leiterband population.

That the modern comparative samples the Wadi Howar series was most similar to were from Southern Sudan and Chad is in complete agreement with both Rilly's (2004, 2010) theses and Dimmendaal's (2007(a), 2007(b)) "Wadi Howar Diaspora" model (see I.D.2.a.3.). In fact, no other imaginable result of the search for the Wadi Howar sample's modern affinities would have lent as much support to Rilly's and Dimmendaal's theories as this finding. It might also be worth stressing that this is not at odds with the developed scenario's compatibility with Ehret's (2006(a)) model of the origin of Chadic.

Various linguists believe that the prehistoric Sudanese Nile Valley also had Afro-Asiatic-speaking inhabitants (see I.D.2.a.1.). The relevant linguistic conclusions are in accord with both the results of relevant osteological studies and the offered interpretations of the population history of the Sudanese Nile Valley. As mentioned above, extant Cushitic languages are spoken by groups characterised by a mix of biologically sub-Saharan and biologically North African characteristics. Extant Berber languages are spoken by groups of biologically North African ancestry (see I.D.2.a.1., V.B.3.a. and V.C.4.b.1.). The members of the C-Group and Kerma's ancient inhabitants are assumed to have spoken a Berber and a Cushitic language respectively (see I.D.2.a.1.). As expected in view of the just described modern correlations, the skeletal remains of these two Nile Valley populations exhibit both biologically sub-Saharan and more or less pronounced biologically North African trait expressions. Both groups also appear to be, at least in part, descended from the partly or wholly biologically North African populations which appeared in the Northern Sudanese Nile Valley during the Neolithic (see I.D.1.a.3.c. and I.D.2.c.1.).

V.C.4.b.4. Rock art

Numerous human figures represented at Saharan rock art sites exhibit interpretable anatomical structures (see I.D.2.b.3.). The geographic and temporal distribution of those with biologically partly sub-Saharan and partly North African, biologically fully sub-Saharan and biologically fully North African features is compatible with the proposed theory. Pictures of evidently biologically sub-Saharan people have been discovered all over the southern parts and in many of the more northerly regions of the Sahara (I.D.2.b., I.D.2.b.1. and 3.). This geographic distribution suggests that the southern parts of the prehistoric Sahara were inhabited by a fairly homogeneous, biologically sub-Saharan population, presumably the Saharo-Nilotic population complex.

The relative ages of "Bubaline Style", "*têtes rondes*" and "Pastoral Period" rock art are potentially informative. It seems clear that the temporal distributions of these types of rock art overlap, at least partially in some regions. However, their overall relative ages remain controversial (see I.D.2.b.1., 2. and 3.). Conversely, most authors assign the same relative ages to the different schools of the "Pastoral Period". Although there is some regional variation, generally speaking, "Pastoral Period" depictions of people with a biologically sub-Saharan appearance predate "Pastoral Period" representations of people who can be identified as partly or wholly biologically North African (see I.D.2.b.3.). This succession is consistent with the pertinent anthropological findings and the offered interpretations (see I.D.1.a.2.c., V.B.3.a. and V.C.4.b.1.).
Many of the Wadi Howar's and Zolat el Hammad's petroglyphs are characterised by affinities with rock art from areas south of the Wadi Howar (see I.D.2.b.4.). Like the results of the inter-sample analyses, these similarities highlight the links between the prehistoric inhabitants of the Wadi Howar and both the prehistoric and modern people south of the wadi.

V.C.4.b.5. Historical context

The pertinent Ancient Egyptian and later artistic representations and written sources are fairly unambiguous (see I.D.2.c.1. and 2.). Nubia's population was undoubtedly biologically heterogeneous. The region was apparently inhabited by a number of different groups. The members of these groups evidently exhibited physical traits ranging from decidedly to only faintly biologically sub-Saharan. Thus, migrations and gene flow must have played an important role in the population history of the Northern Sudanese Nile Valley. The same sources leave little doubt that the vast majority of the Nubians' southern and western neighbours were biologically sub-Saharan. Both conclusions are in perfect agreement with the interpretation of the results of the search for the Wadi Howar sample's metric and non-metric affinities.
The reports referring to group interactions paint an unequivocal picture. Ancient Egyptian texts confirm that groups from the desert repeatedly attempted to enter the Nile Valley (see I.D.2.c.1.). Interestingly, there are, however, apparently no Ancient Egyptian reports of groups leaving the Nile Valley in order to live in the Sahara (see I.D.2.c.3.). Just like the interactions between most nomadic or semi-nomadic pastoralists and later states in other relevant parts of Africa, the relations between the peoples of the Nile Valley and the inhabitants of the areas west of it appear to have been dominated by raids and wars during the period which Ancient Egyptian and later historical sources illuminate (see I.D.2.c.1., 2. and 3.). In view of these findings, it can probably be assumed that hostilities also characterised most of the prehistoric interactions between the populations of the Nile Valley and the Eastern Sahara. Relations more or less limited to unfriendly contacts would certainly explain the relative lack of similarities between the Wadi Howar sample, particularly the Leiterband sub-sample, and the selected Holocene comparative material from the Nile Valley.

V.C.4.b.6. Ethnographic context

The suggested theory assumes specific migration, expansion and integration patterns. Patterns of this kind could still be observed in the Eastern Sahel, Southern Sudan and East Africa in the 19th and early 20th century (see I.D.2.d.5. and 6.). Chains of populations spread out over thousands of kilometres, like the proposed Saharo-Nilotic population complex, still exist in modern-day Africa. Far-flung Sahelian groups like the Hausa, Fulbe and Baggara are well-known examples (see I.D.2.a.1., I.D.2.b.3., I.D.2.c.3., I.D.2.d.5. and 7.). There are various integration mechanisms which ensure that groups can exchange members and that population complexes stay reasonably homogeneous. Groups of Southern African foragers, for instance, exchanged members through visiting networks or in the context of seasonal fission-fusion cycles (see I.D.2.d.5.). Elsewhere other mechanisms were more important. For example, larger tribes of Southern Sudanese mixed economy pastoralists usually assimilated smaller groups of hunter-gatherers and pastoralists when they expanded their territories (see I.D.2.d.5. and 6.). The developed scenario posits that comparable mechanisms played an important role during both the recolonisation of the Sahara by the early members of the Saharo-Nilotic population complex and the formation of the herder-gatherer population of the Leiterband/Herringbone phase. Various Southern Sudanese groups, such as the Nuer, Atwot and certain Dinka groups, embarked on large-scale migrations or conquests (see I.D.2.d.6.). The Leiterband herder-gatherers were in all probability involved in similar undertakings.

The interpretation of the Wadi Howar sample's strong affinities with the Southern Sudanese and Chadian comparative material is corroborated by the oral history of certain Southern Sudanese tribes (see I.D.2.d.6.). The history of the Nuer is especially interesting. The Nuer reportedly left their original homeland somewhere northwest of the Bahr el Ghazal in response to its aridification. After they had reached the region west of the White Nile which the Nuer now consider their homeland, they went on to conquer a vast area east of this river.

Finally, there are obvious cultural similarities between the different prehistoric groups of the Wadi Howar and certain modern tribes. These similarities are fully consistent with the results of the inter-sample comparisons. Although there is not much information on these two groups, the Southern Sudanese Moñ Thañ and Yari are likely to have or have had lifestyles comparable to that of the Wavy Line/Laqiya hunter-gatherer-fishers. The Moñ Thañ apparently still mainly rely on exploiting riverine resources and the Yari lived as forest-dwelling hunter-gatherers until fairly recently (see I.C.3.a.1., I.D.2.d.1. and 5.). The information on other groups is more conclusive. The subsistence strategies, activity patterns, social practices and settlements of the Southern Sudanese Nuer, Dinka and Shilluk and the Chad Basin's Buduma are stunningly similar to those of the people of the Wadi Howar's early Leiterband/Herringbone period (see I.C.3.a.2., I.C.3.b.1., I.D.2.d.1., 2., 7. and 8.). The culture of the Tubu and Beri has much in common with that of the Handessi phase pastoralists (see I.C.3.a.3., I.D.2.d.1., 2., 7. and 8.).

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VII. Appendix

Appendix I. Comparative material

Appendix I.A. Prehistoric samples

Appendix I.A.1. Jebel Sahaba/Tushka

Series/Site	**Individual**	**Sex**	**Age**
Jebel Sahaba	117-2	male	*Iuvenis*
Jebel Sahaba	117-4	female	*Adultus-Maturus*
Jebel Sahaba	117-8*	(female)	*Adultus-Maturus*
Jebel Sahaba	117-10*	male	*Adultus*
Jebel Sahaba	117-15*	female	*Adultus*
Jebel Sahaba	117-16*	female	*Adultus-Maturus*
Jebel Sahaba	117-17*	male	*Adultus*
Jebel Sahaba	117-18*	male	*Maturus*
Jebel Sahaba	117-19*	male	*Adultus-Maturus*
Jebel Sahaba	117-20*	(male)	*Adultus*
Jebel Sahaba	117-21	(male)	*Adultus-Maturus*
Jebel Sahaba	117-22*	female	*Adultus*
Jebel Sahaba	117-25*	male	*Maturus*
Jebel Sahaba	117-28*	female	*Adultus*
Jebel Sahaba	117-33*	female	*Adultus*
Jebel Sahaba	117-42*	male	*Adultus*
Jebel Sahaba	117-102*	female	*Adultus*
Jebel Sahaba	117-106*	male	*Iuvenis*
Tushka	8905-2	female	*Iuvenis-Adultus*
Tushka	8905-7	female	*Adultus*
Tushka	8905-8	male	*Adultus*

* including postcranial data set

Appendix I.A.2. A-Group

Series/Site	**Individual**	**Sex**	**Age**
A-Group	25/22a	male	*Maturus*
A-Group	25/106	female	*Maturus*
A-Group	25/106	male	*Maturus*
A-Group	90/6:4	indeterminate	*Adultus*
A-Group	95/2:2	male	*Adultus*
A-Group	95/34	male	indeterminate
A-Group	95/42a	female	*Adultus*
A-Group	230/11	indeterminate	*Iuvenis*
A-Group	277/34a	female	*Senilis*
A-Group	277/37c:II	female	*Adultus*
A-Group	277/47	male	*Adultus*
A-Group	277/49a	male	*Adultus*
A-Group	277/49b	male	*Adultus*
A-Group	277/63	male	*Adultus*
A-Group	277/65	indeterminate	*Adultus*
A-Group	308/10	female	*Adultus*
A-Group	308/17	female	*Adultus*
A-Group	401/2	female	*Adultus*
A-Group	401/14	female	*Maturus*
A-Group	401/43	male	*Maturus*
A-Group	401/49	male	*Maturus*

Appendix I.A.3. Malian Sahara

Series/Site	Individual	Sex	Age
Erg Ine Sakane	AZ56/H1	(male)	*Infans I*
Erg Ine Sakane	AZ56/H6	indeterminate	*Iuvenis-Adultus*
Erg Ine Sakane	AZ56/H8	female	*Adultus*
Erg Ine Sakane	AZ56/H9	indeterminate	*Adultus-Maturus*
Hassi el Abiod	AR7/H1	male	*(Adultus)-Maturus*
Hassi el Abiod	MK37/H1	indeterminate	*Adultus*
Hassi el Abiod	MN6/H1	male	*Adultus-Maturus*
Hassi el Abiod	MN10/H1	male	*Adultus*
Hassi el Abiod	MN10/H3	(male)	*Adultus*
Hassi el Abiod	MN10/H4	female	*Maturus*
Hassi el Abiod	MN10/H5	male	*Adultus-Maturus*
Hassi el Abiod	MN27/H2	male	*Adultus*
Hassi el Abiod	MN27/H3	female	*Iuvenis*
Hassi el Abiod	MN27/H9	(male)	*Maturus*
Hassi el Abiod	MN27/H10	indeterminate	*Iuvenis*
Hassi el Abiod	MN36/H10	male	*Adultus*
Kesert el Gani	MT32/H2	male	*Adultus-Maturus*
Kobadi	KBD89/H1	indeterminate	*Adultus*
Kobadi	KBD89/H3	female	*Adultus*
Kobadi	KBD89/H37	female	*Iuvenis-Adultus*
Kobadi	KBD89/H80	indeterminate	*Adultus-(Maturus)*
Kobadi	KBD89/H97	female	*Adultus*
Tagnout Chaggeret	MK42/H1	male	*Adultus-Maturus*

Appendix I.A.4. “Sudanese Hotchpotch”

Appendix I.A.4.a. Jebel Shaqadud

Appendix I.A.4.a.1. Jebel Shaqadud (material)

Series/Site	Individual	Sex	Age
Jebel Shaqadud	3	male	*Maturus*
Jebel Shaqadud	6	(female)	*Adultus-(Maturus)*
Jebel Shaqadud	61A	male	*Adultus*
Jebel Shaqadud	61B	(female)	adult or older
Jebel Shaqadud	61C	male	*Adultus*
Jebel Shaqadud	61D	female	*(Maturus)-(Senilis)*
Jebel Shaqadud	(Matrix)	(female)	*Adultus*

Appendix I.A.4.a.2. Jebel Shaqadud (publication and photos)

Series/Site	Individual	Sex	Age
Jebel Shaqadud	(LP1)	male	adult or older
Jebel Shaqadud	(LP2)	(female)	adult or older

Appendix I.A.4.b. El Kadada

Appendix I.A.4.b.1. El Kadada (material)

Series/Site	Individual	Sex	Age
El Kadada	(KD-P1)	(female)	*Adultus*
El Kadada	(KD-P2)	male	adult or older
El Kadada	(KD-P3)	(male)	*Adultus*
El Kadada	(KD-P4)	male	*Adultus*
El Kadada	(KD-P5)	indeterminate	adult or older

Appendix I.A.4.b.2. El Kadada (publication)

Series/Site	Individual	Sex	Age
El Kadada	KDD 22/3	(male)	*Infans II*
El Kadada	KDD 22/5	(female)	*Adultus*
El Kadada	KDD 22/7	indeterminate	indeterminate
El Kadada	KDD 22/9	(male)	*Infans I*
El Kadada	KDD 22/71	(male)	*Infans I*
El Kadada	KDD 75/3	female	*Adultus*

Appendix I.A.4.c. Saggai (publication)

Series/Site	**Individual**	**Sex**	**Age**
Saggai	S-1	female	*Adultus*
Saggai	S-5a	female	*Adultus*
Saggai	S-5b	female	*Adultus*
Saggai	S-7b	female	*Adultus*

Appendix I.B. Modern samples

Appendix I.B.1. Southern Sudan

Ethnic group/Area of origin	**Linguistic affiliation**	**Individual**	**Sex**	**Age**
Banda	Niger-Congo, Adamawa-Ubangi	17.567	(male)	*Adultus*
Banda	Niger-Congo, Adamawa-Ubangi	17.884	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-1	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-2	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-3	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-4	(male)	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-5	(male)	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-6	(male)	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-7	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-8	(male)	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-9	(male)	*Iuvenis-Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-10	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-11	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-12	male	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-13	(male)	*Adultus*
Darfur	Nilo-Saharan, Fur?	E.1026-14	(male)	*Adultus*
Dinka	Nilo-Saharan, Nilotic	9.992*	(female)	*Iuvenis-Adultus*
Kordofan	Niger-Congo, Kordofanian?	9.956	(male)	*Adultus-Maturus*
Kordofan	Niger-Congo, Kordofanian?	E.1028-10	male	*Adultus*
Masalit	Nilo-Saharan, Maban	18.515	male	*Adultus*
Masalit	Nilo-Saharan, Maban	18.516	(male)	adult or older
Shir (Mandari)	Nilo-Saharan, Nilotic	2.919	male	*Adultus*
Shir (Mandari)	Nilo-Saharan, Nilotic	2.920	(female)	*Adultus*
Shir (Mandari)	Nilo-Saharan, Nilotic	2.921	indeterminate	*Infans II*

* cast

Appendix I.B.2. Chad

Ethnic group/Area of origin	**Linguistic affiliation**	**Individual**	**Sex**	**Age**
Bornouan (Kanuri)	Nilo-Saharan, Saharan	18.801	male	*Adultus*
Buduma	Afro-Asiatic, Chadic	17.590	indeterminate	*Infans I*
Buduma	Afro-Asiatic, Chadic	17.591	(female)	*Adultus*
Buduma	Afro-Asiatic, Chadic	17.592	(male)	*Adultus-Maturus*
Buduma	Afro-Asiatic, Chadic	17.593	(male)	*Adultus*
Kanembu	Nilo-Saharan, Saharan	17.585	(male)	*Adultus*
Kanembu	Nilo-Saharan, Saharan	17.586	female	*Adultus*
Kanembu	Nilo-Saharan, Saharan	17.587	male	*Maturus*
Kuri	Afro-Asiatic, Chadic	17.588	male	*Adultus*
Kuri	Afro-Asiatic, Chadic	17.589	(female)	*Adultus*
Mundang	Niger-Congo, Adamawa-Ubangi	19.673	indeterminate	*Adultus*
Mundang	Niger-Congo, Adamawa-Ubangi	19.674	(male)	*Iuvenis*
Mundang	Niger-Congo, Adamawa-Ubangi	19.675	(male)	*Adultus*
Mundang	Niger-Congo, Adamawa-Ubangi	19.676	(male)	*Adultus*
Sara	Nilo-Saharan, Bongo-Bagirmi	23.586	indeterminate	*Adultus*
Tubu	Nilo-Saharan, Saharan	17.804	male	*Adultus*
Tubu	Nilo-Saharan, Saharan	18.636	(male)	*Adultus*
Tubu	Nilo-Saharan, Saharan	18.637	male	*Iuvenis*
Tubu	Nilo-Saharan, Saharan	18.808	(female)	*Adultus*
Tubu	Nilo-Saharan, Saharan	18.833	male	*Adultus*
Tubu	Nilo-Saharan, Saharan	18.834	male	*Senilis*
Tubu	Nilo-Saharan, Saharan	18.835	male	*Adultus*

Appendix I.B.3. Mandinka

Ethnic group/Area of origin	**Linguistic affiliation**	**Individual**	**Sex**	**Age**
Guinea	Niger-Congo, Mande	9.539	(female)	*Iuvenis*
Guinea	Niger-Congo, Mande	9.540	(female)	*Adultus*
Guinea	Niger-Congo, Mande	9.547	(male)	*Adultus*
(Senegal)	Niger-Congo, Mande	0.141-1	(male)	*Adultus*
(Senegal)	Niger-Congo, Mande	0.141-2	male	*Adultus*
(Senegal)	Niger-Congo, Mande	0.141-3	male	*Adultus*
(Senegal)	Niger-Congo, Mande	0.141-5	male	*Adultus*
(Senegal)	Niger-Congo, Mande	0.141-8	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-9	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-10	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-11	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-12	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-13	(male)	*Adultus*
Senegal	Niger-Congo, Mande	0.141-14	(male)	*Adultus*
Senegal	Niger-Congo, Mande	0.141-15	male	*Adultus-Maturus*
Senegal	Niger-Congo, Mande	0.141-16	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-17	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-18	male	*Adultus*
Senegal	Niger-Congo, Mande	0.141-19	male	*Adultus*
Senegal	Niger-Congo, Mande	0.142	male	*Adultus*
Senegal	Niger-Congo, Mande	3.804	male	*Adultus*
Senegal	Niger-Congo, Mande	22.947	male	*Adultus*

Appendix I.B.4. Somalis

Ethnic group/Area of origin	**Linguistic affiliation**	**Individual**	**Sex**	**Age**
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.1	male	*Adultus-Maturus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.2	male	*Adultus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.5	male	*Adultus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.6	female	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.9	female	*Maturus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.11	male	*Adultus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.12	male	*Adultus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.13	female	*Maturus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.17	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.22	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.27	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.30	female	*Adultus*
Somalia	Afro-Asiatic, Cushitic	Af.15.0.31	male	*Adultus-Maturus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.37	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.39	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.41	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.48	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.50	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.51	male	*Adultus*
(Somalia)	Afro-Asiatic, Cushitic	Af.15.0.58	male	early *Adultus*

Appendix I.B.5. Haya

Ethnic group/Area of origin	**Linguistic affiliation**	**Individual**	**Sex**	**Age**
Tanzania	Niger-Congo, Bantu	Af.23.0.17	male	*Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.18	male	*Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.19	male	*Adultus-Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.20	(female)	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.22	male	*Adultus-Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.23	male	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.25/129*	female	*Adultus-(Maturus)*
Tanzania	Niger-Congo, Bantu	Af.23.0.28	female	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.31	male	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.42	(female)	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.44	female	*Adultus-Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.47	female	adult or older
Tanzania	Niger-Congo, Bantu	Af.23.0.109	male	*Adultus-Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.112	female	*Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.113	male	*Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.117	female	*Adultus-(Maturus)*
Tanzania	Niger-Congo, Bantu	Af.23.0.118	male	*Adultus-(Maturus)*
Tanzania	Niger-Congo, Bantu	Af.23.0.126/199*	female	*Adultus/Maturus*
Tanzania	Niger-Congo, Bantu	Af.23.0.127/205*	female	*Adultus-Maturus/Adultus*
Tanzania	Niger-Congo, Bantu	Af.23.0.209/216*	female	*Maturus/Adultus-Maturus*

* *Calvarium* and mandible (*Mandibula*) taken from different individuals

Appendix II. Preservation lists

Appendix II.A. Full preservation list

Appendix II.A.1. Cranial measurements

CM001 - 1. Maximum cranial length
CM002 - 3. *Glabello-Lambda* length
CM003 - 8. Maximum cranial breadth
CM004 - 9. Least frontal breadth
CM005 - 10. Maximum frontal breadth
CM006 - 12. Biasterionic breadth
CM007 - 13a. Mastoid width (l)
CM008 - 13a. Mastoid width (r)
CM009 - *17. Basion-Bregma* height
CM010 - 19a. Mastoid height (l)
CM011 - 19a. Mastoid height (r)
CM012 - 23. Horizontal circumference
CM013 - 24. Transverse arc
CM014 - 25b. *Glabella-Inion* arc
CM015 - 26a. *Glabella-Bregma* arc
CM016 - 27. Parietal sagittal arc
CM017 - 28. Occipital sagittal arc
CM018 - 28(2). *Inion-Opisthion* arc
CM019 - 29d. *Glabella-Bregma* chord
CM020 - 30. *Bregma-Lambda* chord
CM021 - 31. *Lambda-Opisthion* chord
CM022 - 31(2). *Inion-Opisthion* chord
CM023 - 44. Bimalar breadth
CM024 - 45. Bizygomatic breadth
CM025 - 45(3). Mid-orbital chord
CM026 - 46. Bimaxillary breadth
CM027 - 48 Upper facial height
CM028 - 48(1). *Nasospinale-Prosthion* height
CM029 - 48(3). Minimum orbito-alveolar height
CM030 - *50(1). Interorbital breadth
CM031 - 51. Orbital breadth (l)
CM032 - 51. Orbital breadth (r)
CM033 - 52. Orbital height (l)
CM034 - 52. Orbital height (r)
CM035 - 54. Nasal breadth
CM036 - 55. Nasal height
CM037 - 55(1). Nasal aperture height
CM038 - 56. Length of the nasal bones
CM039 - 57. Simotic chord
CM040 - 60. Maxillo-alveolar length
CM041 - 61. External palate breadth
CM042 - *61a(1). Canine alveolar breadth (mx)
CM043 - *61a(1). Canine alveolar breadth (md)
CM044 - *61a(2). 1st premolar alveolar breadth (mx)
CM045 - *61a(2). 1st premolar alveolar breadth (md)
CM046 - *61a(3). 2nd premolar alveolar breadth (mx)
CM047 - *61a(3). 2nd premolar alveolar breadth (md)
CM048 - *61a(4). 1st molar alveolar breadth (mx)
CM049 - *61a(4). 1st molar alveolar breadth (md)
CM050 - *61a(5). 2nd molar alveolar breadth (mx)
CM051 - *61a(5). 2nd molar alveolar breadth (md)
CM052 - 62. Internal palate length
CM053 - 62(1). Anterior palate length
CM054 - *62a(1). 1st internal dental arch length (mx)
CM055 - *62a(1). 1st internal dental arch length (md)
CM056 - *62a(2). 2nd internal dental arch length (mx)
CM057 - *62a(2). 2nd internal dental arch length (md)
CM058 - *62a(3). 3rd internal dental arch length (mx)
CM059 - *62a(3). 3rd internal dental arch length (md)
CM060 - *62a(4). 4th internal dental arch length (mx)
CM061 - *62a(4). 4th internal dental arch length (md)
CM062 - *62a(5). 5th internal dental arch length (mx)
CM063 - *62a(5). 5th internal dental arch length (md)
CM064 - *62a(6). 6th internal dental arch length (mx)
CM065 - *62a(6). 6th internal dental arch length (md)
CM066 - 63. Internal palate breadth (mx)
CM067 - *63. Internal palate breadth (md)
CM068 - 63(2). Anterior palate breadth (mx)
CM069 - *63(2). Anterior palate breadth (md)
CM070 - *63(2)a. 1st internal dental arch breadth (mx)
CM071 - *63(2)a. 1st internal dental arch breadth (md)
CM072 - *63(2)b. 2nd internal dental arch breadth (mx)
CM073 - *63(2)b. 2nd internal dental arch breadth (md)
CM074 - *63(2)c. 3rd internal dental arch breadth (mx)
CM075 - *63(2)c. 3rd internal dental arch breadth (md)
CM076 - *63(2)d. 4th internal dental arch breadth (mx)
CM077 - *63(2)d. 4th internal dental arch breadth (md)
CM078 - *63(2)e. 5th internal dental arch breadth (mx)
CM079 - *63(2)e. 5th internal dental arch breadth (md)
CM080 - 66. Bigonial breadth
CM081 - 67. Minimum chord between the mental foramina
CM082 - 68. Projective length of the body of the mandible
CM083 - 69. Height of the mandibular symphysis
CM084 - 69a. Symphyseal height
CM085 - *69c. Thickness of the mandibular symphysis
CM086 - 69(1). Mental foramen height (l)
CM087 - 69(1). Mental foramen height (r)
CM088 - 69(2). 2nd molar mandibular body height (l)
CM089 - 69(2). 2nd molar mandibular body height (r)
CM090 - *69(2)a. Canine mandibular body height (l)
CM091 - *69(2)a. Canine mandibular body height (r)
CM092 - *69(2)b. 1st premolar mandibular body height (l)
CM093 - *69(2)b. 1st premolar mandibular body height (r)
CM094 - *69(2)c. 2nd premolar mandibular body height (l)
CM095 - *69(2)c. 2nd premolar mandibular body height (r)
CM096 - *69(2)d. 1st molar mandibular body height (l)
CM097 - *69(2)d. 1st molar mandibular body height (r)
CM098 - *69(2)e. 3rd molar mandibular body height (l)
CM099 - *69(2)e. 3rd molar mandibular body height (r)
CM100 - 69(3). Mental foramen body thickness (l)
CM101 - 69(3). Mental foramen body thickness (r)
CM102 - 69b. 2nd molar mandibular body thickness (l)
CM103 - 69b. 2nd molar mandibular body thickness (r)
CM104 - *69b(1). Canine mandibular body thickness (l)
CM105 - *69b(1). Canine mandibular body thickness (r)
CM106 - *69b(2). 1st premolar mandibular body thickness (l)
CM107 - *69b(2). 1st premolar mandibular body thickness (r)
CM108 - *69b(3). 2nd premolar mandibular body thickness (l)
CM109 - *69b(3). 2nd premolar mandibular body thickness (r)
CM110 - *69b(4). 1st molar mandibular body thickness (l)
CM111 - *69b(4). 1st molar mandibular body thickness (r)
CM112 - *69b(5). 3rd molar mandibular body thickness (l)
CM113 - *69b(5). 3rd molar mandibular body thickness (r)
CM114 - 70. Ramus height (l)
CM115 - 70. Ramus height (r)
CM116 - 70(1). Coronoid height (l)
CM117 - 70(1). Coronoid height (r)
CM118 - 70(2). Minimum ramus height (l)
CM119 - 70(2). Minimum ramus height (r)
CM120 - 71. Minimum ramus breadth (l)
CM121 - 71. Minimum ramus breadth (r)
CM122 - 71a. Minimum ramus width (l)
CM123 - 71a. Minimum ramus width (r)
CM124 - 72. Profile angle
CM125 - 73. Nasal angle
CM126 - 74. Subnasal angle
CM127 - *74a. Alternative subnasal angle
CM128 - 74(2). Dental angle
CM129 - 79. Mandibular ramus angle (l)
CM130 - 79. Mandibular ramus angle (r)
CM131 - 79c. Mental angle
CM132 - 80. Dental arch length of the *Maxilla*
CM133 - 80a. Dental arch length of the mandible
CM134 - 80(1). External dental arch width (mx)
CM135 - 80(1). External dental arch width (md)
CM136 - *80(1)a. Canine dental arch breadth (mx)
CM137 - *80(1)a. Canine dental arch breadth (md)
CM138 - *80(1)b. 1st premolar dental arch breadth (mx)
CM139 - *80(1)b. 1st premolar dental arch breadth (md)
CM140 - *80(1)c. 2nd premolar dental arch breadth (mx)

CM141 - *80(1)c. 2nd premolar dental arch breadth (md)
CM142 - *80(1)d. 1st molar dental arch breadth (mx)
CM143 - *80(1)d. 1st molar dental arch breadth (md)
CM144 - *80(1)e. 2nd molar dental arch breadth (mx)
CM145 - *80(1)e. 2nd molar dental arch breadth (md)
CM146 - *80(1)f. 3rd molar dental arch breadth (mx)
CM147 - *80(1)f. 3rd molar dental arch breadth (md)
CM148 - *80(4)a. Canine dental arch length (mx)
CM149 - *80(4)a. Canine dental arch length (md)
CM150 - *80(4)b. 1st premolar dental arch length (mx)
CM151 - *80(4)b. 1st premolar dental arch length (md)
CM152 - *80(4)c. 2nd premolar dental arch length (mx)
CM153 - *80(4)c. 2nd premolar dental arch length (md)
CM154 - *80(4)d. 1st molar dental arch length (mx)
CM155 - *80(4)d. 1st molar dental arch length (md)
CM156 - *80(4)e. 2nd molar dental arch length (mx)
CM157 - *80(4)e. 2nd molar dental arch length (md)
CM 158 - *104. Maximum temporal line distance (l)
CM 159 - *104. Maximum temporal line distance (r)
CM 160 - *105. Minimum temporal line distance (l)
CM 161 - *105. Minimum temporal line distance (r)
CM 162 - Cranial thickness (*Os frontale*; medio-occipital to *Frontotemporale*)
CM 163 - Cranial thickness (*Os parietale* lateral to *Bregma*)
CM 164 - Cranial thickness (*Os parietale* lateral to supero-lateral to *Lambda*)
CM 165 - Cranial thickness (*Os occipitale*; centre of the *Fossa cerebralis*)
CM 166 - Cranial thickness (*Os occipitale*; centre of the *Fossa cerebellaris*)
CM 167 - Cranial thickness (*Os occipitale*; centre of *Lambda*)
CM 168 - Cranial thickness (maximum cranial thickness; location)
CM 169 - Cranial thickness (minimum cranial thickness; location)
CM 170 - Cranial thickness (location)
CM 171 - Cranial thickness (location)

Appendix II.A.2. Dental measurements

DM001 - 81. Crown length UI1 (l)
DM002 - 81. Crown length UI1 (r)
DM003 - 81. Crown length UI2 (l)
DM004 - 81. Crown length UI2 (r)
DM005 - 81. Crown length UC (l)
DM006 - 81. Crown length UC (r)
DM007 - 81. Crown length UP1 (l)
DM008 - 81. Crown length UP1 (r)
DM009 - 81. Crown length UP2 (l)
DM010 - 81. Crown length UP2 (r)
DM011 - 81. Crown length UM1 (l)
DM012 - 81. Crown length UM1 (r)
DM013 - 81. Crown length UM2 (l)
DM014 - 81. Crown length UM2 (r)
DM015 - 81. Crown length UM3 (l)
DM016 - 81. Crown length UM3 (r)
DM017 - 81. Crown length LI1 (l)
DM018 - 81. Crown length LI1 (r)
DM019 - 81. Crown length LI2 (l)
DM020 - 81. Crown length LI2 (r)
DM021 - 81. Crown length LC (l)
DM022 - 81. Crown length LC (r)
DM023 - 81. Crown length LP1 (l)
DM024 - 81. Crown length LP1 (r)
DM025 - 81. Crown length LP2 (l)
DM026 - 81. Crown length LP2 (r)
DM027 - 81. Crown length LM1 (l)
DM028 - 81. Crown length LM1 (r)
DM029 - 81. Crown length LM2 (l)
DM030 - 81. Crown length LM2 (r)
DM031 - 81. Crown length LM3 (l)
DM032 - 81. Crown length LM3 (r)
DM033 - 81(1). Crown width UI1 (l)
DM034 - 81(1). Crown width UI1 (r)
DM035 - 81(1). Crown width UI2 (l)
DM036 - 81(1). Crown width UI2 (r)
DM037 - 81(1). Crown width UC (l)
DM038 - 81(1). Crown width UC (r)
DM039 - 81(1). Crown width UP1 (l)
DM040 - 81(1). Crown width UP1 (r)
DM041 - 81(1). Crown width UP2 (l)
DM042 - 81(1). Crown width UP2 (r)
DM043 - 81(1). Crown width UM1 (l)
DM044 - 81(1). Crown width UM1 (r)
DM045 - 81(1). Crown width UM2 (l)
DM046 - 81(1). Crown width UM2 (r)
DM047 - 81(1). Crown width UM3 (l)
DM048 - 81(1). Crown width UM3 (r)
DM049 - 81(1). Crown width LI1 (l)
DM050 - 81(1). Crown width LI1 (r)
DM051 - 81(1). Crown width LI2 (l)
DM052 - 81(1). Crown width LI2 (r)
DM053 - 81(1). Crown width LC (l)
DM054 - 81(1). Crown width LC (r)
DM055 - 81(1). Crown width LP1 (l)
DM056 - 81(1). Crown width LP1 (r)
DM057 - 81(1). Crown width LP2 (l)
DM058 - 81(1). Crown width LP2 (r)
DM059 - 81(1). Crown width LM1 (l)
DM060 - 81(1). Crown width LM1 (r)
DM061 - 81(1). Crown width LM2 (l)
DM062 - 81(1). Crown width LM2 (r)
DM063 - 81(1). Crown width LM3 (l)
DM064 - 81(1). Crown width LM3 (r)

Appendix II.A.3. Postcranial measurements

PM001 - C1. *Clavicula* - Maximum length (l)
PM002 - C1. *Clavicula* - Maximum length (r)
PM003 - C4. Vertical diameter of the mid-shaft (l)
PM004 - C4. Vertical diameter of the mid-shaft (r)
PM005 - C5. Sagittal diameter of the mid-shaft (l)
PM006 - C5. Sagittal diameter of the mid-shaft (r)
PM007 - C6. Circumference of the mid-shaft (l)
PM008 - C6. Circumference of the mid-shaft (r)
PM015 - H1. *Humerus* -Maximum length (l)
PM016 - H1. *Humerus* -Maximum length (r)
PM017 - H4a. Maximum bi-epicondylar width (l)
PM018 - H4a. Maximum bi-epicondylar width (r)
PM019 - H5. Maximum diameter of the mid-shaft (l)
PM020 - H5. Maximum diameter of the mid-shaft (r)
PM021 - H6. Minimum diameter of the mid-shaft (l)
PM022 - H6. Minimum diameter of the mid-shaft (r)
PM023 - H7. Least circumference of the shaft (l)
PM024 - H7. Least circumference of the shaft (r)
PM025 - H7a. Mid-shaft circumference (l)
PM026 - H7a. Mid-shaft circumference (r)
PM027 - *H19. *Tuberositas deltoidea* breadth (l)
PM028 - *H19. *Tuberositas deltoidea* breadth (r)
PM029 - *H20. *Crista tuberculi majoris* breadth (l)
PM030 - *H20. *Crista tuberculi majoris* breadth (r)
PM037 - R1. *Radius* - Maximum length (l)
PM038 - R1. *Radius* - Maximum length (r)
PM039 - R3. Minimum circumference (l)
PM040 - R3. Minimum circumference (r)
PM041 - R4. Maximum transverse shaft diameter (l)
PM042 - R4. Maximum transverse shaft diameter (r)
PM043 - R4a. Transverse mid-shaft diameter (l)
PM044 - R4a. Transverse mid-shaft diameter (r)
PM045 - R5. Minimum sagittal shaft diameter (l)
PM046 - R5. Minimum sagittal shaft diameter (r)
PM047 - R5a. Sagittal mid-shaft diameter (l)
PM048 - R5a. Sagittal mid-shaft diameter (r)
PM049 - R5(4). Neck circumference (l)
PM050 - R5(4). Neck circumference (r)

PM051 - R5(5). Mid-shaft circumference (l)
PM052 - R5(5). Mid-shaft circumference (r)
PM053 - *R5(7). Maximum circumference (l)
PM054 - *R5(7). Maximum circumference (r)
PM055 - *R10. Longitudinal *Tuberositas radii* diameter (l)
PM056 - *R10. Longitudinal *Tuberositas radii* diameter (r)
PM057 - *R11. Transverse *Tuberositas radii* diameter (l)
PM058 - *R11. Transverse *Tuberositas radii* diameter (r)
PM065 - U1. *Ulna* - Maximum length (l)
PM066 - U1. *Ulna* - Maximum length (r)
PM067 - U3. Least circumference (l)
PM068 - U3. Least circumference (r)
PM069 - U3b. *Tuberositas ulnae* circumference (l)
PM070 - U3b. *Tuberositas ulnae* circumference (r)
PM071 - *U3c. Crest circumference (l)
PM072 - *U3c. Crest circumference (r)
PM073 - U11. Dorso-ventral shaft diameter (l)
PM074 - U11. Dorso-ventral shaft diameter (r)
PM075 - U12. Transverse shaft diameter (l)
PM076 - U12. Transverse shaft diameter (r)
PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)
PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)
PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)
PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)
PM087 - P22. Maximum *Acetabulum* breadth (l)
PM088 - P22. Maximum *Acetabulum* breadth (r)
PM089 - F1. *Femur* - Maximum length (l)
PM090 - F1. *Femur* - Maximum length (r)
PM091 - F2. Physiological length (l)
PM092 - F2. Physiological length (r)
PM093 - F6. Anterior-posterior mid-shaft diameter (l)
PM094 - F6. Anterior-posterior mid-shaft diameter (r)
PM095 - F7. Medio-lateral mid-shaft diameter (l)
PM096 - F7. Medio-lateral mid-shaft diameter (r)
PM097 - F8. Mid-shaft circumference (l)
PM098 - F8. Mid-shaft circumference (r)
PM099 - F9. Subtrochanteric transverse diameter (l)
PM100 - F9. Subtrochanteric transverse diameter (r)
PM101 - F10. Subtrochanteric sagittal diameter (l)
PM102 - F10. Subtrochanteric sagittal diameter (r)
PM103 - *F10(1). Subtrochanteric circumference (l)
PM104 - *F10(1). Subtrochanteric circumference (r)
PM105 - F15. Vertical neck diameter (l)
PM106 - F15. Vertical neck diameter (r)
PM107 - F16. Sagittal neck diameter (l)
PM108 - F16. Sagittal neck diameter (r)
PM109 - F17. Neck circumference (l)
PM110 - F17. Neck circumference (r)
PM111 - F18. Vertical head diameter (l)
PM112 - F18. Vertical head diameter (r)
PM113 - F19. Transverse head diameter (l)
PM114 - F19. Transverse head diameter (r)
PM115 - F20. Head circumference (l)
PM116 - F20. Head circumference (r)
PM117 - *F34. *Linea aspera* breadth (l)
PM118 - *F34. *Linea aspera* breadth (r)
PM119 - *F35. *Linea intertrochanterica* breadth (l)
PM120 - *F35. *Linea intertrochanterica* breadth (r)
PM128 - T1. *Tibia* length (l)
PM129 - T1. *Tibia* length (r)
PM130 - T1a. *Tibia* - Maximum length (l)
PM131 - T1a. *Tibia* - Maximum length (r)
PM132 - T2. Physiological length (l)
PM133 - T2. Physiological length (r)
PM134 - T4. Maximum sagittal tuberosity diameter (l)
PM135 - T4. Maximum sagittal tuberosity diameter (r)
PM136 - T5. Minimum transverse tuberosity diameter (l)
PM137 - T5. Minimum transverse tuberosity diameter (r)
PM138 - T8. Sagittal mid-shaft diameter (l)
PM139 - T8. Sagittal mid-shaft diameter (r)
PM140 - T8a. Sagittal nutrient foramen diameter (l)
PM141 - T8a. Sagittal nutrient foramen diameter (r)
PM142 - T9. Transverse mid-shaft diameter (l)
PM143 - T9. Transverse mid-shaft diameter (r)
PM144 - T9a. Transverse nutrient foramen diameter (l)
PM145 - T9a. Transverse nutrient foramen diameter (r)
PM146 - T10. Mid-shaft circumference (l)
PM147 - T10. Mid-shaft circumference (r)
PM148 - T10a. Nutient foramen circumference (l)
PM149 - T10a. Nutient foramen circumference (r)
PM150 - T10b. Minimum shaft circumference (l)
PM151 - T10b. Minimum shaft circumference (r)
PM152 - *T15. Longitudinal *Tuberosita tibiae* diameter (l)
PM153 - *T15. Longitudinal *Tuberosita tibiae* diameter (r)
PM154 - *T16. Transverse *Tuberosita tibiae* diameter (l)
PM155 - *T16. Transverse *Tuberosita tibiae* diameter (r)
PM156 - *T17. *Linea musculi solei* breadth (l)
PM157 - *T17. *Linea musculi solei* breadth (r)
PM164 - Fi1. *Fibula* - Maximum length (l)
PM165 - Fi1. *Fibula* - Maximum length (r)
PM166 - Fi2. Maximum mid-shaft diameter (l)
PM167 - Fi2. Maximum mid-shaft diameter (r)
PM168 - Fi3. Minimum mid-shaft diameter (l)
PM169 - Fi3. Minimum mid-shaft diameter (r)
PM170 - Fi4. Mid-shaft circumference (l)
PM171 - Fi4. Mid-shaft circumference (r)
PM172 - Fi4a. Minimum circumference (l)
PM173 - Fi4a. Minimum circumference (r)

Appendix II.A.4. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)
CN002 - Cranial shape (*Norma verticalis*)
CN003 - Cranial height (*Norma lateralis*)
CN004 - Cranial height (*Norma occipitalis*)
CN005 - Cranial shape (*Norma occipitalis*)
CN006 - Occipital bunning
CN007 - Sagittal keeling
CN008 - *Bregma* depression
CN009 - *Tuberculum mastoideum* (l)
CN010 - *Tuberculum mastoideum* (r)
CN011 - Relative facial height
CN012 - Relative facial breadth
CN013 - Orbital geometry
CN014 - Malar prominence (upper facial flatness)
CN015 - Course of the *Sutura zygomaticomaxillaris*
CN016 - Interorbital breadth
CN017 - Shape of the *Sella nasi*
CN018 - Interorbital projection
CN019 - Orientation of the *Processus frontales maxillae*
CN020 - Nasal profile
CN021 - Relative nasal breadth
CN022 - *Spina nasalis anterior*
CN023 - *Margo infranasalis*
CN024 - Alveolar prognathism
CN025 - Dental arch breadth
CN026 - Dental arch shape
CN027 - *Sutura palatina transversa*
CN028 - Symphyseal height
CN029 - Ramus geometry
CN030 - Ramus shape
CN031 - Ramus inversion
CN032 - Ramus angle

Appendix II.A.5. Cranial epigenetic traits

CE001 - *Ossa suturae coronalis*
CE002 - *Ossa suturae sagittalis*
CE003 - *Ossa suturae lambdoideae*
CE004 - *Ossa suturae squamosae* (l)
CE005 - *Ossa suturae squamosae* (r)
CE006 - *Os bregmaticum*
CE007 - *Os lambdae*
CE008 - *Os epiptericum* (l)
CE009 - *Os epiptericum* (r)
CE010 - *Os astericum* (l)

CE011 - *Os astericum* (r)
CE012 - *Os incisurae parietalis* (l)
CE013 - *Os incisurae parietalis* (r)
CE014 - *Os incae*
CE015 - *Os incisivum*/*Sutura incisiva*
CE016 - *Os japonicum* (l)
CE017 - *Os japonicum* (r)
CE018 - *Os squamosum* (l)
CE019 - *Os squamosum* (r)
CE020 - *Os metopicum*
CE021 - *Sutura metopica*
CE022 - *Fissura metopica*
CE023 - *Sutura parietalis* (l)
CE024 - *Sutura parietalis* (r)
CE025 - *Sutura occipitalis*
CE026 - *Sutura zygomatica* (l)
CE027 - *Sutura zygomatica* (r)
CE028 - *Sutura fronto-temporalis* (l)
CE029 - *Sutura fronto-temporalis* (r)
CE030 - *Foramen parietale* (l)
CE031 - *Foramen parietale* (r)
CE032 - *Foramen mastoideum* (l)
CE033 - *Foramen mastoideum* (r)
CE034 - *Canalis condylaris* (l)
CE035 - *Canalis condylaris* (r)
CE036 - *Foramen supraorbitale* (l)
CE037 - *Foramen supraorbitale* (r)
CE038 - *Foramen frontale* (l)
CE039 - *Foramen frontale* (r)
CE040 - *Foramen zygomaticofaciale* (l)
CE041 - *Foramen zygomaticofaciale* (r)
CE042 - *Foramen ethmoidale posterius* (l)
CE043 - *Foramen ethmoidale posterius* (r)
CE044 - *Foramen ethomoidale accessorium* (l)
CE045 - *Foramen ethomoidale accessorium* (r)
CE046 - *Foramen ethmoidale anterius extrasuturale* (l)
CE047 - *Foramen ethmoidale anterius extrasuturale* (r)
CE048 - *Foramen tympanicum* Huschkei (l)
CE049 - *Foramen tympanicum* Huschkei (r)
CE050 - *Foramen infraorbitale accessorium* (l)
CE051 - *Foramen infraorbitale accessorium* (r)
CE052 - *Foramen infraorbitale partitum* (l)
CE053 - *Foramen infraorbitale partitum* (r)
CE054 - **Foramina paranasalia*
CE055 - *Foramen palatinum minus accessorium* (l)
CE056 - *Foramen palatinum minus accessorium* (r)
CE057 - *Foramen mentale accessorium* (l)
CE058 - *Foramen mentale accessorium* (r)
CE059 - *Foramen ovale incompletum* (l)
CE060 - *Foramen ovale incompletum* (r)
CE061 - *Foramen spinosum incompletum* (l)
CE062 - *Foramen spinosum incompletum* (r)
CE063 - Mylohyoid bridging (l)
CE064 - Mylohyoid bridging (r)
CE065 - *Torus maxillaris* (l)
CE066 - *Torus maxillaris* (r)
CE067 - *Torus acusticus* (l)
CE068 - *Torus acusticus* (r)
CE069 - *Torus occipitalis*
CE070 - *Tuberculum praecondylare* (l)
CE071 - *Tuberculum praecondylare* (r)
CE072 - *Facies articularis condylaris bipartita* (l)
CE073 - *Facies articularis condylaris bipartita* (r)
CE074 - *Linea nuchalis suprema*

Appendix II.A.6. Dental epigenetic traits

DE001 - Winging UI1 (l)
DE002 - Winging UI1 (r)
DE003 - Labial curvature UI1 (l)
DE004 - Labial curvature UI1 (r)
DE005 - Shovel UI1 (l)
DE006 - Shovel UI1 (r)
DE007 - Double shovel UI1 (l)
DE008 - Double shovel UI1 (r)
DE009 - Interruption groove UI2 (l)
DE010 - Interruption groove UI2 (r)
DE011 - *Tuberculum dentale* UI2 (l)
DE012 - *Tuberculum dentale* UI2 (r)
DE013 - Canine mesial ridge (“Bushman canine”) UC (l)
DE014 - Canine mesial ridge (“Bushman canine”) UC (r)
DE015 - Distal accessory ridge UC (l)
DE016 - Distal accessory ridge UC (r)
DE017 - Premol. mesial & distal access. cusps UP1 (l)
DE018 - Premol. mesial & distal access. cusps UP1 (r)
DE019 - Premol. mesial & distal access. cusps UP2 (l)
DE020 - Premol. mesial & distal access. cusps UP2 (r)
DE021 - Tricusped premolars UP1 (l)
DE022 - Tricusped premolars UP1 (r)
DE023 - Distosagittal ridge UP1 (l)
DE024 - Distosagittal ridge UP1 (r)
DE025 - Metacone UM3 (l)
DE026 - Metacone UM3 (r)
DE027 - Hypocone UM2 (l)
DE028 - Hypocone UM2 (r)
DE029 - Cusp 5 (metaconule) UM1 (l)
DE030 - Cusp 5 (metaconule) UM1 (r)
DE031 - Carabelli’s trait UM1 (l)
DE032 - Carabelli’s trait UM1 (r)
DE033 - Parastyle UM2 (l)
DE034 - Parastyle UM2 (r)
DE035 - Parastyle UM3 (l)
DE036 - Parastyle UM3 (r)
DE037 - Enamel extension UM1 (l)
DE038 - Enamel extension UM1 (r)
DE039 - Premolar root number UP1 (l)
DE040 - Premolar root number UP1 (r)
DE041 - Upper molar root number UM2 (l)
DE042 - Upper molar root number UM2 (r)
DE043 - Peg-shaped incisor UI2 (l)
DE044 - Peg-shaped incisor UI2 (r)
DE045 - Peg-shaped molar UM3 (l)
DE046 - Peg-shaped molar UM3 (r)
DE047 - Congenital absence UM3 (l)
DE048 - Congenital absence UM3 (r)
DE049 - Premol. lingual cusps LP2 (l)
DE050 - Premol. lingual cusps LP2 (r)
DE051 - Anterior fovea LM1 (l)
DE052 - Anterior fovea LM1 (r)
DE053 - Groove pattern LM2 (l)
DE054 - Groove pattern LM2 (r)
DE055 - Cusp number LM1 (l)
DE056 - Cusp number LM1 (r)
DE057 - Cusp number LM2 (l)
DE058 - Cusp number LM2 (r)
DE059 - Deflecting wrinkle LM1 (l)
DE060 - Deflecting wrinkle LM1 (r)
DE061 - Distal trigonid crest LM1 (l)
DE062 - Distal trigonid crest LM1 (r)
DE063 - Protostylid LM1 (l)
DE064 - Protostylid LM1 (r)
DE065 - Cusp 7 LM1 (l)
DE066 - Cusp 7 LM1 (r)
DE067 - Tome’s root LP1 (l)
DE068 - Tome’s root LP1 (r)
DE069 - Canine root number LC (l)
DE070 - Canine root number LC (r)
DE071 - Lower molar root number LM1 (l)
DE072 - Lower molar root number LM1 (r)
DE073 - Lower molar root number LM2 (l)
DE074 - Lower molar root number LM2 (r)
DE075 - Torsomolar angle LM3 (l)
DE076 - Torsomolar angle LM3 (r)
DE077 - Midline diastema
DE078 - Palatine torus
DE079 - Mandibular torus (l)
DE080 - Mandibular torus (r)
DE081 - Rocker jaw

Appendix II.A.7. Postcranial epigenetic traits

PE001 - Allen's fossa (l)
PE002 - Allen's fossa (r)
PE003 - Poirier's facet (l)
PE004 - Poirier's facet (r)
PE005 - Plaque (*Femur*) (l)
PE006 - Plaque (*Femur*) (r)
PE007 - *Fossa hypotrochanterica* (l)
PE008 - *Fossa hypotrochanterica* (r)
PE009 - *Tuberculum fossae trochantericae* (l)
PE010 - *Tuberculum fossae trochantericae* (r)
PE011 - *Trochanter tertius* (l)
PE012 - *Trochanter tertius* (r)
PE013 - Medial squatting facet (l)
PE014 - Medial squatting facet (r)
PE015 - Lateral squatting facet (l)
PE016 - Lateral squatting facet (r)
PE017 - *Processus supracondylaris* (l)
PE018 - *Processus supracondylaris* (r)
PE019 - *Foramen supratrochleare* (l)
PE020 - *Foramen supratrochleare* (r)
PE021 -**Foramen intertrochleare* (l)
PE022 -**Foramen intertrochleare* (r)
PE023 - Acetabular crease (l)
PE024 - Acetabular crease (r)
PE025 - *Sulcus praearicularis* (l)
PE026 - *Sulcus praearicularis* (r)
PE027 - Accessory sacral facets (l)
PE028 - Accessory sacral facets (r)
PE029 - *Acromion (Facies articularis inferior)* (l)
PE030 - *Acromion (Facies articularis inferior)* (r)
PE031 - *Foramen supraspinale* (l)
PE032 - *Foramen supraspinale* (r)
PE033 - *Sulcus circumflexus* (l)
PE034 - *Sulcus circumflexus* (r)
PE035 - *Incisura vasta* (l)
PE036 - *Incisura vasta* (r)
PE037 - *Fossa vasta* (l)
PE038 - *Fossa vasta* (r)
PE039 - *Patella bipartita* (l)
PE040 - *Patella bipartita* (r)
PE041 - *Os trigonum* (l)
PE042 - *Os trigonum* (r)
PE043 - *Facies articularis media* (l)
PE044 - *Facies articularis media* (r)
PE045 - Lateral talar extension (l)
PE046 - Lateral talar extension (r)
PE047 - *Facies articularis inferior* (l)
PE048 - *Facies articularis inferior* (r)
PE049 - *Facies articularis navicularis bipartita* (l)
PE050 - *Facies articularis navicularis bipartita* (r)
PE051 - Anterior calcaneal facet double (l)
PE052 - Anterior calcaneal facet double (r)
PE053 - Anterior calcaneal facet absent (l)
PE054 - Anterior calcaneal facet absent (r)
PE055 - *Tuberculum peroneale* (l)
PE056 - *Tuberculum peroneale* (r)
PE057 - *Fovea articularis superior bipartita*
PE058 - *Ponticulus posterior*
PE059 - Lateral bridging
PE060 - *Foramen transversum bipartitum*
PE061 - *Processus spinosus bipartitus*
PE062 - *Hiatus sacralis caudalis*

Appendix II.A.8. Cranial robusticity traits

CR001 - Relief of the *Planum nuchale*
CR002 - *Inion* (*Protuberantia occipitalis externa*)
CR003 - *Processus mastoideus*
CR004 - *Crista supramastoidea*
CR005 - *Tubera frontalia et parietalia*
CR006 - *Arcus superciliaris*
CR007 - *Glabella*
CR008 - *Forma orbitae*
CR009 - *Os zygomaticum*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)

Appendix II.A.9. Postcranial robusticity traits

PR001 - Humeral shaft bowing (l)
PR002 - Humeral shaft bowing (r)
PR003 - Radial shaft bowing (l)
PR004 - Radial shaft bowing (r)
PR005 - Radial *Margo interosseus* size (l)
PR006 - Radial *Margo interosseus* size (r)
PR007 - Ulnar shaft bowing (l)
PR008 - Ulnar shaft bowing (r)
PR009 - Ulnar *Margo interosseus* size (l)
PR010 - Ulnar *Margo interosseus* size (r)
PR011 - Femoral shaft bowing (l)
PR012 - Femoral shaft bowing (r)
PR011a - Femoral shaft bowing (l) - shape
PR012a - Femoral shaft bowing (r) - shape
PR011b - Femoral shaft bowing (l) - degree
PR012b - Femoral shaft bowing (r) - degree
PR013 - Pilasterism (l)
PR014 - Pilasterism (r)
PR015 - Tibial retroversion (l)
PR016 - Tibial retroversion (r)

Appendix II.A.10. Cranial musculoskeletal stress traits

CS001 - *Calvarium*; *Musculus trapezius* (*Origo*)
CS002 - *Calvarium*; *Musculus masseter* (*Origo*) (l)
CS003 - *Calvarium*; *Musculus masseter* (*Origo*) (r)
CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)
CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)
CS006 - *Calvarium*; *Musculus temporalis* (*Origo*) (l)
CS007 - *Calvarium*; *Musculus temporalis* (*Origo*) (r)
CS008 - *Mandibula*; *Musculus temporalis* (*Insertio*) (l)
CS009 - *Mandibula*; *Musculus temporalis* (*Insertio*) (r)
CS010 - *Mandibula*; *Musculus masseter* (*Insertio*) (l)
CS011 - *Mandibula*; *Musculus masseter* (*Insertio*) (r)
CS012 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (l)
CS013 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (r)

Appendix II.A.11. Postcranial musculoskeletal stress traits

PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)
PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)
PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)
PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)

PS005 - *Radius*; *Musculus biceps brachii* (*Insertio*) (l)
PS006 - *Radius*; *Musculus biceps brachii* (*Insertio*) (r)
PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)
PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)
PS009 - *Femur*; *Musculus iliopsoas* (*Insertio*) (l)
PS010 - *Femur*; *Musculus iliopsoas* (*Insertio*) (r)
PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)
PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)
PS013 - *Tibia*; *Ligamentum patellae* (*Musculus quadriceps femoris*) (*Insertio*) (l)
PS014 - *Tibia*; *Ligamentum patellae* (*Musculus quadriceps femoris*) (*Insertio*) (r)
PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)
PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)

Appendix II.A.12. Enamel hypoplasia

DS001 - Hypoplasia UI1 (l)
DS002 - Hypoplasia UI1 (r)
DS003 - Hypoplasia UI2 (l)
DS004 - Hypoplasia UI2 (r)
DS005 - Hypoplasia UC (l)
DS006 - Hypoplasia UC (r)
DS007 - Hypoplasia UP1 (l)
DS008 - Hypoplasia UP1 (r)
DS009 - Hypoplasia UP2 (l)
DS010 - Hypoplasia UP2 (r)
DS011 - Hypoplasia UM1 (l)
DS012 - Hypoplasia UM1 (r)
DS013 - Hypoplasia UM2 (l)
DS014 - Hypoplasia UM2 (r)
DS015 - Hypoplasia UM3 (l)
DS016 - Hypoplasia UM3 (r)
DS017 - Hypoplasia LI1 (l)
DS018 - Hypoplasia LI1 (r)
DS019 - Hypoplasia LI2 (l)
DS020 - Hypoplasia LI2 (r)
DS021 - Hypoplasia LC (l)
DS022 - Hypoplasia LC (r)
DS023 - Hypoplasia LP1 (l)
DS024 - Hypoplasia LP1 (r)
DS025 - Hypoplasia LP2 (l)
DS026 - Hypoplasia LP2 (r)
DS027 - Hypoplasia LM1 (l)
DS028 - Hypoplasia LM1 (r)
DS029 - Hypoplasia LM2 (l)
DS030 - Hypoplasia LM2 (r)
DS031 - Hypoplasia LM3 (l)
DS032 - Hypoplasia LM3 (r)

Appendix II.A.13. Dental abrasion

DA001 - Abrasion UI1 (l)
DA002 - Abrasion UI1 (r)
DA003 - Abrasion UI2 (l)
DA004 - Abrasion UI2 (r)
DA005 - Abrasion UC (l)
DA006 - Abrasion UC (r)
DA007 - Abrasion UP1 (l)
DA008 - Abrasion UP1 (r)
DA009 - Abrasion UP2 (l)
DA010 - Abrasion UP2 (r)
DA011 - Abrasion UM1 (l)
DA012 - Abrasion UM1 (r)
DA013 - Abrasion UM2 (l)
DA014 - Abrasion UM2 (r)
DA015 - Abrasion UM3 (l)
DA016 - Abrasion UM3 (r)
DA017 - Abrasion LI1 (l)
DA018 - Abrasion LI1 (r)
DA019 - Abrasion LI2 (l)
DA020 - Abrasion LI2 (r)
DA021 - Abrasion LC (l)
DA022 - Abrasion LC (r)
DA023 - Abrasion LP1 (l)
DA024 - Abrasion LP1 (r)
DA025 - Abrasion LP2 (l)
DA026 - Abrasion LP2 (r)
DA027 - Abrasion LM1 (l)
DA028 - Abrasion LM1 (r)
DA029 - Abrasion LM2 (l)
DA030 - Abrasion LM2 (r)
DA031 - Abrasion LM3 (l)
DA032 - Abrasion LM3 (r)

Appendix II.A.14. Dental caries

DC001 - Caries UI1 (l)
DC002 - Caries UI1 (r)
DC003 - Caries UI2 (l)
DC004 - Caries UI2 (r)
DC005 - Caries UC (l)
DC006 - Caries UC (r)
DC007 - Caries UP1 (l)
DC008 - Caries UP1 (r)
DC009 - Caries UP2 (l)
DC010 - Caries UP2 (r)
DC011 - Caries UM1 (l)
DC012 - Caries UM1 (r)
DC013 - Caries UM2 (l)
DC014 - Caries UM2 (r)
DC015 - Caries UM3 (l)
DC016 - Caries UM3 (r)
DC017 - Caries LI1 (l)
DC018 - Caries LI1 (r)
DC019 - Caries LI2 (l)
DC020 - Caries LI2 (r)
DC021 - Caries LC (l)
DC022 - Caries LC (r)
DC023 - Caries LP1 (l)
DC024 - Caries LP1 (r)
DC025 - Caries LP2 (l)
DC026 - Caries LP2 (r)
DC027 - Caries LM1 (l)
DC028 - Caries LM1 (r)
DC029 - Caries LM2 (l)
DC030 - Caries LM2 (r)
DC031 - Caries LM3 (l)
DC032 - Caries LM3 (r)

Appendix II.A.15. *Cribra orbitalia*

CO001 - *Cribra orbitalia* (l)
CO002 - *Cribra orbitalia* (r)

Appendix II.B. Shortened and additional shortened preservation list

Appendix II.B.1. Cranial measurements

CM001 - 1. Maximum cranial length
CM002 - 3. *Glabello-Lambda* length
CM003 - 8. Maximum cranial breadth
CM004 - 9. Least frontal breadth
CM007 - 13a. Mastoid width (l)
CM008 - 13a. Mastoid width (r)
CM010 - 19a. Mastoid height (l)
CM011 - 19a. Mastoid height (r)
CM020 - 30. *Bregma-Lambda* chord
CM028 - 48(1). *Nasospinale-Prosthion* height
CM030 - *50(1). Interorbital breadth
CM035 - 54. Nasal breadth
CM042 - 61a(1). Canine alveolar breadth (mx)
CM043 - 61a(1). Canine alveolar breadth (md)
CM045 - 61a(2). 1st premolar alveolar breadth (md)
CM047 - 61a(3). 2nd premolar alveolar breadth (md)
CM049 - 61a(4). 1st molar alveolar breadth (md)
CM051 - 61a(5). 2nd molar alveolar breadth (md)
CM058 - *62a(3). 3rd internal dental arch length (mx)
CM059 - *62a(3). 3rd internal dental arch length (md)
CM060 - *62a(4). 4th internal dental arch length (mx)
CM061 - *62a(4). 4th internal dental arch length (md)
CM068 - 63(2). Anterior palate breadth (mx)
CM069 - *63(2). Anterior palate breadth (md)
CM070 - *63(2)a. 1st internal dental arch breadth (mx)
CM071 - *63(2)a. 1st internal dental arch breadth (md)
CM072 - *63(2)b. 2nd internal dental arch breadth (mx)
CM073 - *63(2)b. 2nd internal dental arch breadth (md)
CM075 - *63(2)c. 3rd internal dental arch breadth (md)
CM077 - *63(2)d. 4th internal dental arch breadth (md)
CM080 - 66. Bigonial breadth
CM082 - 68. Projective length of the body of the mandible
CM083 - 69. Height of the mandibular symphysis
CM085 - *69c. Thickness of the mandibular symphysis
CM086 - 69(1). Mental foramen height (l)
CM087 - 69(1). Mental foramen height (r)
CM088 - 69(2). 2nd molar mandibular body height (l)
CM089 - 69(2). 2nd molar mandibular body height (r)
CM100 - 69(3). Mental foramen body thickness (l)
CM101 - 69(3). Mental foramen body thickness (r)
CM102 - 69b. 2nd molar mandibular body thickness (l)
CM103 - 69b. 2nd molar mandibular body thickness (r)
CM122 - 71a. Minimum ramus width (l)
CM123 - 71a. Minimum ramus width (r)
CM133 - 80a. Dental arch length of the mandible
CM135 - 80(1). External dental arch width (md)
CM136 - *80(1)a. Canine dental arch breadth (mx)
CM137 - *80(1)a. Canine dental arch breadth (md)
CM141 - *80(1)c. 2nd premolar dental arch breadth (md)
CM143 - *80(1)d. 1st molar dental arch breadth (md)
CM148 - *80(4)a. Canine dental arch length (mx)
CM149 - *80(4)a. Canine dental arch length (md)
CM150 - *80(4)b. 1st premolar dental arch length (mx)
CM153 - *80(4)c. 2nd premolar dental arch length (md)

Appendix II.B.2. Dental measurements

DM001 - 81. Crown length UI1 (l)
DM002 - 81. Crown length UI1 (r)
DM003 - 81. Crown length UI2 (l)
DM004 - 81. Crown length UI2 (r)
DM005 - 81. Crown length UC (l)
DM006 - 81. Crown length UC (r)
DM007 - 81. Crown length UP1 (l)
DM008 - 81. Crown length UP1 (r)
DM009 - 81. Crown length UP2 (l)
DM010 - 81. Crown length UP2 (r)
DM011 - 81. Crown length UM1 (l)
DM012 - 81. Crown length UM1 (r)
DM013 - 81. Crown length UM2 (l)
DM014 - 81. Crown length UM2 (r)
DM015 - 81. Crown length UM3 (l)
DM016 - 81. Crown length UM3 (r)
DM017 - 81. Crown length LI1 (l)
DM018 - 81. Crown length LI1 (r)
DM019 - 81. Crown length LI2 (l)
DM020 - 81. Crown length LI2 (r)
DM021 - 81. Crown length LC (l)
DM022 - 81. Crown length LC (r)
DM023 - 81. Crown length LP1 (l)
DM024 - 81. Crown length LP1 (r)
DM025 - 81. Crown length LP2 (l)
DM026 - 81. Crown length LP2 (r)
DM027 - 81. Crown length LM1 (l)
DM028 - 81. Crown length LM1 (r)
DM029 - 81. Crown length LM2 (l)
DM030 - 81. Crown length LM2 (r)
DM031 - 81. Crown length LM3 (l)
DM032 - 81. Crown length LM3 (r)
DM033 - 81(1). Crown width UI1 (l)
DM034 - 81(1). Crown width UI1 (r)
DM035 - 81(1). Crown width UI2 (l)
DM036 - 81(1). Crown width UI2 (r)
DM037 - 81(1). Crown width UC (l)
DM038 - 81(1). Crown width UC (r)
DM039 - 81(1). Crown width UP1 (l)
DM040 - 81(1). Crown width UP1 (r)
DM041 - 81(1). Crown width UP2 (l)
DM042 - 81(1). Crown width UP2 (r)
DM043 - 81(1). Crown width UM1 (l)
DM044 - 81(1). Crown width UM1 (r)
DM045 - 81(1). Crown width UM2 (l)
DM046 - 81(1). Crown width UM2 (r)
DM047 - 81(1). Crown width UM3 (l)
DM048 - 81(1). Crown width UM3 (r)
DM049 - 81(1). Crown width LI1 (l)
DM050 - 81(1). Crown width LI1 (r)
DM051 - 81(1). Crown width LI2 (l)
DM052 - 81(1). Crown width LI2 (r)
DM053 - 81(1). Crown width LC (l)
DM054 - 81(1). Crown width LC (r)
DM055 - 81(1). Crown width LP1 (l)
DM056 - 81(1). Crown width LP1 (r)
DM057 - 81(1). Crown width LP2 (l)
DM058 - 81(1). Crown width LP2 (r)
DM059 - 81(1). Crown width LM1 (l)
DM060 - 81(1). Crown width LM1 (r)
DM061 - 81(1). Crown width LM2 (l)
DM062 - 81(1). Crown width LM2 (r)
DM063 - 81(1). Crown width LM3 (l)
DM064 - 81(1). Crown width LM3 (r)

Appendix II.B.3. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)
CN002 - Cranial shape (*Norma verticalis*)
CN004 - Cranial height (*Norma occipitalis*)
CN005 - Cranial shape (*Norma occipitalis*)
CN006 - Occipital bunning
CN007 - Sagittal keeling
CN016 - Interorbital breadth
CN017 - Shape of the *Sella nasi*
CN019 - Orientation of the *Processus frontales maxillae*
CN023 - *Margo infranasalis*
CN024 - Alveolar prognathism
CN028 - Symphyseal height

CN031 - Ramus inversion
CN032 - Ramus angle

Appendix II.B.4. Cranial epigenetic traits

CE001 - *Ossa suturae coronalis*
CE003 - *Ossa suturae lambdoideae*
CE014 - *Os incae*
CE015 - *Os incisivum*/*Sutura incisiva*
CE021 - *Sutura metopica*
CE040b - *Foramen zygomaticofaciale* (l) - number
CE041b - *Foramen zygomaticofaciale* (r) - number
CE054a - **Foramina paranasalia* (l)
CE054b - **Foramina paranasalia* (r)
CE057b - *Foramen mentale accessorium* (l) - number
CE058b - *Foramen mentale accessorium* (r) - number

Appendix II.B.5. Dental epigenetic traits

DE001 - Winging UI1 (l)
DE002 - Winging UI1 (r)
DE005 - Shovel UI1 (l)
DE006 - Shovel UI1 (r)
DE007 - Double shovel UI1 (l)
DE008 - Double shovel UI1 (r)
DE009 - Interruption groove UI2 (l)
DE010 - Interruption groove UI2 (r)
DE011 - *Tuberculum dentale* UI2 (l)
DE012 - *Tuberculum dentale* UI2 (r)
DE013 - Canine mesial ridge (“Bushman canine”) UC (l)
DE014 - Canine mesial ridge (“Bushman canine”) UC (r)
DE015 - Distal accessory ridge UC (l)
DE016 - Distal accessory ridge UC (r)
DE017 - Premol. mesial & distal access. cusps UP1 (l)
DE018 - Premol. mesial & distal access. cusps UP1 (r)
DE019 - Premol. mesial & distal access. cusps UP2 (l)
DE020 - Premol. mesial & distal access. cusps UP2 (r)
DE027 - Hypocone UM2 (l)
DE028 - Hypocone UM2 (r)
DE029 - Cusp 5 (metaconule) UM1 (l)
DE030 - Cusp 5 (metaconule) UM1 (r)
DE031 - Carabelli’s trait UM1 (l)
DE032 - Carabelli’s trait UM1 (r)
DE033 - Parastyle UM2 (l)
DE034 - Parastyle UM2 (r)
DE035 - Parastyle UM3 (l)
DE036 - Parastyle UM3 (r)
DE039 - Premolar root number UP1 (l)
DE040 - Premolar root number UP1 (r)
DE041 - Upper molar root number UM2 (l)
DE042 - Upper molar root number UM2 (r)
DE043 – Peg-shaped incisor UI2 (l)
DE044 – Peg-shaped incisor UI2 (r)
DE045 – Peg-shaped molar UM3 (l)
DE046 – Peg-shaped molar UM3 (r)
DE047 - Congenital absence UM3 (l)
DE048 - Congenital absence UM3 (r)
DE049 - Premol. lingual cusps LP2 (l)
DE050 - Premol. lingual cusps LP2 (r)
DE053 - Groove pattern LM2 (l)
DE054 - Groove pattern LM2 (r)
DE055 - Cusp number LM1 (l)
DE056 - Cusp number LM1 (r)
DE057 - Cusp number LM2 (l)
DE058 - Cusp number LM2 (r)
DE059 - Deflecting wrinkle LM1 (l)
DE060 - Deflecting wrinkle LM1 (r)
DE063 - Protostylid LM1 (l)
DE064 - Protostylid LM1 (r)
DE065 - Cusp 7 LM1 (l)
DE066 - Cusp 7 LM1 (r)
DE069 - Canine root number LC (l)
DE070 - Canine root number LC (r)
DE071 - Lower molar root number LM1 (l)
DE072 - Lower molar root number LM1 (r)
DE073 - Lower molar root number LM2 (l)
DE074 - Lower molar root number LM2 (r)
DE077 - Midline diastema
DE078 - Palatine torus
DE079 - Mandibular torus (l)
DE080 - Mandibular torus (r)
DE081 - Rocker jaw

Appendix II.B.6. Postcranial measurements (additional shortened list)

PM015 - H1. *Humerus* -Maximum length (l)
PM016 - H1. *Humerus* -Maximum length (r)
PM019 - H5. Maximum diameter of the mid-shaft (l)
PM020 - H5. Maximum diameter of the mid-shaft (r)
PM021 - H6. Minimum diameter of the mid-shaft (l)
PM022 - H6. Minimum diameter of the mid-shaft (r)
PM025 - H7a. Mid-shaft circumference (l)
PM026 - H7a. Mid-shaft circumference (r)
PM065 - U1. *Ulna* - Maximum length (l)
PM066 - U1. *Ulna* - Maximum length (r)
PM067 - U3. Least circumference (l)
PM068 - U3. Least circumference (r)
PM071 - *U3c. Crest circumference (l)
PM072 - *U3c. Crest circumference (r)
PM073 - U11. Dorso-ventral shaft diameter (l)
PM074 - U11. Dorso-ventral shaft diameter (r)
PM075 - U12. Transverse shaft diameter (l)
PM076 - U12. Transverse shaft diameter (r)
PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)
PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)
PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)
PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)
PM089 - F1. *Femur* - Maximum length (l)
PM090 - F1. *Femur* - Maximum length (r)
PM093 - F6. Anterior-posterior mid-shaft diameter (l)
PM094 - F6. Anterior-posterior mid-shaft diameter (r)
PM095 - F7. Medio-lateral mid-shaft diameter (l)
PM096 - F7. Medio-lateral mid-shaft diameter (r)
PM097 - F8. Mid-shaft circumference (l)
PM098 - F8. Mid-shaft circumference (r)
PM099 - F9. Subtrochanteric transverse diameter (l)
PM100 - F9. Subtrochanteric transverse diameter (r)
PM101 - F10. Subtrochanteric sagittal diameter (l)
PM102 - F10. Subtrochanteric sagittal diameter (r)
PM103 - *F10(1). Subtrochanteric circumference (l)
PM104 - *F10(1). Subtrochanteric circumference (r)
PM117 - *F34. *Linea aspera* breadth (l)
PM118 - *F34. *Linea aspera* breadth (r)
PM121 - *Femur* - Cortical thickness (ant.)
PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)
PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)
PM124 - *Femur* - Cortical thickness (med.)
PM125 - *Femur* - Cortical thickness (lat.)
PM126 - *Femur* - Cortical thickness (max.)
PM127 - *Femur* - Cortical thickness (min.)
PM130 - T1a. *Tibia* - Maximum length (l)
PM131 - T1a. *Tibia* - Maximum length (r)
PM138 - T8. Sagittal mid-shaft diameter (l)
PM139 - T8. Sagittal mid-shaft diameter (r)
PM142 - T9. Transverse mid-shaft diameter (l)
PM143 - T9. Transverse mid-shaft diameter (r)
PM146 - T10. Mid-shaft circumference (l)
PM147 - T10. Mid-shaft circumference (r)

PM150 - T10b. Minimum shaft circumference (l)

PM151 - T10b. Minimum shaft circumference (r)

Appendix II.B.7. Cranial robusticity traits (additional shortened list)

CR001 - Relief of the *Planum nuchale*
CR003 - *Processus mastoideus*
CR006 - *Arcus superciliaris*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)

Appendix II.B.8. Postcranial robusticity traits (additional shortened list)

PR007 - Ulnar shaft bowing (l)
PR008 - Ulnar shaft bowing (r)
PR009 - Ulnar *Margo interosseus* size (l)
PR010 - Ulnar *Margo interosseus* size (r)
PR011a - Femoral shaft bowing (l) - shape
PR012a - Femoral shaft bowing (r) - shape
PR013 - Pilasterism (l)
PR014 - Pilasterism (r)

Appendix II.B.9. Cranial musculoskeletal stress traits (additional shortened list)

CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)

CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)

Appendix II.B.10. Postcranial musculoskeletal stress traits (additional shortened list)

PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)
PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)
PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)
PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)
PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)
PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)
PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)
PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)
PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)
PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)

Appendix II.B.11. Enamel hypoplasia (additional shortened list)

DS001a - Hypoplasia UI1 (l) - intensity
DS002a - Hypoplasia UI1 (r) - intensity
DS003a - Hypoplasia UI2 (l) - intensity
DS004a - Hypoplasia UI2 (r) - intensity
DS005a - Hypoplasia UC (l) - intensity
DS006a - Hypoplasia UC (r) - intensity
DS007a - Hypoplasia UP1 (l) - intensity
DS008a - Hypoplasia UP1 (r) - intensity
DS009a - Hypoplasia UP2 (l) - intensity
DS010a - Hypoplasia UP2 (r) - intensity
DS011a - Hypoplasia UM1 (l) - intensity
DS012a - Hypoplasia UM1 (r) - intensity
DS013a - Hypoplasia UM2 (l) - intensity
DS014a - Hypoplasia UM2 (r) - intensity
DS015a - Hypoplasia UM3 (l) - intensity
DS016a - Hypoplasia UM3 (r) - intensity
DS017a - Hypoplasia LI1 (l) - intensity
DS018a - Hypoplasia LI1 (r) - intensity
DS019a - Hypoplasia LI2 (l) - intensity
DS020a - Hypoplasia LI2 (r) - intensity
DS021a - Hypoplasia LC (l) - intensity
DS022a - Hypoplasia LC (r) - intensity
DS023a - Hypoplasia LP1 (l) - intensity
DS024a - Hypoplasia LP1 (r) - intensity
DS025a - Hypoplasia LP2 (l) - intensity
DS026a - Hypoplasia LP2 (r) - intensity
DS027a - Hypoplasia LM1 (l) - intensity
DS028a - Hypoplasia LM1 (r) - intensity
DS029a - Hypoplasia LM2 (l) - intensity
DS030a - Hypoplasia LM2 (r) - intensity
DS031a - Hypoplasia LM3 (l) - intensity
DS032a - Hypoplasia LM3 (r) - intensity

Appendix III. Data collection lists

Appendix III.A. Full data collection list

Appendix III.A.1. Cranial measurements

CM001 - 1. Maximum cranial length
CM002 - 3. *Glabello-Lambda* length
CM003 - 8. Maximum cranial breadth
CM004 - 9. Least frontal breadth
CM005 - 10. Maximum frontal breadth
CM006 - 12. Biasterionic breadth
CM007 - 13a. Mastoid width (l)
CM008 - 13a. Mastoid width (r)
CM009 - 17. *Basion-Bregma* height
CM010 - 19a. Mastoid height (l)
CM011 - 19a. Mastoid height (r)
CM012 - 23. Horizontal circumference
CM013 - 24. Transverse arc
CM014 - 25b. *Glabella-Inion* arc
CM015 - 26a. *Glabella-Bregma* arc
CM016 - 27. Parietal sagittal arc
CM017 - 28. Occipital sagittal arc
CM018 - 28(2). *Inion-Opisthion* arc
CM019 - 29d. *Glabella-Bregma* chord
CM020 - 30. *Bregma-Lambda* chord
CM021 - 31. *Lambda-Opisthion* chord
CM022 - 31(2). *Inion-Opisthion* chord
CM023 - 44. Bimalar breadth
CM024 - 45. Bizygomatic breadth
CM025 - 45(3). Mid-orbital chord
CM026 - 46. Bimaxillary breadth
CM027 - 48 Upper facial height
CM028 - 48(1). *Nasospinale-Prosthion* height
CM029 - 48(3). Minimum orbito-alveolar height
CM030 - *50(1). Interorbital breadth
CM031 - 51. Orbital breadth (l)
CM032 - 51. Orbital breadth (r)
CM033 - 52. Orbital height (l)
CM034 - 52. Orbital height (r)
CM035 - 54. Nasal breadth
CM036 - 55. Nasal height
CM037 - 55(1). Nasal aperture height
CM038 - 56. Length of the nasal bones
CM039 - 57. Simotic chord
CM040 - 60. Maxillo-alveolar length
CM041 - 61. External palate breadth
CM042 - *61a(1). Canine alveolar breadth (mx)
CM043 - *61a(1). Canine alveolar breadth (md)
CM044 - *61a(2). 1^{st} premolar alveolar breadth (mx)
CM045 - *61a(2). 1^{st} premolar alveolar breadth (md)
CM046 - *61a(3). 2^{nd} premolar alveolar breadth (mx)
CM047 - *61a(3). 2^{nd} premolar alveolar breadth (md)
CM048 - *61a(4). 1^{st} molar alveolar breadth (mx)
CM049 - *61a(4). 1^{st} molar alveolar breadth (md)
CM050 - *61a(5). 2^{nd} molar alveolar breadth (mx)
CM051 - *61a(5). 2^{nd} molar alveolar breadth (md)
CM052 - 62. Internal palate length
CM053 - 62(1). Anterior palate length
CM054 - *62a(1). 1^{st} internal dental arch length (mx)
CM055 - *62a(1). 1^{st} internal dental arch length (md)
CM056 - *62a(2). 2^{nd} internal dental arch length (mx)
CM057 - *62a(2). 2^{nd} internal dental arch length (md)
CM058 - *62a(3). 3^{rd} internal dental arch length (mx)
CM059 - *62a(3). 3^{rd} internal dental arch length (md)
CM060 - *62a(4). 4^{th} internal dental arch length (mx)
CM061 - *62a(4). 4^{th} internal dental arch length (md)
CM062 - *62a(5). 5^{th} internal dental arch length (mx)
CM063 - *62a(5). 5^{th} internal dental arch length (md)
CM064 - *62a(6). 6^{th} internal dental arch length (mx)
CM065 - *62a(6). 6^{th} internal dental arch length (md)
CM066 - 63. Internal palate breadth (mx)
CM067 - *63. Internal palate breadth (md)
CM068 - 63(2). Anterior palate breadth (mx)
CM069 - *63(2). Anterior palate breadth (md)
CM070 - *63(2)a. 1^{st} internal dental arch breadth (mx)
CM071 - *63(2)a. 1^{st} internal dental arch breadth (md)
CM072 - *63(2)b. 2^{nd} internal dental arch breadth (mx)
CM073 - *63(2)b. 2^{nd} internal dental arch breadth (md)
CM074 - *63(2)c. 3^{rd} internal dental arch breadth (mx)
CM075 - *63(2)c. 3^{rd} internal dental arch breadth (md)
CM076 - *63(2)d. 4^{th} internal dental arch breadth (mx)
CM077 - *63(2)d. 4^{th} internal dental arch breadth (md)
CM078 - *63(2)e. 5^{th} internal dental arch breadth (mx)
CM079 - *63(2)e. 5^{th} internal dental arch breadth (md)
CM080 - 66. Bigonial breadth
CM081 - 67. Minimum chord between the mental foramina
CM082 - 68. Projective length of the body of the mandible
CM083 - 69. Height of the mandibular symphysis
CM084 - 69a. Symphyseal height
CM085 - *69c. Thickness of the mandibular symphysis
CM086 - 69(1). Mental foramen height (l)
CM087 - 69(1). Mental foramen height (r)
CM088 - 69(2). 2^{nd} molar mandibular body height (l)
CM089 - 69(2). 2^{nd} molar mandibular body height (r)
CM090 - *69(2)a. Canine mandibular body height (l)
CM091 - *69(2)a. Canine mandibular body height (r)
CM092 - *69(2)b. 1^{st} premolar mandibular body height (l)
CM093 - *69(2)b. 1^{st} premolar mandibular body height (r)
CM094 - *69(2)c. 2^{nd} premolar mandibular body height (l)
CM095 - *69(2)c. 2^{nd} premolar mandibular body height (r)
CM096 - *69(2)d. 1^{st} molar mandibular body height (l)
CM097 - *69(2)d. 1^{st} molar mandibular body height (r)
CM098 - *69(2)e. 3^{rd} molar mandibular body height (l)
CM099 - *69(2)e. 3^{rd} molar mandibular body height (r)
CM100 - 69(3). Mental foramen body thickness (l)
CM101 - 69(3). Mental foramen body thickness (r)
CM102 - 69b. 2^{nd} molar mandibular body thickness (l)
CM103 - 69b. 2^{nd} molar mandibular body thickness (r)
CM104 - *69b(1). Canine mandibular body thickness (l)
CM105 - *69b(1). Canine mandibular body thickness (r)
CM106 - *69b(2). 1^{st} premolar mandibular body thickness (l)
CM107 - *69b(2). 1^{st} premolar mandibular body thickness (r)
CM108 - *69b(3). 2^{nd} premolar mandibular body thickness (l)
CM109 - *69b(3). 2^{nd} premolar mandibular body thickness (r)
CM110 - *69b(4). 1^{st} molar mandibular body thickness (l)
CM111 - *69b(4). 1^{st} molar mandibular body thickness (r)
CM112 - *69b(5). 3^{rd} molar mandibular body thickness (l)
CM113 - *69b(5). 3^{rd} molar mandibular body thickness (r)
CM114 - 70. Ramus height (l)
CM115 - 70. Ramus height (r)
CM116 - 70(1). Coronoid height (l)
CM117 - 70(1). Coronoid height (r)
CM118 - 70(2). Minimum ramus height (l)
CM119 - 70(2). Minimum ramus height (r)
CM120 - 71. Minimum ramus breadth (l)
CM121 - 71. Minimum ramus breadth (r)
CM122 - 71a. Minimum ramus width (l)
CM123 - 71a. Minimum ramus width (r)
CM124 - 72. Profile angle
CM125 - 73. Nasal angle
CM126 - 74. Subnasal angle
CM127 - *74a. Alternative subnasal angle
CM128 - 74(2). Dental angle
CM129 - 79. Mandibular ramus angle (l)
CM130 - 79. Mandibular ramus angle (r)
CM131 - 79c. Mental angle
CM132 - 80. Dental arch length of the *Maxilla*
CM133 - 80a. Dental arch length of the mandible
CM134 - 80(1). External dental arch width (mx)
CM135 - 80(1). External dental arch width (md)
CM136 - *80(1)a. Canine dental arch breadth (mx)
CM137 - *80(1)a. Canine dental arch breadth (md)
CM138 - *80(1)b. 1^{st} premolar dental arch breadth (mx)
CM139 - *80(1)b. 1^{st} premolar dental arch breadth (md)
CM140 - *80(1)c. 2^{nd} premolar dental arch breadth (mx)

CM141 - *80(1)c. 2nd premolar dental arch breadth (md)
CM142 - *80(1)d. 1st molar dental arch breadth (mx)
CM143 - *80(1)d. 1st molar dental arch breadth (md)
CM144 - *80(1)e. 2nd molar dental arch breadth (mx)
CM145 - *80(1)e. 2nd molar dental arch breadth (md)
CM146 - *80(1)f. 3rd molar dental arch breadth (mx)
CM147 - *80(1)f. 3rd molar dental arch breadth (md)
CM148 - *80(4)a. Canine dental arch length (mx)
CM149 - *80(4)a. Canine dental arch length (md)
CM150 - *80(4)b. 1st premolar dental arch length (mx)
CM151 - *80(4)b. 1st premolar dental arch length (md)
CM152 - *80(4)c. 2nd premolar dental arch length (mx)
CM153 - *80(4)c. 2nd premolar dental arch length (md)
CM154 - *80(4)d. 1st molar dental arch length (mx)
CM155 - *80(4)d. 1st molar dental arch length (md)
CM156 - *80(4)e. 2nd molar dental arch length (mx)
CM157 - *80(4)e. 2nd molar dental arch length (md)
CM158 - *104. Maximum temporal line distance (l)
CM159 - *104. Maximum temporal line distance (r)
CM160 - *105. Minimum temporal line distance (l)
CM161 - *105. Minimum temporal line distance (r)
CM162 - Cranial thickness (*Os frontale*; medio-occipital to *Frontotemporale*)
CM163 - Cranial thickness (*Os parietale* lateral to *Bregma*)
CM164 - Cranial thickness (*Os parietale* lateral to supero-lateral to *Lambda*)
CM165 - Cranial thickness (*Os occipitale*; centre of the *Fossa cerebralis*)
CM166 - Cranial thickness (*Os occipitale*; centre of the *Fossa cerebellaris*)
CM167 - Cranial thickness (*Os occipitale*; centre of *Lambda*)
CM168 - Cranial thickness (maximum cranial thickness; location)
CM169 - Cranial thickness (minimum cranial thickness; location)
CM170 - Cranial thickness (location)
CM171 - Cranial thickness (location)

Appendix III.A.2. Dental measurements

DM001 - 81. Crown length UI1 (l)
DM002 - 81. Crown length UI1 (r)
DM003 - 81. Crown length UI2 (l)
DM004 - 81. Crown length UI2 (r)
DM005 - 81. Crown length UC (l)
DM006 - 81. Crown length UC (r)
DM007 - 81. Crown length UP1 (l)
DM008 - 81. Crown length UP1 (r)
DM009 - 81. Crown length UP2 (l)
DM010 - 81. Crown length UP2 (r)
DM011 - 81. Crown length UM1 (l)
DM012 - 81. Crown length UM1 (r)
DM013 - 81. Crown length UM2 (l)
DM014 - 81. Crown length UM2 (r)
DM015 - 81. Crown length UM3 (l)
DM016 - 81. Crown length UM3 (r)
DM017 - 81. Crown length LI1 (l)
DM018 - 81. Crown length LI1 (r)
DM019 - 81. Crown length LI2 (l)
DM020 - 81. Crown length LI2 (r)
DM021 - 81. Crown length LC (l)
DM022 - 81. Crown length LC (r)
DM023 - 81. Crown length LP1 (l)
DM024 - 81. Crown length LP1 (r)
DM025 - 81. Crown length LP2 (l)
DM026 - 81. Crown length LP2 (r)
DM027 - 81. Crown length LM1 (l)
DM028 - 81. Crown length LM1 (r)
DM029 - 81. Crown length LM2 (l)
DM030 - 81. Crown length LM2 (r)
DM031 - 81. Crown length LM3 (l)
DM032 - 81. Crown length LM3 (r)
DM033 - 81(1). Crown width UI1 (l)
DM034 - 81(1). Crown width UI1 (r)
DM035 - 81(1). Crown width UI2 (l)
DM036 - 81(1). Crown width UI2 (r)
DM037 - 81(1). Crown width UC (l)
DM038 - 81(1). Crown width UC (r)
DM039 - 81(1). Crown width UP1 (l)
DM040 - 81(1). Crown width UP1 (r)
DM041 - 81(1). Crown width UP2 (l)
DM042 - 81(1). Crown width UP2 (r)
DM043 - 81(1). Crown width UM1 (l)
DM044 - 81(1). Crown width UM1 (r)
DM045 - 81(1). Crown width UM2 (l)
DM046 - 81(1). Crown width UM2 (r)
DM047 - 81(1). Crown width UM3 (l)
DM048 - 81(1). Crown width UM3 (r)
DM049 - 81(1). Crown width LI1 (l)
DM050 - 81(1). Crown width LI1 (r)
DM051 - 81(1). Crown width LI2 (l)
DM052 - 81(1). Crown width LI2 (r)
DM053 - 81(1). Crown width LC (l)
DM054 - 81(1). Crown width LC (r)
DM055 - 81(1). Crown width LP1 (l)
DM056 - 81(1). Crown width LP1 (r)
DM057 - 81(1). Crown width LP2 (l)
DM058 - 81(1). Crown width LP2 (r)
DM059 - 81(1). Crown width LM1 (l)
DM060 - 81(1). Crown width LM1 (r)
DM061 - 81(1). Crown width LM2 (l)
DM062 - 81(1). Crown width LM2 (r)
DM063 - 81(1). Crown width LM3 (l)
DM064 - 81(1). Crown width LM3 (r)

Appendix III.A.3. Postcranial measurements

PM001 - C1. *Clavicula* - Maximum length (l)
PM002 - C1. *Clavicula* - Maximum length (r)
PM003 - C4. Vertical diameter of the mid-shaft (l)
PM004 - C4. Vertical diameter of the mid-shaft (r)
PM005 - C5. Sagittal diameter of the mid-shaft (l)
PM006 - C5. Sagittal diameter of the mid-shaft (r)
PM007 - C6. Circumference of the mid-shaft (l)
PM008 - C6. Circumference of the mid-shaft (r)
PM009 - *Clavicula* - Cortical thickness (ant.)
PM010 - *Clavicula* - Cortical thickness (post.)
PM011 - *Clavicula* - Cortical thickness (sup.)
PM012 - *Clavicula* - Cortical thickness (inf.)
PM013 - *Clavicula* - Cortical thickness (max.)
PM014 - *Clavicula* - Cortical thickness (min.)
PM015 - H1. *Humerus* - Maximum length (l)
PM016 - H1. *Humerus* - Maximum length (r)
PM017 - H4a. Maximum bi-epicondylar width (l)
PM018 - H4a. Maximum bi-epicondylar width (r)
PM019 - H5. Maximum diameter of the mid-shaft (l)
PM020 - H5. Maximum diameter of the mid-shaft (r)
PM021 - H6. Minimum diameter of the mid-shaft (l)
PM022 - H6. Minimum diameter of the mid-shaft (r)
PM023 - H7. Least circumference of the shaft (l)
PM024 - H7. Least circumference of the shaft (r)
PM025 - H7a. Mid-shaft circumference (l)
PM026 - H7a. Mid-shaft circumference (r)
PM027 - *H19. *Tuberositas deltoidea* breadth (l)
PM028 - *H19. *Tuberositas deltoidea* breadth (r)
PM029 - *H20. *Crista tuberculi majoris* breadth (l)
PM030 - *H20. *Crista tuberculi majoris* breadth (r)
PM031 - *Humerus* - Cortical thickness (ant.)
PM032 - *Humerus* - Cortical thickness (post.)
PM033 - *Humerus* - Cortical thickness (med.)
PM034 - *Humerus* - Cortical thickness (lat.)
PM035 - *Humerus* - Cortical thickness (max.)
PM036 - *Humerus* - Cortical thickness (min.)
PM037 - R1. *Radius* - Maximum length (l)
PM038 - R1. *Radius* - Maximum length (r)
PM039 - R3. Minimum circumference (l)
PM040 - R3. Minimum circumference (r)

PM041 - R4. Maximum transverse shaft diameter (l)
PM042 - R4. Maximum transverse shaft diameter (r)
PM043 - R4a. Transverse mid-shaft diameter (l)
PM044 - R4a. Transverse mid-shaft diameter (r)
PM045 - R5. Minimum sagittal shaft diameter (l)
PM046 - R5. Minimum sagittal shaft diameter (r)
PM047 - R5a. Sagittal mid-shaft diameter (l)
PM048 - R5a. Sagittal mid-shaft diameter (r)
PM049 - R5(4). Neck circumference (l)
PM050 - R5(4). Neck circumference (r)
PM051 - R5(5). Mid-shaft circumference (l)
PM052 - R5(5). Mid-shaft circumference (r)
PM053 - *R5(7). Maximum circumference (l)
PM054 - *R5(7). Maximum circumference (r)
PM055 - *R10. Longitudinal *Tuberositas radii* diameter (l)
PM056 - *R10. Longitudinal *Tuberositas radii* diameter (r)
PM057 - *R11. Transverse *Tuberositas radii* diameter (l)
PM058 - *R11. Transverse *Tuberositas radii* diameter (r)
PM059 - *Radius* - Cortical thickness (ant.)
PM060 - *Radius* - Cortical thickness (post.)
PM061 - *Radius* - Cortical thickness (med.)
PM062 - *Radius* - Cortical thickness (lat.)
PM063 - *Radius* - Cortical thickness (max.)
PM064 - *Radius* - Cortical thickness (min.)
PM065 - U1. *Ulna* - Maximum length (l)
PM066 - U1. *Ulna* - Maximum length (r)
PM067 - U3. Least circumference (l)
PM068 - U3. Least circumference (r)
PM069 - U3b. *Tuberositas ulnae* circumference (l)
PM070 - U3b. *Tuberositas ulnae* circumference (r)
PM071 - *U3c. Crest circumference (l)
PM072 - *U3c. Crest circumference (r)
PM073 - U11. Dorso-ventral shaft diameter (l)
PM074 - U11. Dorso-ventral shaft diameter (r)
PM075 - U12. Transverse shaft diameter (l)
PM076 - U12. Transverse shaft diameter (r)
PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)
PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)
PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)
PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)
PM081 - *Ulna* - Cortical thickness (ant.)
PM082 - *Ulna* - Cortical thickness (post.)
PM083 - *Ulna* - Cortical thickness (med.)
PM084 - *Ulna* - Cortical thickness (lat.)
PM085 - *Ulna* - Cortical thickness (max.)
PM086 - *Ulna* - Cortical thickness (min.)
PM087 - P22. Maximum *Acetabulum* breadth (l)
PM088 - P22. Maximum *Acetabulum* breadth (r)
PM089 - F1. *Femur* - Maximum length (l)
PM090 - F1. *Femur* - Maximum length (r)
PM091 - F2. Physiological length (l)
PM092 - F2. Physiological length (r)
PM093 - F6. Anterior-posterior mid-shaft diameter (l)
PM094 - F6. Anterior-posterior mid-shaft diameter (r)
PM095 - F7. Medio-lateral mid-shaft diameter (l)
PM096 - F7. Medio-lateral mid-shaft diameter (r)
PM097 - F8. Mid-shaft circumference (l)
PM098 - F8. Mid-shaft circumference (r)
PM099 - F9. Subtrochanteric transverse diameter (l)
PM100 - F9. Subtrochanteric transverse diameter (r)
PM101 - F10. Subtrochanteric sagittal diameter (l)
PM102 - F10. Subtrochanteric sagittal diameter (r)
PM103 - *F10(1). Subtrochanteric circumference (l)
PM104 - *F10(1). Subtrochanteric circumference (r)
PM105 - F15. Vertical neck diameter (l)
PM106 - F15. Vertical neck diameter (r)
PM107 - F16. Sagittal neck diameter (l)
PM108 - F16. Sagittal neck diameter (r)
PM109 - F17. Neck circumference (l)
PM110 - F17. Neck circumference (r)
PM111 - F18. Vertical head diameter (l)
PM112 - F18. Vertical head diameter (r)
PM113 - F19. Transverse head diameter (l)
PM114 - F19. Transverse head diameter (r)
PM115 - F20. Head circumference (l)
PM116 - F20. Head circumference (r)
PM117 - *F34. *Linea aspera* breadth (l)
PM118 - *F34. *Linea aspera* breadth (r)
PM119 - *F35. *Linea intertrochanterica* breadth (l)
PM120 - *F35. *Linea intertrochanterica* breadth (r)
PM121 - *Femur* - Cortical thickness (ant.)
PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)
PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)
PM124 - *Femur* - Cortical thickness (med.)
PM125 - *Femur* - Cortical thickness (lat.)
PM126 - *Femur* - Cortical thickness (max.)
PM127 - *Femur* - Cortical thickness (min.)
PM128 - T1. *Tibia* length (l)
PM129 - T1. *Tibia* length (r)
PM130 - T1a. *Tibia* - Maximum length (l)
PM131 - T1a. *Tibia* - Maximum length (r)
PM132 - T2. Physiological length (l)
PM133 - T2. Physiological length (r)
PM134 - T4. Maximum sagittal tuberosity diameter (l)
PM135 - T4. Maximum sagittal tuberosity diameter (r)
PM136 - T5. Minimum transverse tuberosity diameter (l)
PM137 - T5. Minimum transverse tuberosity diameter (r)
PM138 - T8. Sagittal mid-shaft diameter (l)
PM139 - T8. Sagittal mid-shaft diameter (r)
PM140 - T8a. Sagittal nutrient foramen diameter (l)
PM141 - T8a. Sagittal nutrient foramen diameter (r)
PM142 - T9. Transverse mid-shaft diameter (l)
PM143 - T9. Transverse mid-shaft diameter (r)
PM144 - T9a. Transverse nutrient foramen diameter (l)
PM145 - T9a. Transverse nutrient foramen diameter (r)
PM146 - T10. Mid-shaft circumference (l)
PM147 - T10. Mid-shaft circumference (r)
PM148 - T10a. Nutient foramen circumference (l)
PM149 - T10a. Nutient foramen circumference (r)
PM150 - T10b. Minimum shaft circumference (l)
PM151 - T10b. Minimum shaft circumference (r)
PM152 - *T15. Longitudinal *Tuberosita tibiae* diameter (l)
PM153 - *T15. Longitudinal *Tuberosita tibiae* diameter (r)
PM154 - *T16. Transverse *Tuberosita tibiae* diameter (l)
PM155 - *T16. Transverse *Tuberosita tibiae* diameter (r)
PM156 - *T17. *Linea musculi solei* breadth (l)
PM157 - *T17. *Linea musculi solei* breadth (r)
PM158 - *Tibia* - Cortical thickness (ant.)
PM159 - *Tibia* - Cortical thickness (post.)
PM160 - *Tibia* - Cortical thickness (med.)
PM161 - *Tibia* - Cortical thickness (lat.)
PM162 - *Tibia* - Cortical thickness (max.)
PM163 - *Tibia* - Cortical thickness (min.)
PM164 - Fi1. *Fibula* - Maximum length (l)
PM165 - Fi1. *Fibula* - Maximum length (r)
PM166 - Fi2. Maximum mid-shaft diameter (l)
PM167 - Fi2. Maximum mid-shaft diameter (r)
PM168 - Fi3. Minimum mid-shaft diameter (l)
PM169 - Fi3. Minimum mid-shaft diameter (r)
PM170 - Fi4. Mid-shaft circumference (l)
PM171 - Fi4. Mid-shaft circumference (r)
PM172 - Fi4a. Minimum circumference (l)
PM173 - Fi4a. Minimum circumference (r)
PM174 - *Fibula* - Cortical thickness (ant.)
PM175 - *Fibula* - Cortical thickness (post.)
PM176 - *Fibula* - Cortical thickness (med.)
PM177 - *Fibula* - Cortical thickness (lat.)
PM178 - *Fibula* - Cortical thickness (max.)
PM179 - *Fibula* - Cortical thickness (min.)

Appendix III.A.4. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)
CN002a - Cranial shape (*Norma verticalis*) - main
CN002b - Cranial shape (*Norma verticalis*) - additional tendency
CN003 - Cranial height (*Norma lateralis*)
CN004 - Cranial height (*Norma occipitalis*)

CN005a - Cranial shape (*Norma occipitalis*) - main
CN005b - Cranial shape (*Norma occipitalis*) - additional tendency
CN006a - Occipital bunning - degree
CN006b - Occipital bunning - shape
CN007a - Sagittal keeling - degree
CN007b - Sagittal keeling - shape
CN008 - *Bregma* depression
CN009 - *Tuberculum mastoideum* (l)
CN010 - *Tuberculum mastoideum* (r)
CN011 - Relative facial height
CN012 - Relative facial breadth
CN013a - Orbital geometry - main
CN013b - Orbital geometry - additional tendency
CN014 - Malar prominence (upper facial flatness)
CN015 - Course of the *Sutura zygomaticomaxillaris*
CN016 - Interorbital breadth
CN017a - Shape of the *Sella nasi* - main
CN017b - Shape of the *Sella nasi* - additional tendency/superstructure
CN018 - Interorbital projection
CN019 - Orientation of the *Processus frontales maxillae*
CN020 - Nasal profile
CN021 - Relative nasal breadth
CN022 - *Spina nasalis anterior*
CN023a - *Margo infranasalis* - main
CN023b - *Margo infranasalis* - additional tendency/degree
CN024 - Alveolar prognathism
CN025 - Dental arch breadth
CN026 - Dental arch shape
CN027 - *Sutura palatina transversa*
CN028 - Symphyseal height
CN029 - Ramus geometry
CN030 - Ramus shape
CN031 - Ramus inversion
CN032 - Ramus angle

Appendix III.A.5. Cranial epigenetic traits

CE001 - *Ossa suturae coronalis*
CE002 - *Ossa suturae sagittalis*
CE003 - *Ossa suturae lambdoideae*
CE004 - *Ossa suturae squamosae* (l)
CE005 - *Ossa suturae squamosae* (r)
CE006 - *Os bregmaticum*
CE007 - *Os lambdae*
CE008 - *Os epiptericum* (l)
CE009 - *Os epiptericum* (r)
CE010 - *Os astericum* (l)
CE011 - *Os astericum* (r)
CE012 - *Os incisurae parietalis* (l)
CE013 - *Os incisurae parietalis* (r)
CE014 - *Os incae*
CE015 - *Os incisivum*/*Sutura incisiva*
CE016 - *Os japonicum* (l)
CE017 - *Os japonicum* (r)
CE018 - *Os squamosum* (l)
CE019 - *Os squamosum* (r)
CE020 - *Os metopicum*
CE021 - *Sutura metopica*
CE022 - *Fissura metopica*
CE023 - *Sutura parietalis* (l)
CE024 - *Sutura parietalis* (r)
CE025 - *Sutura occipitalis*
CE026 - *Sutura zygomatica* (l)
CE027 - *Sutura zygomatica* (r)
CE028 - *Sutura fronto-temporalis* (l)
CE029 - *Sutura fronto-temporalis* (r)
CE030a - *Foramen parietale* (l) - presence
CE031a - *Foramen parietale* (r) - presence
CE030b - *Foramen parietale* (l) - number
CE031b - *Foramen parietale* (r) - number
CE032 - *Foramen mastoideum* (l)
CE033 - *Foramen mastoideum* (r)
CE034 - *Canalis condylaris* (l)
CE035 - *Canalis condylaris* (r)
CE036 - *Foramen supraorbitale* (l)
CE037 - *Foramen supraorbitale* (r)
CE038a - *Foramen frontale* (l) - presence
CE039a - *Foramen frontale* (r) - presence
CE038b - *Foramen frontale* (l) -number
CE039b - *Foramen frontale* (r) - number
CE040a - *Foramen zygomaticofaciale* (l) - presence
CE041a - *Foramen zygomaticofaciale* (r) - presence
CE040b - *Foramen zygomaticofaciale* (l) - number
CE041b - *Foramen zygomaticofaciale* (r) - number
CE042 - *Foramen ethmoidale posterius* (l)
CE043 - *Foramen ethmoidale posterius* (r)
CE044 - *Foramen ethomoidale accessorium* (l)
CE045 - *Foramen ethomoidale accessorium* (r)
CE046 - *Foramen ethmoidale anterius extrasuturale* (l)
CE047 - *Foramen ethmoidale anterius extrasuturale* (r)
CE048 - *Foramen tympanicum* Huschkei (l)
CE049 - *Foramen tympanicum* Huschkei (r)
CE050a - *Foramen infraorbitale accessorium* (l) - presence
CE051a - *Foramen infraorbitale accessorium* (r) - presence
CE050b - *Foramen infraorbitale accessorium* (l) - number
CE051b - *Foramen infraorbitale accessorium* (r) - number
CE052 - *Foramen infraorbitale partitum* (l)
CE053 - *Foramen infraorbitale partitum* (r)
CE054a - **Foramina paranasalia* (l)
CE054b - **Foramina paranasalia* (r)
CE055 - *Foramen palatinum minus accessorium* (l)
CE056 - *Foramen palatinum minus accessorium* (r)
CE057a - *Foramen mentale accessorium* (l) - presence
CE058a - *Foramen mentale accessorium* (r) - presence
CE057b - *Foramen mentale accessorium* (l) - number
CE058b - *Foramen mentale accessorium* (r) - number
CE059 - *Foramen ovale incompletum* (l)
CE060 - *Foramen ovale incompletum* (r)
CE061 - *Foramen spinosum incompletum* (l)
CE062 - *Foramen spinosum incompletum* (r)
CE063 - Mylohyoid bridging (l)
CE064 - Mylohyoid bridging (r)
CE065 - *Torus maxillaris* (l)
CE066 - *Torus maxillaris* (r)
CE067 - *Torus acusticus* (l)
CE068 - *Torus acusticus* (r)
CE069 - *Torus occipitalis*
CE070 - *Tuberculum praecondylare* (l)
CE071 - *Tuberculum praecondylare* (r)
CE072 - *Facies articularis condylaris bipartita* (l)
CE073 - *Facies articularis condylaris bipartita* (r)
CE074 - *Linea nuchalis suprema*

Appendix III.A.6. Dental epigenetic traits

DE001 - Winging UI1 (l)
DE002 - Winging UI1 (r)
DE003 - Labial curvature UI1 (l)
DE004 - Labial curvature UI1 (r)
DE005 - Shovel UI1 (l)
DE006 - Shovel UI1 (r)
DE007 - Double shovel UI1 (l)
DE008 - Double shovel UI1 (r)
DE009 - Interruption groove UI2 (l)
DE010 - Interruption groove UI2 (r)
DE011 - *Tuberculum dentale* UI2 (l)
DE012 - *Tuberculum dentale* UI2 (r)
DE013 - Canine mesial ridge (“Bushman canine”) UC (l)
DE014 - Canine mesial ridge (“Bushman canine”) UC (r)
DE015 - Distal accessory ridge UC (l)
DE016 - Distal accessory ridge UC (r)
DE017 - Premol. mesial & distal access. cusps UP1 (l)
DE018 - Premol. mesial & distal access. cusps UP1 (r)

DE019 - Premol. mesial & distal access. cusps UP2 (l)
DE020 - Premol. mesial & distal access. cusps UP2 (r)
DE021 - Tricusped premolars UP1 (l)
DE022 - Tricusped premolars UP1 (r)
DE023 - Distosagittal ridge UP1 (l)
DE024 - Distosagittal ridge UP1 (r)
DE025 - Metacone UM3 (l)
DE026 - Metacone UM3 (r)
DE027 - Hypocone UM2 (l)
DE028 - Hypocone UM2 (r)
DE029 - Cusp 5 (metaconule) UM1 (l)
DE030 - Cusp 5 (metaconule) UM1 (r)
DE031 - Carabelli's trait UM1 (l)
DE032 - Carabelli's trait UM1 (r)
DE033 - Parastyle UM2 (l)
DE034 - Parastyle UM2 (r)
DE035 - Parastyle UM3 (l)
DE036 - Parastyle UM3 (r)
DE037 - Enamel extension UM1 (l)
DE038 - Enamel extension UM1 (r)
DE039 - Premolar root number UP1 (l)
DE040 - Premolar root number UP1 (r)
DE041 - Upper molar root number UM2 (l)
DE042 - Upper molar root number UM2 (r)
DE043 - Peg-shaped incisor UI2 (l)
DE044 - Peg-shaped incisor UI2 (r)
DE045 - Peg-shaped molar UM3 (l)
DE046 - Peg-shaped molar UM3 (r)
DE047 - Congenital absence UM3 (l)
DE048 - Congenital absence UM3 (r)
DE049 - Premol. lingual cusps LP2 (l)
DE050 - Premol. lingual cusps LP2 (r)
DE051 - Anterior fovea LM1 (l)
DE052 - Anterior fovea LM1 (r)
DE053 - Groove pattern LM2 (l)
DE054 - Groove pattern LM2 (r)
DE055 - Cusp number LM1 (l)
DE056 - Cusp number LM1 (r)
DE057 - Cusp number LM2 (l)
DE058 - Cusp number LM2 (r)
DE059 - Deflecting wrinkle LM1 (l)
DE060 - Deflecting wrinkle LM1 (r)
DE061 - Distal trigonid crest LM1 (l)
DE062 - Distal trigonid crest LM1 (r)
DE063 - Protostylid LM1 (l)
DE064 - Protostylid LM1 (r)
DE065 - Cusp 7 LM1 (l)
DE066 - Cusp 7 LM1 (r)
DE067 - Tome's root LP1 (l)
DE068 - Tome's root LP1 (r)
DE069 - Canine root number LC (l)
DE070 - Canine root number LC (r)
DE071 - Lower molar root number LM1 (l)
DE072 - Lower molar root number LM1 (r)
DE073 - Lower molar root number LM2 (l)
DE074 - Lower molar root number LM2 (r)
DE075 - Torsomolar angle LM3 (l)
DE076 - Torsomolar angle LM3 (r)
DE077 - Midline diastema
DE078 - Palatine torus
DE079 - Mandibular torus (l)
DE080 - Mandibular torus (r)
DE081 - Rocker jaw

Appendix III.A.7. Postcranial epigenetic traits

PE001a - Allen's fossa (l) - presence
PE002a - Allen's fossa (r) - presence
PE001b - Allen's fossa (l) - degree
PE002b - Allen's fossa (r) - degree
PE003a - Poirier's facet (l) - presence
PE004a - Poirier's facet (r) - presence
PE003b - Poirier's facet (l) - degree
PE004b - Poirier's facet (r) - degree
PE005 - Plaque (*Femur*) (l)
PE006 - Plaque (*Femur*) (r)
PE007a - *Fossa hypotrochanterica* (l) - presence
PE008a - *Fossa hypotrochanterica* (r) - presence
PE007b - *Fossa hypotrochanterica* (l) - degree
PE008b - *Fossa hypotrochanterica* (r) - degree
PE009a - *Tuberculum fossae trochantericae* (l) - presence
PE010a - *Tuberculum fossae trochantericae* (r) - presence
PE009b - *Tuberculum fossae trochantericae* (l) - degree
PE010b - *Tuberculum fossae trochantericae* (r) - degree
PE011 - *Trochanter tertius* (l)
PE012 - *Trochanter tertius* (r)
PE013 - Medial squatting facet (l)
PE014 - Medial squatting facet (r)
PE015 - Lateral squatting facet (l)
PE016 - Lateral squatting facet (r)
PE017 - *Processus supracondylaris* (l)
PE018 - *Processus supracondylaris* (r)
PE019a - *Foramen supratrochleare* (l) - presence
PE020a - *Foramen supratrochleare* (r) - presence
PE019b - *Foramen supratrochleare* (l) - degree
PE020b - *Foramen supratrochleare* (r) - degree
PE021a - **Foramen intertrochleare* (l) - presence
PE022a -**Foramen intertrochleare* (r) - presence
PE021b - **Foramen intertrochleare* (l) - degree
PE022b - **Foramen intertrochleare* (r) - degree
PE023 - Acetabular crease (l)
PE024 - Acetabular crease (r)
PE025a - *Sulcus praearicularis* (l) - presence
PE026a - *Sulcus praearicularis* (r) - presence
PE025b - *Sulcus praearicularis* (l) - degree
PE026b - *Sulcus praearicularis* (r) - degree
PE027 - Accessory sacral facets (l)
PE028 - Accessory sacral facets (r)
PE029a - *Acromion (Facies articularis inferior)* (l) - presence
PE030a - *Acromion (Facies articularis inferior)* (r) - presence
PE029b - *Acromion (Facies articularis inferior)* (l) - degree
PE030b - *Acromion (Facies articularis inferior)* (r) - degree
PE031 - *Foramen supraspinale* (l)
PE032 - *Foramen supraspinale* (r)
PE033 - *Sulcus circumflexus* (l)
PE034 - *Sulcus circumflexus* (r)
PE035a - *Incisura vasta* (l) - presence
PE036a - *Incisura vasta* (r) - presence
PE035b - *Incisura vasta* (l) - degree
PE036b - *Incisura vasta* (r) - degree
PE037 - *Fossa vasta* (l)
PE038 - *Fossa vasta* (r)
PE039 - *Patella bipartita* (l)
PE040 - *Patella bipartita* (r)
PE041 - *Os trigonum* (l)
PE042 - *Os trigonum* (r)
PE043 - *Facies articularis media* (l)
PE044 - *Facies articularis media* (r)
PE045 - Lateral talar extension (l)
PE046 - Lateral talar extension (r)
PE047 - *Facies articularis inferior* (l)
PE048 - *Facies articularis inferior* (r)
PE049 - *Facies articularis navicularis bipartita* (l)
PE050 - *Facies articularis navicularis bipartita* (r)
PE051 - Anterior calcaneal facet double (l)
PE052 - Anterior calcaneal facet double (r)
PE053 - Anterior calcaneal facet absent (l)
PE054 - Anterior calcaneal facet absent (r)
PE055 - *Tuberculum peroneale* (l)
PE056 - *Tuberculum peroneale* (r)
PE057 - *Fovea articularis superior bipartita*
PE058 - *Ponticulus posterior*
PE059 - Lateral bridging
PE060 - *Foramen transversum bipartitum*
PE061 - *Processus spinosus bipartitus*
PE062 - *Hiatus sacralis caudalis*

Appendix III.A.8. Cranial robusticity traits

CR001 - Relief of the *Planum nuchale*
CR002 - *Inion* (*Protuberantia occipitalis externa*)
CR003 - *Processus mastoideus*
CR004 - *Crista supramastoidea*
CR005 - *Tubera frontalia et parietalia*
CR006 - *Arcus superciliaris*
CR007 - *Glabella*
CR008 - *Forma orbitae*
CR009 - *Os zygomaticum*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)

Appendix III.A.9. Postcranial robusticity traits

PR001 - Humeral shaft bowing (l)
PR002 - Humeral shaft bowing (r)
PR003 - Radial shaft bowing (l)
PR004 - Radial shaft bowing (r)
PR005 - Radial *Margo interosseus* size (l)
PR006 - Radial *Margo interosseus* size (r)
PR007 - Ulnar shaft bowing (l)
PR008 - Ulnar shaft bowing (r)
PR009 - Ulnar *Margo interosseus* size (l)
PR010 - Ulnar *Margo interosseus* size (r)
PR011a - Femoral shaft bowing (l) - shape
PR012a - Femoral shaft bowing (r) - shape
PR011b - Femoral shaft bowing (l) - degree
PR012b - Femoral shaft bowing (r) - degree
PR013 - Pilasterism (l)
PR014 - Pilasterism (r)
PR015 - Tibial retroversion (l)
PR016 - Tibial retroversion (r)

Appendix III.A.10. Cranial musculoskeletal stress traits

CS001 - *Calvarium*; *Musculus trapezius* (*Origo*)
CS002 - *Calvarium*; *Musculus masseter* (*Origo*) (l)
CS003 - *Calvarium*; *Musculus masseter* (*Origo*) (r)
CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)
CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)
CS006 - *Calvarium*; *Musculus temporalis* (*Origo*) (l)
CS007 - *Calvarium*; *Musculus temporalis* (*Origo*) (r)
CS008 - *Mandibula*; *Musculus temporalis* (*Insertio*) (l)
CS009 - *Mandibula*; *Musculus temporalis* (*Insertio*) (r)
CS010 - *Mandibula*; *Musculus masseter* (*Insertio*) (l)
CS011 - *Mandibula*; *Musculus masseter* (*Insertio*) (r)
CS012 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (l)
CS013 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (r)

Appendix III.A.11. Postcranial musculoskeletal stress traits

PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)
PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)
PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)
PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)
PS005 - *Radius*; *Musculus biceps brachii* (*Insertio*) (l)
PS006 - *Radius*; *Musculus biceps brachii* (*Insertio*) (r)
PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)
PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)
PS009 - *Femur*; *Musculus iliopsoas* (*Insertio*) (l)
PS010 - *Femur*; *Musculus iliopsoas* (*Insertio*) (r)
PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)
PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)
PS013 - *Tibia*; *Ligamentum patellae* (*Musculus quadriceps femoris*) (*Insertio*) (l)
PS014 - *Tibia*; *Ligamentum patellae* (*Musculus quadriceps femoris*) (*Insertio*) (r)
PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)
PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)

Appendix III.A.12. Tooth loss

DL001 - Tooth loss UI1 (l)
DL002 - Tooth loss UI1 (r)
DL001a - Tooth loss UI1 (l) - presence
DL002a - Tooth loss UI1 (r) - presence
DL003 - Tooth loss UI2 (l)
DL004 - Tooth loss UI2 (r)
DL003a - Tooth loss UI2 (l) - presence
DL004a - Tooth loss UI2 (r) - presence
DL005 - Tooth loss UC (l)
DL006 - Tooth loss UC (r)
DL005a - Tooth loss UC (l) - presence
DL006a - Tooth loss UC (r) - presence
DL007 - Tooth loss UP1 (l)
DL008 - Tooth loss UP1 (r)
DL007a - Tooth loss UP1 (l) - presence
DL008a - Tooth loss UP1 (r) - presence
DL009 - Tooth loss UP2 (l)
DL010 - Tooth loss UP2 (r)
DL009a - Tooth loss UP2 (l) - presence
DL010a - Tooth loss UP2 (r) - presence
DL011 - Tooth loss UM1 (l)
DL012 - Tooth loss UM1 (r)
DL011a - Tooth loss UM1 (l) - presence
DL012a - Tooth loss UM1 (r) - presence
DL013 - Tooth loss UM2 (l)
DL014 - Tooth loss UM2 (r)
DL013a - Tooth loss UM2 (l) - presence
DL014a - Tooth loss UM2 (r) - presence
DL015 - Tooth loss UM3 (l)
DL016 - Tooth loss UM3 (r)
DL015a - Tooth loss UM3 (l) - presence
DL016a - Tooth loss UM3 (r) - presence
DL017 - Tooth loss LI1 (l)
DL018 - Tooth loss LI1 (r)
DL017a - Tooth loss LI1 (l) - presence
DL018a - Tooth loss LI1 (r) - presence
DL019 - Tooth loss LI2 (l)
DL020 - Tooth loss LI2 (r)
DL019a - Tooth loss LI2 (l) - presence
DL020a - Tooth loss LI2 (r) - presence
DL021 - Tooth loss LC (l)
DL022 - Tooth loss LC (r)
DL021a - Tooth loss LC (l) - presence
DL022a - Tooth loss LC (r) - presence
DL023 - Tooth loss LP1 (l)
DL024 - Tooth loss LP1 (r)
DL023a - Tooth loss LP1 (l) - presence
DL024a - Tooth loss LP1 (r) - presence
DL025 - Tooth loss LP2 (l)
DL026 - Tooth loss LP2 (r)
DL025a - Tooth loss LP2 (l) - presence
DL026a - Tooth loss LP2 (r) - presence
DL027 - Tooth loss LM1 (l)
DL028 - Tooth loss LM1 (r)

DL027a - Tooth loss LM1 (l) - presence
DL028a - Tooth loss LM1 (r) - presence
DL029 - Tooth loss LM2 (l)
DL030 - Tooth loss LM2 (r)
DL029a - Tooth loss LM2 (l) - presence
DL030a - Tooth loss LM2 (r) - presence
DL031 - Tooth loss LM3 (l)
DL032 - Tooth loss LM3 (r)
DL031a - Tooth loss LM3 (l) - presence
DL032a - Tooth loss LM3 (r) - presence

Appendix III.A.13. Dental abrasion

DA001 - Abrasion UI1 (l)
DA002 - Abrasion UI1 (r)
DA003 - Abrasion UI2 (l)
DA004 - Abrasion UI2 (r)
DA005 - Abrasion UC (l)
DA006 - Abrasion UC (r)
DA007 - Abrasion UP1 (l)
DA008 - Abrasion UP1 (r)
DA009 - Abrasion UP2 (l)
DA010 - Abrasion UP2 (r)
DA011 - Abrasion UM1 (l)
DA012 - Abrasion UM1 (r)
DA013 - Abrasion UM2 (l)
DA014 - Abrasion UM2 (r)
DA015 - Abrasion UM3 (l)
DA016 - Abrasion UM3 (r)
DA017 - Abrasion LI1 (l)
DA018 - Abrasion LI1 (r)
DA019 - Abrasion LI2 (l)
DA020 - Abrasion LI2 (r)
DA021 - Abrasion LC (l)
DA022 - Abrasion LC (r)
DA023 - Abrasion LP1 (l)
DA024 - Abrasion LP1 (r)
DA025 - Abrasion LP2 (l)
DA026 - Abrasion LP2 (r)
DA027 - Abrasion LM1 (l)
DA028 - Abrasion LM1 (r)
DA029 - Abrasion LM2 (l)
DA030 - Abrasion LM2 (r)
DA031 - Abrasion LM3 (l)
DA032 - Abrasion LM3 (r)

Appendix III.A.14. Enamel hypoplasia

DS001a - Hypoplasia UI1 (l) - intensity
DS002a - Hypoplasia UI1 (r) - intensity
DS001b - Hypoplasia UI1 (l) - frequency
DS002b - Hypoplasia UI1 (r) - frequency
DS003a - Hypoplasia UI2 (l) - intensity
DS004a - Hypoplasia UI2 (r) - intensity
DS003b - Hypoplasia UI2 (l) - frequency
DS004b - Hypoplasia UI2 (r) - frequency
DS005a - Hypoplasia UC (l) - intensity
DS006a - Hypoplasia UC (r) - intensity
DS005b - Hypoplasia UC (l) - frequency
DS006b - Hypoplasia UC (r) - frequency
DS007a - Hypoplasia UP1 (l) - intensity
DS008a - Hypoplasia UP1 (r) - intensity
DS007b - Hypoplasia UP1 (l) - frequency
DS008b - Hypoplasia UP1 (r) - frequency
DS009a - Hypoplasia UP2 (l) - intensity
DS010a - Hypoplasia UP2 (r) - intensity
DS009b - Hypoplasia UP2 (l) - frequency
DS010b - Hypoplasia UP2 (r) - frequency
DS011a - Hypoplasia UM1 (l) - intensity
DS012a - Hypoplasia UM1 (r) - intensity
DS011b - Hypoplasia UM1 (l) - frequency
DS012b - Hypoplasia UM1 (r) - frequency
DS013a - Hypoplasia UM2 (l) - intensity
DS014a - Hypoplasia UM2 (r) - intensity
DS013b - Hypoplasia UM2 (l) - frequency
DS014b - Hypoplasia UM2 (r) - frequency
DS015a - Hypoplasia UM3 (l) - intensity
DS016a - Hypoplasia UM3 (r) - intensity
DS015b - Hypoplasia UM3 (l) - frequency
DS016b - Hypoplasia UM3 (r) - frequency
DS017a - Hypoplasia LI1 (l) - intensity
DS018a - Hypoplasia LI1 (r) - intensity
DS017b - Hypoplasia LI1 (l) - frequency
DS018b - Hypoplasia LI1 (r) - frequency
DS019a - Hypoplasia LI2 (l) - intensity
DS020a - Hypoplasia LI2 (r) - intensity
DS019b - Hypoplasia LI2 (l) - frequency
DS020b - Hypoplasia LI2 (r) - frequency
DS021a - Hypoplasia LC (l) - intensity
DS022a - Hypoplasia LC (r) - intensity
DS021b - Hypoplasia LC (l) - frequency
DS022b - Hypoplasia LC (r) - frequency
DS023a - Hypoplasia LP1 (l) - intensity
DS024a - Hypoplasia LP1 (r) - intensity
DS023b - Hypoplasia LP1 (l) - frequency
DS024b - Hypoplasia LP1 (r) - frequency
DS025a - Hypoplasia LP2 (l) - intensity
DS026a - Hypoplasia LP2 (r) - intensity
DS025b - Hypoplasia LP2 (l) - frequency
DS026b - Hypoplasia LP2 (r) - frequency
DS027a - Hypoplasia LM1 (l) - intensity
DS028a - Hypoplasia LM1 (r) - intensity
DS027b - Hypoplasia LM1 (l) - frequency
DS028b - Hypoplasia LM1 (r) - frequency
DS029a - Hypoplasia LM2 (l) - intensity
DS030a - Hypoplasia LM2 (r) - intensity
DS029b - Hypoplasia LM2 (l) - frequency
DS030b - Hypoplasia LM2 (r) - frequency
DS031a - Hypoplasia LM3 (l) - intensity
DS032a - Hypoplasia LM3 (r) - intensity
DS031b - Hypoplasia LM3 (l) - frequency
DS032b - Hypoplasia LM3 (r) - frequency

Appendix III.A.15. Dental caries

DC001 - Caries UI1 (l)
DC002 - Caries UI1 (r)
DC001a - Caries UI1 (l) - presence
DC002a - Caries UI1 (r) - presence
DC003 - Caries UI2 (l)
DC004 - Caries UI2 (r)
DC003a - Caries UI2 (l) - presence
DC004a - Caries UI2 (r) - presence
DC005 - Caries UC (l)
DC006 - Caries UC (r)
DC005a - Caries UC (l) - presence
DC006a - Caries UC (r) - presence
DC007 - Caries UP1 (l)
DC008 - Caries UP1 (r)
DC007a - Caries UP1 (l) - presence
DC008a - Caries UP1 (r) - presence
DC009 - Caries UP2 (l)
DC010 - Caries UP2 (r)
DC009a - Caries UP2 (l) - presence
DC010a - Caries UP2 (r) - presence
DC011 - Caries UM1 (l)
DC012 - Caries UM1 (r)
DC011a - Caries UM1 (l) - presence
DC012a - Caries UM1 (r) - presence
DC013 - Caries UM2 (l)
DC014 - Caries UM2 (r)

DC013a - Caries UM2 (l) - presence
DC014a - Caries UM2 (r) - presence
DC015 - Caries UM3 (l)
DC016 - Caries UM3 (r)
DC015a - Caries UM3 (l) - presence
DC016a - Caries UM3 (r) - presence
DC017 - Caries LI1 (l)
DC018 - Caries LI1 (r)
DC017a - Caries LI1 (l) - presence
DC018a - Caries LI1 (r) - presence
DC019 - Caries LI2 (l)
DC020 - Caries LI2 (r)
DC019a - Caries LI2 (l) - presence
DC020a - Caries LI2 (r) - presence
DC021 - Caries LC (l)
DC022 - Caries LC (r)
DC021a - Caries LC (l) - presence
DC022a - Caries LC (r) - presence
DC023 - Caries LP1 (l)
DC024 - Caries LP1 (r)
DC023a - Caries LP1 (l) - presence
DC024a - Caries LP1 (r) - presence
DC025 - Caries LP2 (l)
DC026 - Caries LP2 (r)
DC025a - Caries LP2 (l) - presence
DC026a - Caries LP2 (r) - presence
DC027 - Caries LM1 (l)
DC028 - Caries LM1 (r)
DC027a - Caries LM1 (l) - presence
DC028a - Caries LM1 (r) - presence
DC029 - Caries LM2 (l)
DC030 - Caries LM2 (r)
DC029a - Caries LM2 (l) - presence
DC030a - Caries LM2 (r) - presence
DC031 - Caries LM3 (l)
DC032 - Caries LM3 (r)
DC031a - Caries LM3 (l) - presence
DC032a - Caries LM3 (r) - presence

Appendix III.A.16. *Cribra orbitalia*

CO001 - *Cribra orbitalia* (l)
CO002 - *Cribra orbitalia* (r)

Appendix III.B. Shortened data collection list

Appendix III.B.1. Cranial measurements

CM001 - 1. Maximum cranial length
CM002 - 3. *Glabello-Lambda* length
CM003 - 8. Maximum cranial breadth
CM004 - 9. Least frontal breadth
CM007 - 13a. Mastoid width (l)
CM008 - 13a. Mastoid width (r)
CM010 - 19a. Mastoid height (l)
CM011 - 19a. Mastoid height (r)
CM020 - 30. *Bregma-Lambda* chord
CM028 - 48(1). *Nasospinale-Prosthion* height
CM030 - *50(1). Interorbital breadth
CM035 - 54. Nasal breadth
CM042 - *61a(1). Canine alveolar breadth (mx)
CM043 - *61a(1). Canine alveolar breadth (md)
CM045 - *61a(2). 1st premolar alveolar breadth (md)
CM047 - *61a(3). 2nd premolar alveolar breadth (md)
CM049 - *61a(4). 1st molar alveolar breadth (md)
CM051 - *61a(5). 2nd molar alveolar breadth (md)
CM058 - *62a(3). 3rd internal dental arch length (mx)
CM059 - *62a(3). 3rd internal dental arch length (md)
CM060 - *62a(4). 4th internal dental arch length (mx)
CM061 - *62a(4). 4th internal dental arch length (md)
CM068 - 63(2). Anterior palate breadth (mx)
CM069 - *63(2). Anterior palate breadth (md)
CM070 - *63(2)a. 1st internal dental arch breadth (mx)
CM071 - *63(2)a. 1st internal dental arch breadth (md)
CM072 - *63(2)b. 2nd internal dental arch breadth (mx)
CM073 - *63(2)b. 2nd internal dental arch breadth (md)
CM075 - *63(2)c. 3rd internal dental arch breadth (md)
CM077 - *63(2)d. 4th internal dental arch breadth (md)
CM080 - 66. Bigonial breadth
CM082 - 68. Projective length of the body of the mandible
CM083 - 69. Height of the mandibular symphysis
CM085 - *69c. Thickness of the mandibular symphysis
CM086 - 69(1). Mental foramen height (l)
CM087 - 69(1). Mental foramen height (r)
CM088 - 69(2). 2nd molar mandibular body height (l)
CM089 - 69(2). 2nd molar mandibular body height (r)
CM100 - 69(3). Mental foramen body thickness (l)
CM101 - 69(3). Mental foramen body thickness (r)
CM102 - 69b. 2nd molar mandibular body thickness (l)
CM103 - 69b. 2nd molar mandibular body thickness (r)
CM122 - 71a. Minimum ramus width (l)
CM123 - 71a. Minimum ramus width (r)
CM133 - 80a. Dental arch length of the mandible
CM135 - 80(1). External dental arch width (md)
CM136 - *80(1)a. Canine dental arch breadth (mx)
CM137 - *80(1)a. Canine dental arch breadth (md)
CM141 - *80(1)c. 2nd premolar dental arch breadth (md)
CM143 - *80(1)d. 1st molar dental arch breadth (md)
CM148 - *80(4)a. Canine dental arch length (mx)
CM149 - *80(4)a. Canine dental arch length (md)
CM150 - *80(4)b. 1st premolar dental arch length (mx)
CM153 - *80(4)c. 2nd premolar dental arch length (md)

Appendix III.B.2. Dental measurements

DM001 - 81. Crown length UI1 (l)
DM002 - 81. Crown length UI1 (r)
DM003 - 81. Crown length UI2 (l)
DM004 - 81. Crown length UI2 (r)
DM005 - 81. Crown length UC (l)
DM006 - 81. Crown length UC (r)
DM007 - 81. Crown length UP1 (l)
DM008 - 81. Crown length UP1 (r)
DM009 - 81. Crown length UP2 (l)
DM010 - 81. Crown length UP2 (r)
DM011 - 81. Crown length UM1 (l)
DM012 - 81. Crown length UM1 (r)
DM013 - 81. Crown length UM2 (l)
DM014 - 81. Crown length UM2 (r)
DM015 - 81. Crown length UM3 (l)
DM016 - 81. Crown length UM3 (r)
DM017 - 81. Crown length LI1 (l)
DM018 - 81. Crown length LI1 (r)
DM019 - 81. Crown length LI2 (l)
DM020 - 81. Crown length LI2 (r)
DM021 - 81. Crown length LC (l)
DM022 - 81. Crown length LC (r)
DM023 - 81. Crown length LP1 (l)
DM024 - 81. Crown length LP1 (r)
DM025 - 81. Crown length LP2 (l)
DM026 - 81. Crown length LP2 (r)
DM027 - 81. Crown length LM1 (l)
DM028 - 81. Crown length LM1 (r)
DM029 - 81. Crown length LM2 (l)
DM030 - 81. Crown length LM2 (r)
DM031 - 81. Crown length LM3 (l)
DM032 - 81. Crown length LM3 (r)

DM033 - 81(1). Crown width UI1 (l)
DM034 - 81(1). Crown width UI1 (r)
DM035 - 81(1). Crown width UI2 (l)
DM036 - 81(1). Crown width UI2 (r)
DM037 - 81(1). Crown width UC (l)
DM038 - 81(1). Crown width UC (r)
DM039 - 81(1). Crown width UP1 (l)
DM040 - 81(1). Crown width UP1 (r)
DM041 - 81(1). Crown width UP2 (l)
DM042 - 81(1). Crown width UP2 (r)
DM043 - 81(1). Crown width UM1 (l)
DM044 - 81(1). Crown width UM1 (r)
DM045 - 81(1). Crown width UM2 (l)
DM046 - 81(1). Crown width UM2 (r)
DM047 - 81(1). Crown width UM3 (l)
DM048 - 81(1). Crown width UM3 (r)
DM049 - 81(1). Crown width LI1 (l)
DM050 - 81(1). Crown width LI1 (r)
DM051 - 81(1). Crown width LI2 (l)
DM052 - 81(1). Crown width LI2 (r)
DM053 - 81(1). Crown width LC (l)
DM054 - 81(1). Crown width LC (r)
DM055 - 81(1). Crown width LP1 (l)
DM056 - 81(1). Crown width LP1 (r)
DM057 - 81(1). Crown width LP2 (l)
DM058 - 81(1). Crown width LP2 (r)
DM059 - 81(1). Crown width LM1 (l)
DM060 - 81(1). Crown width LM1 (r)
DM061 - 81(1). Crown width LM2 (l)
DM062 - 81(1). Crown width LM2 (r)
DM063 - 81(1). Crown width LM3 (l)
DM064 - 81(1). Crown width LM3 (r)

Appendix III.B.3. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)
CN002 - Cranial shape (*Norma verticalis*)
CN002a - Cranial shape (*Norma verticalis*) - main
CN004 - Cranial height (*Norma occipitalis*)
CN005 - Cranial shape (*Norma occipitalis*)
CN005a - Cranial shape (*Norma occipitalis*) - main
CN006a - Occipital bunning - degree
CN006b - Occipital bunning - shape
CN007a - Sagittal keeling - degree
CN007b - Sagittal keeling - shape
CN016 - Interorbital breadth
CN017a - Shape of the *Sella nasi* - main
CN017b - Shape of the *Sella nasi* - additional tendency/superstructure
CN019 - Orientation of the *Processus frontales maxillae*
CN023 - *Margo infranasalis*
CN023a - *Margo infranasalis* - main
CN024 - Alveolar prognathism
CN028 - Symphyseal height
CN031 - Ramus inversion
CN032 - Ramus angle

Appendix III.B.4. Cranial epigenetic traits

CE001 - *Ossa suturae coronalis*
CE003 - *Ossa suturae lambdoideae*
CE014 - *Os incae*
CE015 - *Os incisivum*/*Sutura incisiva*
CE021 - *Sutura metopica*
CE040b - *Foramen zygomaticofaciale* (l) - number
CE041b - *Foramen zygomaticofaciale* (r) - number
CE054a - **Foramina paranasalia* (l)
CE054b - **Foramina paranasalia* (r)
CE057b - *Foramen mentale accessorium* (l) - number
CE058b - *Foramen mentale accessorium* (r) - number

Appendix III.B.5. Dental epigenetic traits

DE001 - Winging UI1 (l)
DE002 - Winging UI1 (r)
DE005 - Shovel UI1 (l)
DE006 - Shovel UI1 (r)
DE007 - Double shovel UI1 (l)
DE008 - Double shovel UI1 (r)
DE009 - Interruption groove UI2 (l)
DE010 - Interruption groove UI2 (r)
DE011 - *Tuberculum dentale* UI2 (l)
DE012 - *Tuberculum dentale* UI2 (r)
DE013 - Canine mesial ridge (“Bushman canine”) UC (l)
DE014 - Canine mesial ridge (“Bushman canine”) UC (r)
DE015 - Distal accessory ridge UC (l)
DE016 - Distal accessory ridge UC (r)
DE017 - Premol. mesial & distal access. cusps UP1 (l)
DE018 - Premol. mesial & distal access. cusps UP1 (r)
DE019 - Premol. mesial & distal access. cusps UP2 (l)
DE020 - Premol. mesial & distal access. cusps UP2 (r)
DE027 - Hypocone UM2 (l)
DE028 - Hypocone UM2 (r)
DE029 - Cusp 5 (metaconule) UM1 (l)
DE030 - Cusp 5 (metaconule) UM1 (r)
DE031 - Carabelli’s trait UM1 (l)
DE032 - Carabelli’s trait UM1 (r)
DE033 - Parastyle UM2 (l)
DE034 - Parastyle UM2 (r)
DE035 - Parastyle UM3 (l)
DE036 - Parastyle UM3 (r)
DE039 - Premolar root number UP1 (l)
DE040 - Premolar root number UP1 (r)
DE041 - Upper molar root number UM2 (l)
DE042 - Upper molar root number UM2 (r)
DE043 - Peg-shaped incisor UI2 (l)
DE044 - Peg-shaped incisor UI2 (r)
DE045 - Peg-shaped molar UM3 (l)
DE046 - Peg-shaped molar UM3 (r)
DE047 - Congenital absence UM3 (l)
DE048 - Congenital absence UM3 (r)
DE049 - Premol. lingual cusps LP2 (l)
DE050 - Premol. lingual cusps LP2 (r)
DE053 - Groove pattern LM2 (l)
DE054 - Groove pattern LM2 (r)
DE055 - Cusp number LM1 (l)
DE056 - Cusp number LM1 (r)
DE057 - Cusp number LM2 (l)
DE058 - Cusp number LM2 (r)
DE059 - Deflecting wrinkle LM1 (l)
DE060 - Deflecting wrinkle LM1 (r)
DE063 - Protostylid LM1 (l)
DE064 - Protostylid LM1 (r)
DE065 - Cusp 7 LM1 (l)
DE066 - Cusp 7 LM1 (r)
DE069 - Canine root number LC (l)
DE070 - Canine root number LC (r)
DE071 - Lower molar root number LM1 (l)
DE072 - Lower molar root number LM1 (r)
DE073 - Lower molar root number LM2 (l)
DE074 - Lower molar root number LM2 (r)
DE077 - Midline diastema
DE078 - Palatine torus
DE079 - Mandibular torus (l)
DE080 - Mandibular torus (r)
DE081 - Rocker jaw

Appendix III.C. Additional sections of the alternative shortened data collection list

Appendix III.C.1. Postcranial measurements

PM015 - H1. *Humerus* -Maximum length (l)
PM016 - H1. *Humerus* -Maximum length (r)
PM019 - H5. Maximum diameter of the mid-shaft (l)
PM020 - H5. Maximum diameter of the mid-shaft (r)
PM021 - H6. Minimum diameter of the mid-shaft (l)
PM022 - H6. Minimum diameter of the mid-shaft (r)
PM025 - H7a. Mid-shaft circumference (l)
PM026 - H7a. Mid-shaft circumference (r)
PM065 - U1. *Ulna* - Maximum length (l)
PM066 - U1. *Ulna* - Maximum length (r)
PM067 - U3. Least circumference (l)
PM068 - U3. Least circumference (r)
PM071 - *U3c. Crest circumference (l)
PM072 - *U3c. Crest circumference (r)
PM073 - U11. Dorso-ventral shaft diameter (l)
PM074 - U11. Dorso-ventral shaft diameter (r)
PM075 - U12. Transverse shaft diameter (l)
PM076 - U12. Transverse shaft diameter (r)
PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)
PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)
PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)
PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)
PM089 - F1. *Femur* - Maximum length (l)
PM090 - F1. *Femur* - Maximum length (r)
PM093 - F6. Anterior-posterior mid-shaft diameter (l)
PM094 - F6. Anterior-posterior mid-shaft diameter (r)
PM095 - F7. Medio-lateral mid-shaft diameter (l)
PM096 - F7. Medio-lateral mid-shaft diameter (r)
PM097 - F8. Mid-shaft circumference (l)
PM098 - F8. Mid-shaft circumference (r)
PM099 - F9. Subtrochanteric transverse diameter (l)
PM100 - F9. Subtrochanteric transverse diameter (r)
PM101 - F10. Subtrochanteric sagittal diameter (l)
PM102 - F10. Subtrochanteric sagittal diameter (r)
PM103 - *F10(1). Subtrochanteric circumference (l)
PM104 - *F10(1). Subtrochanteric circumference (r)
PM117 - *F34. *Linea aspera* breadth (l)
PM118 - *F34. *Linea aspera* breadth (r)
PM121 - *Femur* - Cortical thickness (ant.)
PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)
PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)
PM124 - *Femur* - Cortical thickness (med.)
PM125 - *Femur* - Cortical thickness (lat.)
PM126 - *Femur* - Cortical thickness (max.)
PM127 - *Femur* - Cortical thickness (min.)
PM130 - T1a. *Tibia* - Maximum length (l)
PM131 - T1a. *Tibia* - Maximum length (r)
PM138 - T8. Sagittal mid-shaft diameter (l)
PM139 - T8. Sagittal mid-shaft diameter (r)
PM142 - T9. Transverse mid-shaft diameter (l)
PM143 - T9. Transverse mid-shaft diameter (r)
PM146 - T10. Mid-shaft circumference (l)
PM147 - T10. Mid-shaft circumference (r)
PM150 - T10b. Minimum shaft circumference (l)
PM151 - T10b. Minimum shaft circumference (r)

Appendix III.C.2. Cranial robusticity traits

CR001 - Relief of the *Planum nuchale*
CR003 - *Processus mastoideus*
CR006 - *Arcus superciliaris*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)

Appendix III.C.3. Postcranial robusticity traits

PR007 - Ulnar shaft bowing (l)
PR008 - Ulnar shaft bowing (r)
PR009 - Ulnar *Margo interosseus* size (l)
PR010 - Ulnar *Margo interosseus* size (r)
PR011a - Femoral shaft bowing (l) - shape
PR012a - Femoral shaft bowing (r) - shape
PR011b - Femoral shaft bowing (l) - degree
PR012b - Femoral shaft bowing (r) - degree
PR013 - Pilasterism (l)
PR014 - Pilasterism (r)

Appendix III.C.4. Cranial musculoskeletal stress traits

CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)
CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)

Appendix III.C.5. Postcranial musculoskeletal stress traits

PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)
PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)
PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)
PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)
PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)
PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)
PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)
PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)
PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)
PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)

Appendix III.C.6. Enamel hypoplasia

DS001a - Hypoplasia UI1 (l) - intensity
DS002a - Hypoplasia UI1 (r) - intensity
DS003a - Hypoplasia UI2 (l) - intensity
DS004a - Hypoplasia UI2 (r) - intensity
DS005a - Hypoplasia UC (l) - intensity
DS006a - Hypoplasia UC (r) - intensity
DS007a - Hypoplasia UP1 (l) - intensity
DS008a - Hypoplasia UP1 (r) - intensity
DS009a - Hypoplasia UP2 (l) - intensity
DS010a - Hypoplasia UP2 (r) - intensity
DS011a - Hypoplasia UM1 (l) - intensity
DS012a - Hypoplasia UM1 (r) - intensity
DS013a - Hypoplasia UM2 (l) - intensity
DS014a - Hypoplasia UM2 (r) - intensity
DS015a - Hypoplasia UM3 (l) - intensity
DS016a - Hypoplasia UM3 (r) - intensity
DS017a - Hypoplasia LI1 (l) - intensity
DS018a - Hypoplasia LI1 (r) - intensity
DS019a - Hypoplasia LI2 (l) - intensity
DS020a - Hypoplasia LI2 (r) - intensity

DS021a - Hypoplasia LC (l) - intensity
DS022a - Hypoplasia LC (r) - intensity
DS023a - Hypoplasia LP1 (l) - intensity
DS024a - Hypoplasia LP1 (r) - intensity
DS025a - Hypoplasia LP2 (l) - intensity
DS026a - Hypoplasia LP2 (r) - intensity
DS027a - Hypoplasia LM1 (l) - intensity
DS028a - Hypoplasia LM1 (r) - intensity
DS029a - Hypoplasia LM2 (l) - intensity
DS030a - Hypoplasia LM2 (r) - intensity
DS031a - Hypoplasia LM3 (l) - intensity
DS032a - Hypoplasia LM3 (r) - intensity

Appendix IV. Definitions of non-standard measurements

Appendix IV.A. Cranial measurements

CM030 - *50(1). Interorbital breadth:	Direct distance between the left and right “interorbital point”. The “interorbital point” is located where the frontomaxillary suture (*Sutura frontomaxillaris*), or its extension, meets the medial margin (*Margo medialis*) of the orbit (*Orbita*). The medial margin (*Margo medialis*) of the orbit (*Orbita*) is readily discernible in frontal view (*Norma frontalis*). Sliding callipers.
CM042/43 - *61a(1). Canine alveolar breadth:	Distance between the outermost points of the sockets (*Alveoli*) of the canines (*Dentes canini*). Measured vertically to the median sagittal plane. *Maxilla* and mandible (*Mandibula*). Sliding callipers.
CM044/45 - *61a(2). 1st premolar alveolar breadth:	Analogous to CM042/43 - *61a(1). Sockets (*Alveoli*) of the first premolars (*Dentes praemolares I*).
CM046/47 - *61a(3). 2nd premolar alveolar breadth:	Analogous to CM042/43 - *61a(1). Sockets (*Alveoli*) of the second premolars (*Dentes praemolares II*).
CM048/49 - *61a(4). 1st molar alveolar breadth:	Analogous to CM042/43 - *61a(1). Sockets (*Alveoli*) of the first molars (*Dentes molares I*).
CM050/51 - *61a(5). 2nd molar alveolar breadth:	Analogous to CM042/43 - *61a(1). Sockets (*Alveoli*) of the second molars (*Dentes molares II*).
CM054/55 - *62a(1). 1st internal dental arch length:	Distance between the *Orale* (or *Linguale*, for the mandibular measurement) and a straight line connecting the most inferior (or most superior, for the mandibular measurement) points on the lingual alveolar margin (*Margo alveolaris*) between the second incisors and canines (*Dentes incisivi II et canini*). Measured in the median sagittal plane. *Maxilla* and mandible (*Mandibula*). Floss, sliding callipers.
CM056/57 - *62a(2). 2nd internal dental arch length:	Analogous to CM054/55 - *62a(1). Line connecting points between the canines and first premolars (*Dentes canini et praemolares I*).
CM058/59 - *62a(3). 3rd internal dental arch length:	Analogous to CM054/55 - *62a(1). Line connecting points between the first and second premolars (*Dentes praemolares I et II*).
CM060/61 - *62a(4). 4th internal dental arch length:	Analogous to CM054/55 - *62a(1). Line connecting points between the second premolars and first molars (*Dentes praemolares II et molares I*).
CM062/63 - *62a(5). 5th internal dental arch length:	Analogous to CM054/55 - *62a(1). Line connecting points between the first and second molars (*Dentes molares I et II*).
CM064/65 - *62a(6). 6th internal dental arch length:	Analogous to CM054/55 - *62a(1). Line connecting points between the second and third molars (*Dentes molares II et III*).
CM067 - *63. Internal palate breadth (md):	Distance between the mandibular equivalents of the *Endomolares*.
CM069 - *63(2). Anterior palate breadth (md):	Mandibular equivalent of 63(2).
CM070/71 - *63(2)a. 1st internal dental arch breadth:	Analogous to 63(2). and *63(2). Points between the second incisors and canines (*Dentes incisivi II et canini*).
CM072/73 - *63(2)b. 2nd internal dental arch breadth:	Analogous to 63(2). and *63(2). Points between the first and second premolars (*Dentes praemolares I et II*).
CM074/75 - *63(2)c. 3rd internal dental arch breadth:	Analogous to 63(2). and *63(2). Points between the second premolars and first molars (*Dentes praemolares II et molares I*).
CM076/77 - *63(2)d. 4th internal dental arch breadth:	Analogous to 63(2). and *63(2). Points between the first and second molars (*Dentes molares I et II*).
CM078/79 - *63(2)e. 5th internal dental arch breadth:	Analogous to 63(2). and *63(2). Points between the second and third molars (*Dentes molares II et III*).
CM085 - *69c. Thickness of the mandibular symphysis:	Analogous to 69b. Mandibular symphysis (*Symphysis mandibulae*). Vertical to 69.
CM090/91 - *69(2)a. Canine mandibular body height:	Analogous to 69(2). Beneath the canine (*Dens caninus*).
CM092/93 - *69(2)b. 1st premolar mandibular body height:	Analogous to 69(2). Beneath the first premolar (*Dens praemolaris I*).
CM094/95 - *69(2)c. 2nd premolar mandibular body height:	Analogous to 69(2). Beneath the second premolar (*Dens praemolaris II*).
CM096/97 - *69(2)d. 1st molar mandibular body height:	Analogous to 69(2). Beneath the first molar (*Dens molaris I*).
CM098/99 - *69(2)e. 3rd molar mandibular body height:	Analogous to 69(2). Beneath the third molar (*Dens molaris III*).
CM104/105 - *69b(1). Canine mandibular body thickness:	Analogous to 69b. Beneath the canine (*Dens caninus*).
CM106/107 - *69b(2). 1st premol. mand. body thickness:	Analogous to 69b. Beneath the first premolar (*Dens praemolaris I*).
CM108/109 - *69b(3). 2nd premol. mand. body thickness:	Analogous to 69b. Beneath the second premolar (*Dens praemolaris II*).
CM110/111 - *69b(4). 1st molar mand. body thickness:	Analogous to 69b. Beneath the first molar (*Dens molaris I*).
CM112/113 - *69b(5). 3rd molar mand. body thickness:	Analogous to 69b. Beneath the third molar (*Dens molaris III*).
CM127 - *74a. Alternative subnasal angle:	Analogous to 74. Angle between a straight line connecting the *Nasospinale* to the *Prosthion* and the overall occlusal plane.
CM136/137 - *80(1)a. Canine dental arch breadth:	Analogous to 80(1). Most vestibular points of the canines (*Dentes canini*).
CM138/139 - *80(1)b. 1st premolar dental arch breadth:	Analogous to 80(1). Most vestibular points of the first premolars (*Dentes praemolares I*).
CM140/141 - *80(1)c. 2nd premolar dental arch breadth:	Analogous to 80(1). Most vestibular points of the second premolars (*Dentes praemolares II*).
CM142/143 - *80(1)d. 1st molar dental arch breadth:	Analogous to 80(1). Most vestibular points of the first molars (*Dentes molares I*).

CM144/145 - *80(1)e. 2nd molar dental arch breadth:	Analogous to 80(1). Most vestibular points of the second molars (*Dentes molares II*).
CM146/147 - *80(1)f. 3rd molar dental arch breadth:	Analogous to 80(1). Most vestibular points of the third molars (*Dentes molares III*).
CM148/149 - *80(4)a. Canine dental arch length:	Analogous to 80. and 80a. Line distal to canines (*Dentes canini*).
CM150/151 - *80(4)b. 1st premolar dental arch length:	Analogous to 80. and 80a. Line distal to first premolars (*Dentes praemolares I*).
CM152/153 - *80(4)c. 2nd premolar dental arch length:	Analogous to 80. and 80a. Line distal to second premolars (*Dentes praemolares II*).
CM154/155 - *80(4)d. 1st molar dental arch length:	Analogous to 80. and 80a. Line distal to first molars (*Dentes molares I*).
CM156/157 - *80(4)e. 2nd molar dental arch length:	Analogous to 80. and 80a. Line distal to second molars (*Dentes molares II*).
CM158/159 - *104. Maximum temporal line distance:	Maximum distance between the superior (*Linea temporalis superior*) and inferior temporal line (*Linea temporalis inferior*). Sliding callipers.
CM160/161 - *105. Minimum temporal line distance:	Minimum distance between the superior (*Linea temporalis superior*) and inferior temporal line (*Linea temporalis inferior*). Sliding callipers.
CM162-171 - Cranial thickness:	Distance between the surface of the internal lamina (*Lamina interna*) and the surface of the external lamina (*Lamina externa*) at the defined location. Vertical to the surface of the external lamina (*Lamina externa*). Spreading or sliding callipers.

Appendix IV.B. Postcranial measurements

PM009-14 - *Clavicula* - Cortical thickness:	Thickness of the cortical bone (*Substantia compacta*) vertical to the outer surface of the bone at the defined location. Approximately at mid-shaft. Sliding callipers.
PM027/28 - *H19. *Tuberositas deltoidea* breadth:	Maximum breadth of the deltoid tuberosity (*Tuberositas deltoidea*). Vertical to the tuberosity's course. Sliding callipers.
PM029/30 - *H20. *Crista tuberculi majoris* breadth:	Maximum breadth of the major tubercle crest (*Crista tuberculi majoris*). Vertical to the crest's course. Sliding callipers.
PM031-36 - *Humerus* - Cortical thickness:	Analogous to PM009-14.
PM053/54 - *R5(7). Maximum circumference:	Circumference at R4. Tape measure or thread.
PM055/56 - *R10. Longitudinal *Tuberositas radii* diameter:	Maximum length of the radial tuberosity (*Tuberositas radii*). Longitudinal to the shaft (*Corpus radii*). Sliding callipers.
PM057/58 - *R11. Transverse *Tuberositas radii* diameter:	Maximum breadth of the radial tuberosity (*Tuberositas radii*). Vertical to *R10. Sliding callipers.
PM059-64 - *Radius* - Cortical thickness:	Analogous to PM009-14.
PM071/72 - *U3c. Crest circumference:	Circumference at U11. Tape measure or thread.
PM077/78 - *U18. Longitudinal *Tub. ulnae* diameter:	Maximum length of the ulnar tuberosity (*Tuberositas ulnae*). Longitudinal to the shaft (*Corpus ulnae*). Sliding callipers.
PM079/80 - *U19. Transverse *Tub. ulnae* diameter:	Maximum breadth of the ulnar tuberosity (*Tuberositas ulnae*). Vertical to *U18. Sliding callipers.
PM081-86 - *Ulna* - Cortical thickness:	Analogous to PM009-14.
PM103/104 - *F10(1). Subtrochanteric circumference:	Circumference at F9. Tape measure.
PM117/118 - *F34. *Linea aspera* breadth:	Maximum breadth of the *Linea aspera* at F6. Distance between the lateral edge of the tip of the lateral lip (*Labium laterale*) and the medial edge of the tip of the medial lip (*Labium mediale*). The measurement must not be taken at the base of the *Linea aspera*. Sliding callipers.
PM119/120 - *F35. *Linea intertrochanterica* breadth:	Maximum breadth of the intertrochanteric line (*Linea intertrochanterica*). Vertical to the line's course. Sliding callipers.
PM121-127 - *Femur* - Cortical thickness:	Analogous to PM009-14.
PM152/153 - *T15. Longitudinal *Tub. tibiae* diameter:	Maximum length of the tibial tuberosity (*Tuberositas tibiae*). Longitudinal to the shaft (*Corpus tibiae*). Sliding callipers.
PM154/155 - *T16. Transverse *Tub. tibiae* diameter:	Maximum breadth of the tibial tuberosity (*Tuberositas tibiae*). Vertical to *T15. Sliding callipers.
PM156/157 - *T17. *Linea musculi solei* breadth:	Maximum breadth of the soleal line (*Linea musculi solei*). Vertical to the line's course. Sliding callipers.
PM158-163 - *Tibia* - Cortical thickness:	Analogous to PM009-14.
PM174-179 - *Tibia* - Cortical thickness:	Analogous to PM009-14.

Appendix V. Definitions of indices

Appendix V.A. Cranial indices

ICM001 - I1. Cranial index:	8. / 1.
ICM002 - *I46c. Interorbital palatal index:	50(1). / 63(2).
ICM003 - *I51(1)b. Naso-palatal index:	54. / 63(2).
ICM004 - *I54b. Palato-alveolar index:	48(1). / 63(2).
ICM005 - *I58b. Palatal length-breadth index:	*62(a)3. / 63(2).
ICM006 - *I62b. Mandibular length-breadth index:	68. / 66.
ICM007 - *I62c. Anterior mandibular length-breadth index:	*62(a)3. / 63(2).
ICM008 - I62(1). Mandibular height index:	69(2). / 69.
ICM009 - *I63b. Alternative ramus breadth index:	71a. / 63(2).
ICM010 - *I66b. Height-breadth index of the *Corpus mandibulae* at M2:	69b. / 69(2).
ICM011 - *I66c. Symphyseal index:	*69c. / 69.
ICM012 - *I66d. Symphyseal height index:	69. / *63(2).
ICM013 - Cranial thickness index:	(Max + Min) / (81(1).LM2 · 2)

Appendix V.B. Dental indices

IDM001-16 - I74. Crown index:	81(1). / 81.
IDM017-32 - I75. Crown area:	81. · 81(1).
IDM033-48 - Asymmetry index:	[(81.(l) – 81.(r)) + (81(1).(l) – 81(1).(r))] / [((81.(l) + 81.(r)) / 2) + ((81(1).(l) + 81(1).(r)) / 2)]

Appendix V.C. Postcranial indices

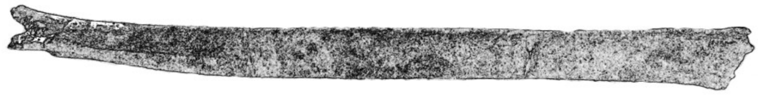
IPM001 - HI1. Robusticity index:	H7. / H1.
IPM002 - *HI1b. Modified robusticity index:	H7a. / H1.
IPM003 - *HI1c. Pearson's robusticity index:	(H5. + H6.) / H1.
IPM004 - HI2. Diaphyseal index:	H6. / H5.
IPM005 - Humeral cortical thickness index:	(Max + Min) / H7a.
IPM006 - *RI1b. Modified robusticity index:	R3. / R1.
IPM007 - RI2. Diaphyseal index:	R5. / R4.
IPM008 - *RI1c. Pearson's robusticity index:	(R4. + R5.) / R1.
IPM009 - Radial cortical thickness index:	(Max + Min / *R5(7).
IPM010 - *UI1b. Modified robusticity index:	U3. / U1.
IPM011 - *UI1c. Pearson's robusticity index:	(U11. + U12.) / U1.
IPM012 - UI6. Diaphyseal index:	U11. / U12.
IPM013 - *UI10. Crest circumference length index:	*U3c. / U1.
IPM014 - Ulnar cortical thickness index:	(Max + Min) / U3.
IPM015 - *FI1b. Modified length index:	F8. / F1.
IPM016 - *FI2b. Pearson's robusticity index:	(F6. + F7.) / F1
IPM017 - FI3. *Index pilastericus*:	F6. / F7.
IPM018 - FI4. *Index platymericus*:	F10. / F9.
IPM019 - *FI16. Subtrochanteric index:	*F10(1). / F1.
IPM020 - *FI17. Subtrochanteric robusticity index:	(F9. + F10.) / F1.
IPM021 - *FI18. *Linea aspera* index:	*F34. / F7.
IPM022 - Femoral cortical thickness index:	(Max + Min) / F8.
IPM023 - 2nd femoral cortical thickness index:	(Ant + Lin as + Med + Lat) / F8.
IPM024 - TI1. Mid-shaft diameter index:	T9. / T8.
IPM025 - TI2. *Index cnemicus*:	T9a. / T8a.
IPM026 - *TI3b. Modified length index:	T10b. / T1a.
IPM027 - *TI5. Modified robusticity index:	(T8. + T9.) / T1a.
IPM028 - Tibial cortical thickness index:	(Max + Min) / T10.
IPM029 - *Modified radio-humeral index (brachial index):	R1. / H1.
IPM030 - *Modified tibio-femoral index (crural index):	T1a. / F1.
IPM031 - *Modified intermembral index:	(H1. + R1.) / (F1. + T1a.)

Appendix VI. Scoring protocols

Appendix VI.A. Robusticity, stress and health traits

Appendix VI.A.1. Postcranial robusticity traits

PR001/2 - Humeral shaft bowing



(a)

(b)

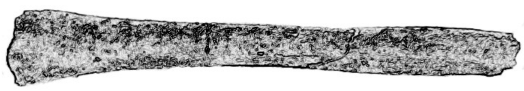
Figure 114: Humeral shaft bowing. Score 5 (a) and score 9 (b).

Humeral torsion and retroversion are comparatively well researched phenomena (e.g. Aiello/Dean 1990: 349; Bräuer 1988: 200-201; Cowgill 2007; Kennedy 1989: 144; Martin 1928: 1106-1107; Rhodes 2006; Rhodes/Churchill 2009; Winkler/Wilfing 1991: 19). The curvature of the humeral shaft (*Corpus humeri*), on the other hand, has been largely ignored. In this study, the degree of shaft bowing was visually assessed in medial (*Norma medialis*) and lateral view (*Norma lateralis*).

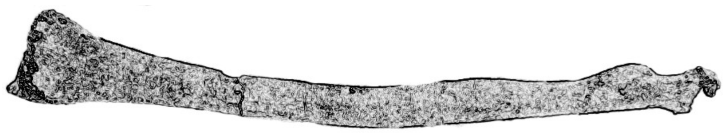
Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 115: Humeral shaft bowing scale.

PR003/4 - Radial shaft bowing & PR007/8 - Ulnar shaft bowing



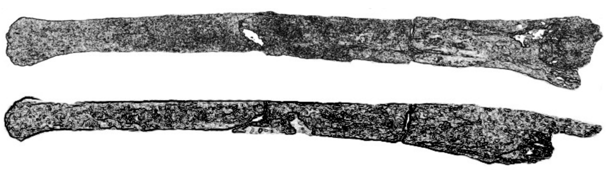
(a)



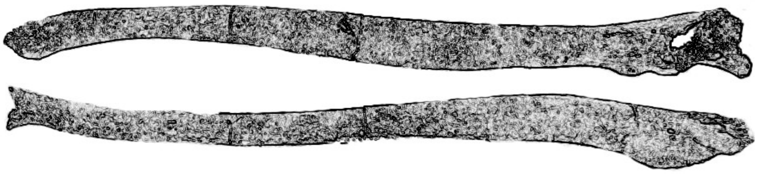
(b)

Figure 116: Radial shaft bowing in palmar view (*Norma palmaris*). Score 1 (a) and score 7 (b).

The bowing of the radial (*Corpus radii*) and ulnar shaft (*Corpus ulnae*) is usually measured and then discussed in functional terms (e.g. Aiello/Dean 1990: 364; Bräuer 1988: 203-205; Galtés *et al*. 2009; Henke/Rothe 1994: 489, 496; Stringer/Gamble 1994: 79).



(a)



(b)

Figure 117: Ulnar shaft bowing in palmar (*Norma palmaris*) and medial view (*Norma medialis*). Score 2 (a) and score 8 (b).

For these two variables, however, curvature was not quantified by taking the relevant measurements. Radial shaft bowing was graded by inspecting the shaft's (*Corpus radii*) anterior (*Facies anterior*) and posterior surface (*Facies posterior*). The degree of ulnar shaft bowing was scored in palmar (*Norma palmaris*) and medial view (*Norma medialis*). Consequently, an ulnar shaft bowing score reflected a bone's overall curvature.

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 118: Radial and ulnar shaft bowing scale.

PR005/6 - Radial *Margo interosseus* size & PR009/10 - Ulnar *Margo interosseus* size

(a)

(b)

Figure 119: Ulnar *Margo interosseus* size. Score 5 (a) and score 9 (b).

Distinguishing between the shaft (*Corpus*) in the narrow sense of the term and the crest (*Crista*), as one of its superstructures, was crucial when scoring radial and ulnar interosseous border (*Margo interosseus*) size (e.g. Galtés *et al*. 2009; Greene/Armelagos 1972: 38). Due to the almost complete lack of relevant publications which could have been used as external benchmarks, assigned grades had to be internally calibrated.

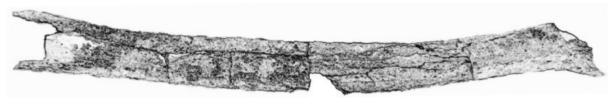
Score	Description
1	very small
2	very small to small
3	small
4	small to moderate
5	moderate
6	moderate to large
7	large
8	large to very large
9	very large

Figure 120: Radial and ulnar *Margo interosseus* size scale.

PR011/12 - Femoral shaft bowing

PR011a/12a - Femoral shaft bowing - shape; PR011b/12b - Femoral shaft bowing - degree

(a)



(b)

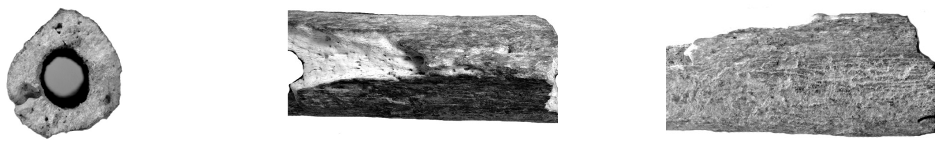
Figure 121: Femoral shaft bowing. Score 32 (a) and score 55 (b).

Femoral shaft bowing has been interpreted in connection with postcranial robusticity, occupational stress, pathological conditions, malnutrition and biological ancestry (e.g. Aiello/Dean 1990: 466; Anderson 1968: 1024; Bräuer 1983: 54, 62, 1988: 219-220; Bruns *et al*. 2002; Dalou 2007; Greene/Armelagos 1972: 43; İşcan *et al*. 2000: 229; Krogman/İşcan 1986: 293, 297; Larsen 2002: 128; Martin 1928: 1142-143; Mays *et al*. 2009; Ried 1927; Roberts/Manchester 1995; Shackelford/Trinkaus 2002; Stuart-Macadam *et al*. 1998; Wang *et al*. 2008: 48; Weaver 2003). Ried's (1927) typology of shapes of the femoral shaft (*Corpus femoris*) was converted into a nominal scale. Specimens were placed into one of the six resulting shape categories. The degree of anteroposterior curvature was graded with sub-scores. It was not measured. Instead, the degree of bowing was assessed visually.

Score (shape)	**Description**
10	orthomorphic (straight)
20	orthomorphic to clastomorphic
30	clastomorphic (angled)
40	clastomorphic to campylomorphic
50	campylomorphic (arched)
60	campylomorphic to orthomorphic
Score (degree)	**Description**
0	no expression
1	very faintly
2	faintly
3	moderately
4	fully
5	extremely

Figure 122: Femoral shaft bowing scale.

PR013/14 - Pilasterism



(a)

(b)

Figure 123: Pilasterism. Score 3 (a) and score 9 (b).

Pilasterism has played a role in a variety of studies. The morphognostic, osteometric and cross-sectional analyses have focused on subjects as diverse as diachronic changes in stress and robusticity levels, specific activity patterns, biomechanic interconnections and biological ancestry (e.g. Aiello/Dean 1990: 466; Birkby *et al*. 2008: 31; Bräuer 1988: 220; Georgeon *et al*. 1993: 38; Greene/Armelagos 1972: 42; Holt 2003: 208; Kennedy 1989: 149; Marchi 2008; Martin 1928: 1134-1138, 1143; Ruff *et al*. 1984: 132; Wang *et al*. 2008: 48). The scale employed to categorise specimens was based on a descriptive schema suggested by Martin (1928: 1136-1137). Whenever possible, the diagnosis relied on the inspection of the shaft's (*Corpus*) cross-section as well as its lateral (*Facies lateralis*) and posterior surface (*Facies posterior*).

Score	Description
1	*Femur* without a pilaster
2	very small pilaster
3	small pilaster, only visible in lateral view
4	small to large pilaster
5	large pilaster, visible in lateral and medial view
6	large to very large pilaster
7	very large pilaster
8	very to extremely large pilaster
9	extremely large pilaster
10	shifted pilaster

Figure 124: Pilasterism scale.

PR015/16 - Tibial retroversion

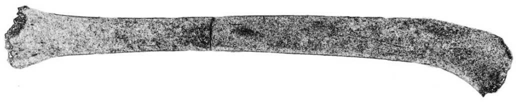


Figure 125: Tibial retroversion. Score 8.

The ontogenetic development of tibial retroversion, its association with habitual squatting and its distribution in modern and prehistoric populations have been extensively studied (e.g. Boulle 2001; Bräuer 1988: 221-222; Derry 1907; Hipp 1953; Kate/Robert 1965; Kennedy 1989: 149-150; Martin 1928: 1161-1162, 1164; Quarry Wood 1920; Trinkaus 1975, 2009; Wilczak/Kennedy 1998: 481). The illustrations in the pertinent publications were used as an external yardstick for the scores of the ordinal scale. The *Tibiae* were scored accordingly. No attempts were made to measure the degree of retroversion.

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 126: Tibial retroversion scale.

Appendix VI.B. Geographic variation

Appendix VI.B.1. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)

This variable was based on a widely used classification scheme for cranial index values (I1.) (e.g. Bass 1987: 69; Bräuer 1988: 190; İşcan 2000: 285; Krogman/İşcan 1986: 530; Martin 1928: 772-778). When the maximum cranial length (1.) and breadth (8.) could be measured, the cranial index (8. / 1.) was simply calculated and appropriately scored. The same procedure was adopted when both measurements could be taken or reliably estimated photogrammetrically. *Crania* which could not be measured could often still be scored. Their photographs were compared with photographs of *Crania* with known index values. When *Crania* scored in this manner did not appear to belong in one of the five main categories, they were placed in an intermediate category. In some cases, intermediate scores were also assigned to *Crania* with securely determined indices. For instance, a rhomboid *Cranium* with an index value of 71.2 was classified as "dolichocranic to hyper-dolichocranic" if it was generally narrow and its otherwise atypically large maximum breadth was solely due to very prominent parietal eminences (*Tubera parietalia*).

Score	Description
1	ultra- (≥ 90.0) or hyper-brachycranic (89.9-85.0)
2	hyper-brachycranic to brachycranic
3	brachycranic (84.9-80.0)
4	brachycranic to mesocranic
5	mesocranic (79.9-75.0)
6	mesocranic to dolichocranic
7	dolichocranic (74.9-70.0)
8	dolichocranic to hyper-dolichocranic
9	hyper- (69.9-65.0) or ultra-dolichocranic (≤ 64.9)

Figure 127: Cranial length (*Norma verticalis*) scale.

CN002 - Cranial shape (*Norma verticalis*)

CN002a - Cranial shape (*Norma verticalis*) - main; CN002b - Cranial shape (*Norma verticalis*) - additional tendency

Cranial shape in vertical view (*Norma verticalis*) was classified according to the adaptation of Sergi's (1894) typology presented in Martin (1928: 688-689). Additional scores were assigned when *Crania* of one type displayed tendencies towards another (e.g. Bräuer 1983: 37-38; Brues 1990: 3; De Villiers 1968; Dutour 1989: 128-129; Martin 1928: 687-690; Petit-Maire/Dutour 1987: 272; Sergi 1894: 25-59, 1901; Winkler/Wilfing 1991: 25).

Score (main)	**Description**
10	sphenoid
20	birsoid
30	sphaeriod
40	ellipsoid
50	ovoid
60	pentagonoid
70	rhomboid
Score (additional)	**Description**
0	with no additional tendency
1	with a sphenoid tendency
2	with a birsoid tendency
3	with a sphaeriod tendency
4	with an ellipsoid tendency
5	with an ovoid tendency
6	with a pentagonoid tendency
7	with a rhomboid tendency

Figure 128: Cranial shape (*Norma verticalis*) scale.

CN003 - Cranial height (*Norma lateralis*)

This variable was designed as a non-metric version of the height-length index (I2.). The scale constituted an adaptation of a well-established classification scheme for values of this index (e.g. Bass 1987: 70-71; Bräuer 1988: 190; İşcan 2000: 288; Krogman/İşcan 1986: 530; Martin 1928: 796-799). The scoring procedure was analogous to that of variable "CN001 - Cranial length (*Norma verticalis*)". The categories "hyper-chamaecranic" (≤ 64.9) and "hyper-hypsicranic" (≥ 80.0) were added to increase the resolution of the scale.

Score	**Description**
1	hyper-chamaecranic [(≤ 64.9)]
2	hyper-chamaecranic to chamaecranic
3	chamaecranic (≤ 69.9)
4	chamaecranic to orthocranic
5	orthocranic (70.0-74.9)
6	orthocranic to hypsicranic
7	hypsicranic (≥ 75.0)
8	hypsicranic to hyper-hypsicranic
9	hyper-hypsicranic [(≥ 80.0)]

Figure 129: Cranial height (*Norma lateralis*) scale.

CN004 - Cranial height (*Norma occipitalis*)

"CN004 - Cranial height (*Norma occipitalis*)" served as a non-metric substitute for the height-breadth index (I3.). Broca's (1875) divisions formed the core of the grading system (e.g. Bass 1987: 71-72; Bräuer 1988: 190; Broca 1875; İşcan 2000: 288; Krogman/İşcan 1986: 530; Martin 1928: 799-804). "Hyper-tapeinocranic" (≤ 85.9) and "hyper-acrocranic" (104.0 ≤) were introduced as additional categories. *Crania* were generally scored using the techniques described for variable "CN001 - Cranial length (*Norma verticalis*)". Whereas, if possible, each Wadi Howar individual's maximum cranial breadth (8.) and *Basion-Bregma* height (17.) were measured, only the former measurement was included on the shortened data collection list. It was therefore impossible to calculate the height-breadth indices of the comparative specimens precisely. Nevertheless, whenever that could be done, estimated height-breadth indices were taken into consideration when the comparative individuals were scored. If a *Cranium*'s maximum cranial length (1.) could be measured, its height-breadth index was estimated as follows. First, the specimen's approximate *Basion-Bregma* height (17.) and maximum cranial length (1.) were measured on the same photograph in lateral view (*Norma lateralis*). Next, its real maximum cranial length was divided by its photogrammetrically determined maximum cranial length. The result was then multiplied by the approximate *Basion-Bregma* height measured on the photograph. The resulting estimated real *Basion-Bregma* height could finally be used to calculate the individual's estimated height-breadth index.

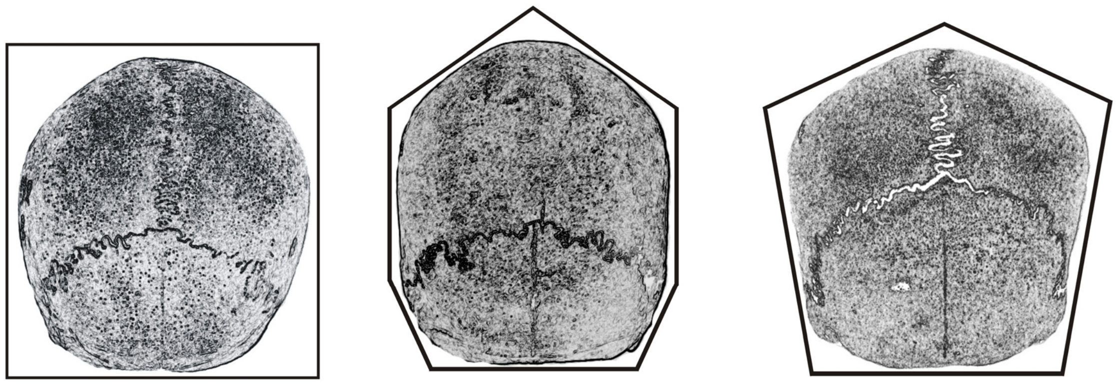
Score	Description
1	hyper-tapeinocranic [(≤ 85.9)]
2	hyper-tapeinocranic to tapeinocranic
3	tapeinocranic (≤ 91.9)
4	tapeinocranic to metriocranic
5	metriocranic (92.0-97.9)
6	metriocranic to acrocranic
7	acrocranic (≥ 98.0)
8	acrocranic to hyper-acrocranic
9	hyper-acrocranic [(≥ 104.0)]

Figure 130: Cranial height (*Norma occipitalis*) scale.

CN005 - Cranial shape (*Norma occipitalis*)

CN005a - Cranial shape (*Norma occipitalis*) - main; CN005b - Cranial shape (*Norma occipitalis*) - additional tendency

The outline of a *Cranium* in occipital view (*Norma occipitalis*) was classified using a system based on Sergi's (1894) typology. His schematic drawings of ovoid, ellipsoid, sphaeroid and pentagonoid skull shapes were reinterpreted. The outline of the forehead (*Frons*) of each of these representations was redefined as the outline of its cranial base (*Basis cranii*). Moreover, an additional type, "heptagonoid", was integrated into the scoring system. The scoring technique was analogous to that employed for variable "CN002 - Cranial shape (*Norma verticalis*)".



(a) (b) (c)

Figure 131: Occipital contour types. Sphaeroid (a), heptagonoid (b) and pentagonoid (c).

Only three of the above-mentioned five main types were encountered (see Figure 131). A *Cranium* was classified as "sphaeroid", if its occipital contour was generally rounded. Following Haberer (1902), similar outlines, especially in tapeinocranic specimens, could also be described as "bomb-shaped". A flat basal outline and lower lateral contours approximating a V were considered the main defining features of a "pentagonoid" *Cranium*. This occipital outline could be described as a variant of Haberer's (1902) "house-shape" or Sergi's (1894) "lophocephalic" type. The score "heptagonoid" was assigned when the lower occipital contour of a *Cranium* resembled an angled U. "Heptagonoid" *Crania* would also fall into Haberer's (1902) "house-shaped" or Sergi's (1894) "lophocephalic" category (e.g. Dutour 1989: 142-144; Georgeon *et al*. 1993: 36; Haberer 1902; Henke/Rothe 1994: 399, 485-486; Knußmann 1996: 381, 393; Martin 1928: 688-689, 691; Sergi 1894).

Score (main)	Description
20	ovoid
30	ellipsoid
40	sphaeriod
70	heptagonoid
80	pentagonoid

Score (additional)	Description
0	with no additional tendency
2	with an ovoid tendency
3	with an ellipsoid tendency
4	with a sphaeriod tendency
7	with a heptagonoid tendency
8	with a pentagonoid tendency

Figure 132: Cranial shape (*Norma occipitalis*) scale.

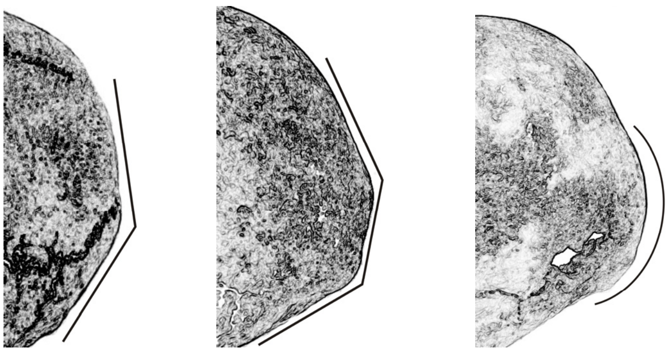
CN006 - Occipital bunning

CN006a - Occipital bunning - degree); CN006b - Occipital bunning - shape

Score (degree)	Description
10	absent
20	very faint
30	faint
40	faint to moderate
50	moderate
60	moderate to pronounced
70	pronounced
80	pronounced to very pronounced
90	very pronounced
Score (shape)	**Description**
0	rounded
2	pointed
5	angled

Figure 133: Occipital bunning scale.

The degree of occipital bunning was judged relative to the size of the *Cranium*. It was assessed in lateral (*Norma lateralis*) and basilar view (*Norma basilaris*) (e.g. Ducros 1967; Gunz/Harvati 2007; Henke/Rothe 1994: 485-486, 493-494; Stringer/Gamble 1994: 76-77, 83-84; Trinkaus 2007: 7369; Trinkaus/LeMay 1982; Wolpoff *et al.* 2001: 294-295). In addition, three shapes were distinguished (see Figure 134). Trait expressions characterised by one clearly discernible angle were classified as “pointed”. Trait expressions with two clearly discernible angles were classified as “angled”. Finally, trait expressions without discernible angles were classified as “rounded”.

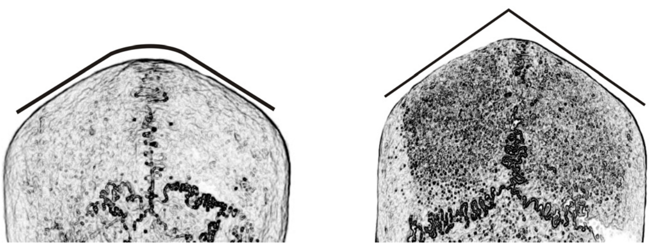


(a) (b) (c)

Figure 134: Occipital bunning. Score 32 (a), score 75 (b) and score 80 (c).

CN007 - Sagittal keeling

CN007a - Sagittal keeling - degree; CN007b - Sagittal keeling - shape



(a) (b)

Figure 135: Sagittal keeling. Score 70 (a) and score 85 (b).

Both the degree and the type of sagittal keeling were scored (e.g. Henke/Rothe 1994: 397-405; Lahr 1996: 341-342; Lahr/Arensburg 1995: 89; Rhine 1990; Seligman/Seligman 1932: 370-371; Sergi 1894: 43-44, 56-57). Four criteria were used to classify the degree of keeling. The extent to which the overall shape of the skull cap (*Calvaria*) was dominated by the keeling, the size of the areas affected by parasagittal flattening, the angle between the flattened areas and the median sagittal plane and the amount of space separating the flattened areas were all taken into account. The keeling of *Crania* with a lot of space between the flattened areas was described as “rounded”. The score for “angled” keeling was assigned to *Crania* with little or no space between the flattened areas.

Score (degree)	Description
10	absent
20	very faint
30	faint
40	faint to moderate
50	moderate
60	moderate to pronounced
70	pronounced
80	pronounced to very pronounced
90	very pronounced
Score (shape)	**Description**
0	rounded
5	angled

Figure 136: Sagittal keeling scale.

CN008 - *Bregma* depression
The germane figures in relevant publications provided the benchmarks for this variable (e.g. Bass 1987: 85, 87; Gill 1998: 300; Rhine 1990; White 2000: 377). Scores were assigned accordingly and, as usual, ordered within the sample.

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 137: *Bregma* depression scale.

CN009/10 - *Tuberculum mastoideum*
The descriptions and illustrations published by Gill (1998: 303) were transformed into this scale. The trait was scored in the same fashion as "CN008 - *Bregma* depression".

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 138: *Tuberculum mastoideum* scale.

CN011 - Relative facial height
This variable was used as an alternative to the total facial index (I38.) (e.g. Bass 1987: 75; Bräuer 1988: 191; Krogman/İşcan 1986: 530; Martin 1928: 900-901). Scores were assigned according to an adapted version of the protocol outlined for variable "CN001 - Cranial length (*Norma verticalis*)".

Score	Description
1	hyper-euryprosopic (≤ 79.9)
2	hyper-euryprosopic to euryprosopic
3	euryprosopic (80.0-84.9)
4	euryprosopic to mesoprosopic
5	mesoprosopic (85.0-89.9)
6	mesoprosopic to leptoprosopic
7	leptoprosopic (90.0-94.9)
8	leptoprosopic to hyper-leptoprosopic
9	hyper-leptoprosopic (≥ 95.0)

Figure 139: Relative facial height scale.

CN012 - Relative facial breadth

"CN012 - Relative facial breadth" was introduced to fulfil the function of the upper facial index (I39.) (e.g. Bass 1987: 75; Bräuer 1988: 191; Krogman/İşcan 1986: 530; Martin 1928: 902-903). The scoring technique was analogous to that used for variable "CN001 - Cranial length (*Norma verticalis*)".

Score	Description
1	hyper-euryenic (≤ 44.9)
2	hyper-euryenic to euryenic
3	euryenic (45.0-49.9)
4	euryenic to mesenic
5	mesenic (50.0-54.9)
6	mesenic to leptenic
7	leptenic (55.0-59.9)
8	leptenic to hyper-leptenic
9	hyper-leptenic (≥ 60.0)

Figure 140: Relative facial breadth scale.

CN013 - Orbital geometry

CN013a - Orbital geometry - main; CN013b - Orbital geometry - additional tendency

Orbital shape was classified in the same manner as cranial shape in vertical view (*Norma verticalis*) (see CN002). The typology was based on the relevant descriptions in the pertinent publications (e.g. Bräuer 1983: 35; Brues 1990: 3; Gill 1998: 300; İşcan 2000: 229; Novotný *et al*. 1993: 77; Rhine 1990).

Score (main)	Description
10	rhomboid
20	rectangular
30	round
Score (additional)	**Description**
0	with no additional tendency
1	with a rhomboid tendency
2	with a rectangular tendency
3	with a round tendency

Figure 141: Orbital geometry scale.

CN014 - Malar prominence (upper facial flatness)

The assessment of the prominence of the zygomatic bones (*Ossa zygomatica*) was aided by the descriptions and illustrations in the germane literature (e.g. Bass 1987: 83-88; Brues 1990: 3; Gill 1998: 300; İşcan 2000: 228-229; Rhine 1990; White 2000: 377). As in other cases, this information served as a point of reference for the internally calibrated scores.

Score	Description
1	steeply receding
2	steeply receding to receding
3	receding
4	receding to moderate
5	moderate
6	moderate to prominent
7	prominent
8	prominent to very prominent
9	very prominent

Figure 142: Malar prominence scale.

CN015 - Course of the *Sutura zygomaticomaxillaris*

Gill's (1998: 308-309) typology was employed to categorise the course of the zygomaticomaxillary suture (*Sutura zygomaticomaxillaris*).

Score	Description
1	curved
2	intermediate
3	angled

Figure 143: Course of the *Sutura zygomaticomaxillaris* scale.

CN016 - Interorbital breadth

Interorbital breadth was graded relative to biorbital breadth (e.g. Bräuer 1983: 118, 1988: 191; Brues 1990: 3; Bruner/Manzi 2004; Gill/Gilbert 1990; İşcan 2000: 228; Martin 1928: 967-968; Schwartz 1995: 288). The scores were therefore comparable to categories of interorbital breadth index (I46a.) values. The scores were, however, assigned entirely osteoscopically.

Score	Description
1	very narrow
2	very narrow to narrow
3	narrow
4	narrow to moderate
5	moderate
6	moderate to broad
7	broad
8	broad to very broad
9	very broad

Figure 144: Interorbital breadth scale.

CN017 - Shape of the *Sella nasi*

CN017a - Shape of the *Sella nasi* - main; CN017b - Shape of the *Sella nasi* - additional tendency/superstructure

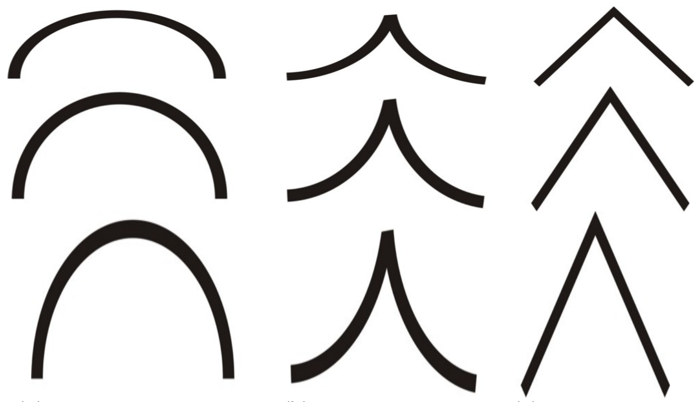


Figure 145: Schematic representations of horizontal contour types of the nasal saddle (*Sella nasi*). Low, normal and high Quonset hut (a), low, normal and high sagging tent (b) and low, normal and high A-frame (c).

The scale used to score the shape of the nasal saddle (*Sella nasi*) in transverse section was based on Brues's typology (e.g. Brues 1990: 5; Byers 2002: 154-158; Gill 1998: 304; İşcan 2000: 229; Lahr 1996: 342-343). It was considered necessary to define various sub-types of the overall shape (see Figure 145). Additional shape tendencies and small superstructures were coded with supplementary scores (see Figure 146).

Score (main)	Description
10	low Quonset hut
20	Quonset hut
30	high Quonset hut
40	low sagging tent
50	sagging tent
60	high sagging tent
70	low A-frame
80	A-frame
90	high A-frame
Score (additional)	**Description**
0	with no additional tendency/superstructure
1	rounded
2	with tendencies towards a Quonset hut shape
3	with tendencies towards a sagging tent shape
4	with tendencies towards an A-frame shape
5	with a median ridge
6	with a Quonset hut superstructure
7	with a sagging tent superstructure
8	with an A-frame superstructure

Figure 146: Shape of the *Sella nasi* scale.

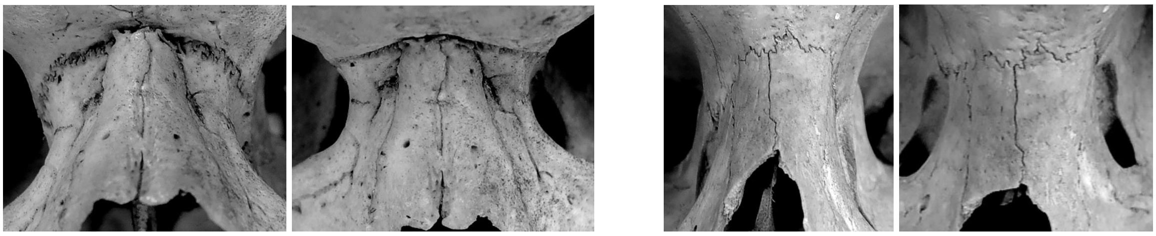
CN018 - Interorbital projection

The prominence of the nasal bridge (*Dorsum nasi*), i.e. the interorbital projection relative to the orbital margin (*Margo orbitalis*), was assessed in lateral view (*Norma lateralis*) (e.g. Brues 1977: 111; Byers 2002: 155-156; Carey/Steegmann 1981; Gill 1998: 300, 304; Gill/Gilbert 1990; İşcan 2000: 229; Roseman/Weaver 2004; Schwartz 1995: 288).

Score	Description
1	flat
2	intermediate
3	projecting

Figure 147: Interorbital projection scale.

CN019 - Orientation of the *Processus frontales maxillae*



(a) (b)

Figure 148: Different orientations of the frontal processes of the *Maxilla* (*Processus frontales maxillae*). Score 1 (a) and score 9 (b).

Gill/Gilbert's (1990) remarks on the orientation of the frontal processes of the *Maxilla* (*Processus frontales maxillae*) provided the impetus for developing this grading system (Gill 1998: 304-305; Gill/Gilbert 1990: 47-48). The expression of the trait was inspected in frontal (*Norma frontalis*) and half vertical view (*Norma verticalis*) (see Figure 148). Angles between the frontal surfaces of the processes and the coronal plane were not determined. Different orientations were merely visually assessed.

Score	Description
1	very flat
2	very flat to flat
3	flat
4	flat to moderate
5	moderate
6	moderate to steep
7	steep
8	steep to very steep
9	very steep

Figure 149: Orientation of the *Processus frontales maxillae* scale.

CN020 - Nasal profile

CN020a - Nasal profile - main; CN020b - Nasal profile - additional

The scale employed for this variable was based on a somatological typology of nasal profiles in lateral view (*Norma lateralis*) (Knußmann 1996: 17). The observed profile of the osseous parts of the back of a nose (*Dorsum nasi*) was classified by comparing it to the corresponding parts of the typological illustrations (e.g. Brues 1990: 3; Gill 1998: 300; İşcan 2000: 229; Lahr 1996: 342-343; Lang/Wachsmuth 1985: 199; White 2000: 377).

Score (main)	Description
10	concave
20	angled concave
30	straight
40	convex
50	angled convex
Score (additional)	**Description**
1	not rising
2	rising slightly
3	rising moderately
4	rising steeply
5	rising very steeply

Figure 150: Nasal profile scale.

CN021 - Relative nasal breadth

This variable was intended as a non-metric version of the nasal index (I48.) (e.g. Bass 1987: 76; Bräuer 1988: 192; İşcan 2000: 288; Krogman/İşcan 1986: 530; Martin 1928: 938-942; Roseman 2004; Roseman/Weaver 2004). The expressions were graded using techniques analogous to those explained for variable "CN001 - Cranial length (*Norma verticalis*)".

Score	Description
1	hyper-chamaerrhinic (≥ 58.0)
2	hyper-chamaerrhinic to chamaerrhinic
3	chamaerrhinic (57.9-51.0)
4	chamaerrhinic to mesorrhinic
5	mesorrhinic (50.9-47.0)
6	mesorrhinic to leptorrhinic
7	leptorrhinic (≤ 46.9)
8	leptorrhinic to hyper-leptorrhinic
9	hyper-leptorrhinic [(≤ 39.9)]

Figure 151: Relative nasal breadth scale.

CN022 - *Spina nasalis anterior*

The size of the anterior nasal spine (*Spina nasalis anterior*) was scored according to Martin's (1928: 948) reproduction of Broca's (1875) illustrations (e.g. Broca 1875; Gill 1998: 300-301; Martin 1928: 948-949; Rhine 1990; Schwartz 1995: 288; White 2000: 377).

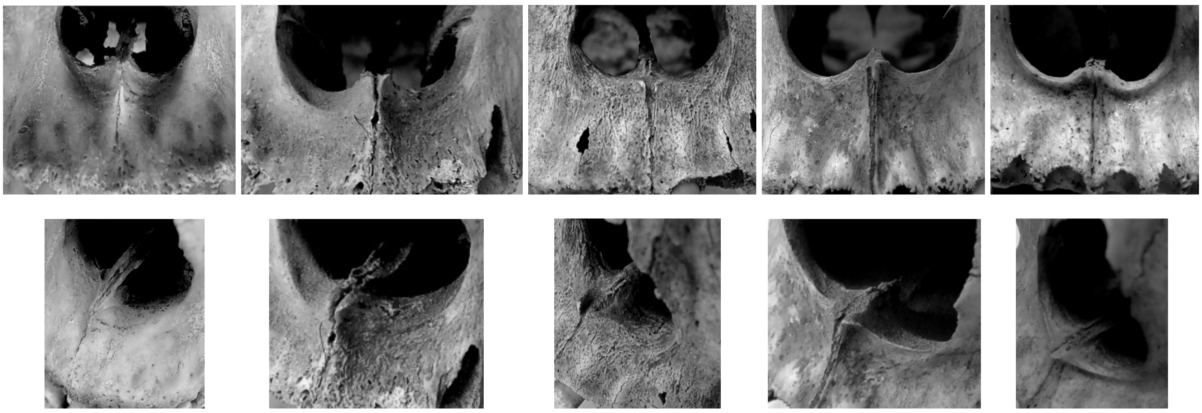
Score	Description
1	very small/absent (1)
2	very small to small
3	small (2)
4	small to moderate
5	moderate (3)
6	moderate to large
7	large (4)
8	large to very large
9	very large (5)

Figure 152: *Spina nasalis anterior* scale.

CN023 - *Margo infranasalis*

CN023a - *Margo infranasalis* - main; CN023b - *Margo infranasalis* - additional tendency/degree

Hovorka's (1893) typology was modified to classify the architecture of the inferior nasal margin (*Margo infranasalis*) (e.g. Bass 1987: 83-87; Gill 1998: 300-301; Gower 1923; Hovorka 1893; İşcan 2000: 228-229; Lahr 1996: 100-103; Martin 1928: 949; Rhine 1990; Schwartz 1995: 288; Weinberg *et al*. 2005; White 2000: 376-377). The categories "*Sulcus praenasalis*" and "*Fossa praenasalis*" were adopted unchanged. The remaining three categories of the modified typology were partly equivalent to Hovorka's (1893) "*Forma infantilis*" and "*Forma anthropina*". They were, however, redefined and renamed (see Figure 153).



(a) (b) (c) (d) (e)

Figure 153: *Margo infranasalis* types. *Sulcus praenasalis* (a), *Fossa praenasalis* (b), *Rotunditas infranasalis* (c), *Crista infranasalis* (d) and *Sima praenasalis* (e).

An inferior nasal margin (*Margo infranasalis*) was classified as a "*Rotunditas infranasalis*" if it was rounded and lacked both delimiting crests and grooves leading into the nasal aperture (*Apertura piriformis*). This type is similar to Hovorka's (1893) "*Forma infantilis*". It has also been variously described as "smooth" or "ill-defined". The term "*Crista infranasalis*" was introduced to refer to a vertical crest which clearly separates the nasal aperture (*Apertura piriformis*) from the area immediately anterior to it. This type may be considered the main variant of Hovorka's (1893) "*Forma anthropina*". A "*Sima praenasalis*" can be regarded as another variant of Hovorka's (1893) "*Forma anthropina*". It was defined as a horizontal crest which forms the inferior nasal margin (*Margo infranasalis*). Such a crest is often called a "nasal sill". Additional scores were assigned whenever it was necessary to capture encountered variations.

Score (main)	Description
10	*Sulcus praenasalis*
20	*Fossa praenasalis*
30	*Rotunditas infranasalis*
40	*Crista infranasalis*
50	*Sima praenasalis*
Score (additional)	**Description**
0	no additional tendency/neither faint nor pronounced
1	faint
2	pronounced
3	with tendencies towards a *Sulcus praenasalis*
4	with tendencies towards a *Fossa praenasalis*
5	with tendencies towards a *Rotunditas infranasalis*
6	with tendencies towards a *Crista infranasalis*
7	with tendencies towards a *Sima praenasalis*

Figure 154: *Margo infranasalis* scale.

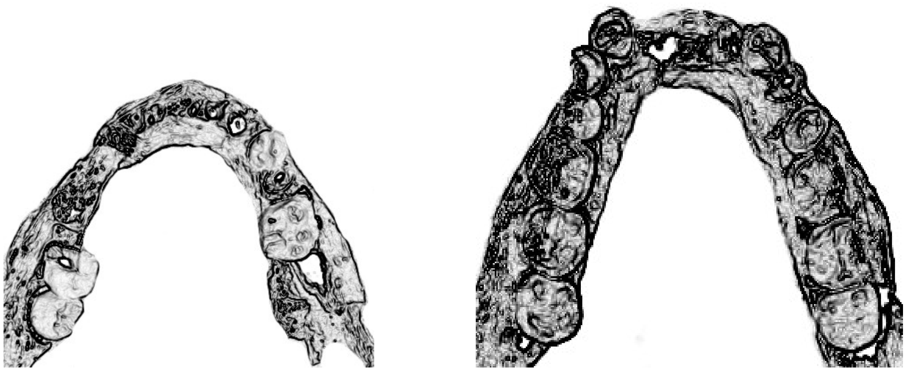
CN024 - Alveolar prognathism

"CN024 - Alveolar prognathism" was employed as a non-metric substitute for the subnasal angle measurement (74.) (e.g. Bräuer 1988: 184; Martin 1928: 664-667). The divisions given in Bräuer (1988: 184) were transformed into this grading system. Alveolar prognathism was thus graded analogously to variable "CN001 - Cranial length (*Norma verticalis*)" (e.g. Bass 1987: 87; Byers 2002: 158; Gill 1998: 300-303; İşcan *et al*. 2000: 228-229; Knußmann 1996: 409-410; Limson 1932; Ousley *et al*. 2009; Rhine 1990; Schwartz 1995: 288; Strouhal 1975: 34-35; White 2000: 376-377; Winkler/Wilfing 1991: 19).

Score	Description
1	hyper-orthognathous (≥ 93°) or orthognathous (93°-85°)
2	orthognathous to mesognathous
3	mesognathous (85°-80°)
4	mesognathous to prognathous
5	prognathous (80°-70°)
6	prognathous to hyper-prognathous
7	hyper-prognathous (70°-60°)
8	hyper-prognathous to ultra-prognathous
9	ultra-prognathous (< 60°)

Figure 155: Alveolar prognathism scale.

CN025 - Dental arch breadth



(a) (b)

Figure 156: Dental arch breadth. Score 1 (a) and score 7 (b).

Originally, this variable was to be based on either the maxilloalveolar (I54.) or the palatal index (I58.) (e.g. Bass 1987: 78-79; Bräuer 1988: 192; Krogman/İşcan 1986: 530; Martin 1928: 987; Ousley *et al*. 2009). However, the published classification schemes were found to be unsatisfactory. Moreover, the necessary measurements could only be taken occasionally. Consequently, the breadth of the maxillary (*Arcus dentalis superior*) and/or mandibular dental arch (*Arcus dentalis inferior*) was graded visually, relative to the length of the respective structure. The assigned scores were therefore highly sample-specific.

Score	Description
1	very broad
2	very broad to broad
3	broad
4	broad to moderate
5	moderate
6	moderate to narrow
7	narrow
8	narrow to very narrow
9	very narrow

Figure 157: Dental arch breadth scale.

CN026 - Dental arch shape

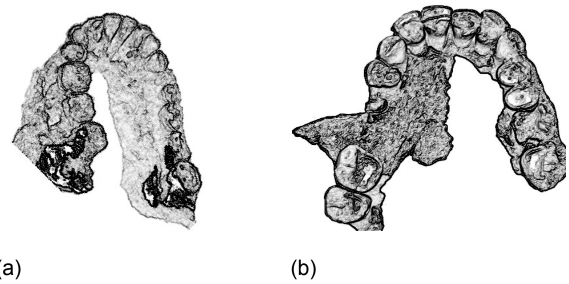


Figure 158: Dental arch shape. Score 3 (a) and score 5 (b).

Dental arch (*Arcus dentalis*) shape was classified in accordance with the figures illustrating palate shape in Byers (2002: 161) and Gill (1998: 303) (e.g. Brues 1990: 3; Byers 2002: 160-161; Derry 1949: 32; Gill 1998: 302-303, 306-307; İşcan *et al*. 2000: 229; Olivier 1969; Rhine 1990; White 2000: 377). Like "CN025 - Dental arch breadth", this variable focused on both the *Maxilla* and the mandible (*Mandibula*).

Score	Description
1	elliptic (horseshoe-shaped)
2	elliptic to hyperbolic
3	hyperbolic (U-shaped)
4	hyperbolic to parabolic
5	parabolic (V-shaped)
6	parabolic to elliptic

Figure 159: Dental arch shape scale.

CN027 - *Sutura palatina transversa*

The determination of palatine suture (*Sutura palatina transversa*) type was based on the illustrations published by Gill (1998: 303) (e.g. Gill 1998: 302-303, 306-308; Rhine 1990; White 2000: 377).

Score	Description
1	straight
2	straight to jagged
3	jagged (mesial aspect forms an anterior zigzag)
4	jagged to arched
5	arched (mesial aspect forms an anterior curve)
6	arched to straight

Figure 160: *Sutura palatina transversa* scale.

CN028 - Symphyseal height

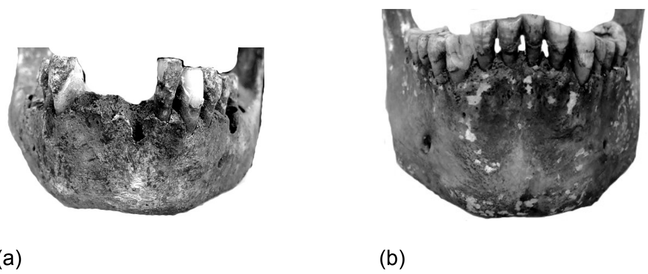


Figure 161: Symphyseal height. Score 4 (a) and score 9 (b).

Symphyseal height was assessed visually in frontal view (*Norma frontalis*). The height of the mandibular symphysis (*Symphysis mandibulae*) was scored relative to the breadth of the anterior surface of the mandible (*Mandibula*) (e.g. Bräuer 1988: 183, 192; Derry 1949: 32; Greene/Armelagos 1972: 29).

Score	Description
1	very low
2	very low to low
3	low
4	low to moderate
5	moderate
6	moderate to high
7	high
8	high to very high
9	very high

Figure 162: Symphyseal height scale.

CN029 - Ramus geometry

"CN029 - Ramus geometry" was used to categorise the height of an ascending ramus (*Ramus mandibulae*) relative to its breadth (e.g. Bräuer 1983: 118-119; Bräuer 1988: 192; Derry 1914: 105; İşcan *et al*. 2000: 229; Martin 1928: 983; White 2000: 377). The evaluation was carried out visually.

Score	Description
1	very low
2	very low to low
3	low
4	low to moderate
5	moderate
6	moderate to high
7	high
8	high to very high
9	very high

Figure 163: Ramus geometry scale.

CN030 - Ramus shape

Rhine's (1990: 10, 12-13, 15, 20) descriptions and illustrations provided the framework within which ascending ramus (*Ramus mandibulae*) shapes were classified (e.g. Derry 1949: 32; İşcan *et al*. 2000: 229; Rhine 1990).

Score	Description
1	uniform (with a uniform width)
2	slightly narrowed
3	narrowed (narrowed close to or at its midpoint)
4	markedly narrowed

Figure 164: Ramus shape scale.

CN031 - Ramus inversion

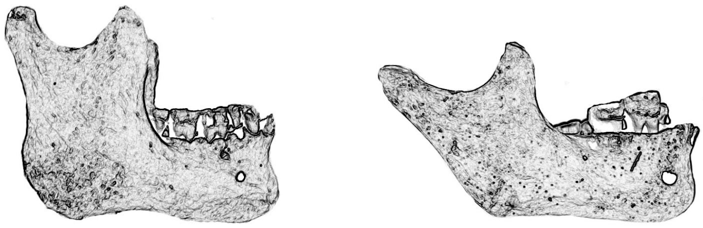
Figure 165: Ramus inversion. Score 1 (a) and score 9 (b).

Angel/Kelley's (1990: 37-39) illustrations served as the external yardstick by which degrees of ramus inversion were judged (e.g. Angel/Kelley 1990; Gill 1998: 309-310; Novotný *et al.* 1993: 78; Rhine 1990). Nonetheless, the scale was constructed with the encountered variation in mind. Furthermore, the inversion of the entire posterior edge of the ascending ramus (*Ramus mandibulae*), not just the inversion of its middle third, was assessed. Assigned scores represented the inversion of both the left and right ascending ramus (*Ramus mandibulae*).

Score	Description
1	absent
2	very faint
3	faint
4	faint to moderate
5	moderate
6	moderate to pronounced
7	pronounced
8	pronounced to very pronounced
9	very pronounced

Figure 166: Ramus inversion scale.

CN032 - Ramus angle



(a) (b)

Figure 167: Ramus angle. Score 2 (a) and score 9 (b).

This classification scheme was developed as a means of transforming mandibular ramus angles (79.) into non-metric scores (e.g. Bräuer 1988: 185; Henke *et al*. 2002: 301-304; Martin 1928: 984-985; White 2000: 377). The divisions were defined for this study. The scoring techniques were analogous to those outlined for variable "CN001 - Cranial length (*Norma verticalis*)".

Score	Description
1	very sharp (≤ 99.9°)
2	very sharp to sharp (100.0°-104.9°)
3	sharp (105.0°-109.9°)
4	sharp to moderate (110.0°-114.9°)
5	moderate (115.0°-119.9°)
6	moderate to blunt (120.0°-124.9°)
7	blunt (125.0°-129.9°)
8	blunt to very blunt (130.0°-134.9°)
9	very blunt (≥ 135.0°)

Figure 168: Ramus angle scale.

Appendix VI.B.2. Cranial epigenetic traits

CE015 - *Os incisivum*/*Sutura incisiva*

The degree to which the incisive bone (*Os incisivum*) and suture (*Sutura incisiva*) were present was described using an ordinal scale.

Score	Description
1	not present
2	less than 50% of the suture remain
3	more than 50% of the suture remain
4	present

Figure 169: *Os incisivum/Sutura incisiva* scale.

CE036/36 - *Foramen supraorbitale*

Four different scores could be employed to record the presence and shape of the supraorbital foramen (*Foramen supraorbitale*).

Score	Description
1	not present
2	*Foramen*
3	divided *Foramen*
4	*Incisura*

Figure 170: *Foramen supraorbitale* scale.

CE030/31 - *Foramen parietale*, CE038/39 - *Foramen frontale* & CE040/41 - *Foramen zygomaticofaciale*

CE030a/31a - *Foramen parietale* - presence; CE030b/31b - *Foramen parietale* - number; CE038a/39a - *Foramen frontale* - presence; CE038b/39b - *Foramen frontale* - number; CE040a/41a - *Foramen zygomaticofaciale* - presence; CE040b/41b - *Foramen zygomaticofaciale* - number

These three traits were coded on the basis of the combined scores below.

Score (presence)	**Description**
10	not present
20	present
Score (number)	**Description**
1	one *Foramen*
2	two *Foramina*
3	three *Foramina*
4	four *Foramina*

Figure 171: *Foramen parietale*, *Foramen frontale* and *Foramen zygomaticofaciale* scale.

CE050/51 - *Foramen infraorbitale accessorium* & CE057/58 - *Foramen mentale accessorium*

CE050a/51a - *Foramen infraorbitale accessorium* - presence; CE050b/51b - *Foramen infraorbitale accessorium* - number; CE057a/58a - *Foramen mentale accessorium* - presence; CE057b/58b - *Foramen mentale accessorium* - number

A slightly different system of combined scores was used to categorise infraorbital (*Foramen infraorbitale accessorium*) and mental foramen (*Foramen mentale accessorium*) types.

Score (presence)	**Description**
10	not present
20	present
Score (number)	**Description**
0	no *Foramen* (i.e. normal *Foramen* absent; only with 10)
1	one *Foramen* (i.e. only normal *Foramen* present; only with 10)
2	two *Foramina* (incl. normal *Foramen*; only with 20)
3	three *Foramina* (incl. normal *Foramen*; only with 20)
4	four *Foramina* (incl. normal *Foramen*; only with 20)

Figure 172: *Foramen infraorbitale accessorium* and *Foramen mentale accessorium* scale.

CE054 - **Foramina paranasalia*

CE054a/54b - **Foramina paranasalia*

The paranasal foramen (*Foramen paranasale*) constituted a newly defined cranial epigenetic trait (see V.A.10., V.B.3.a.2. and V.C.1.i.). *Foramina* located immediately lateral to the nasal aperture (*Apertura piriformis*) were recorded separately on either side and together. The first figure of a double-figure score represented the left and the second figure the right score.

Score	**Description**
0	impossible to assess
1	not present
2	single large *Foramen paranasale* present
3	single small *Foramen paranasale* present
4	multiple *Foramina*

Figure 173: *Foramina paranasalia* scale.

CE061/62 - *Foramen spinosum*

The *Foramen spinosum* (CE061/62) could be "open" (2) or "closed" (1).

Appendix VI.B.3. Dental epigenetic traits

DE001/2 - Winging

The "winging" of each one of the two upper first incisors (*Dentes incisivi superiores I*) was documented.

DE009/10 - Interruption groove UI2, DE053/54 - Groove pattern LM2 & DE065/66 - Cusp 7 LM1

Certain ASUDAS abbreviations were converted into numerical codes. The variables "Interruption groove UI2", "Groove pattern LM2" and "Cusp 7 LM1" were affected by these changes.

Interruption groove score	ASUDAS abbreviation
0	0
1	M
2	D
3	MD
4	Med
Groove pattern score	**ASUDAS abbreviation**
1	Y
2	+
3	X
Cusp 7 score	**ASUDAS abbreviation**
1.5	1A

Figure 174: Recoding of “Interruption groove UI2”, “Groove pattern LM2” and “Cusp 7 LM1” abbreviations.

DE015/16 - Distal accessory ridge UC & DE025/26 - Metacone UM3

Two traits were assessed by comparing them with ASUDAS plaques for other traits. “Distal accessory ridge UC” expressions were scored using the “Distal accessory ridge LC” and “Metacone UM3” expressions using the “Hypocone UM2” plaque.

DE055/56 - Cusp number LM1 & DE057/58 - Cusp number LM2

ASUDAS grade > 4 of the variables “Cusp number LM1” and “Cusp number LM2” was renamed 5.5.

DE075/76 - Trosomolar angle

Vestibular trosomolar angles were marked with a minus (-).

DE077 - Midline diastema

The non-ASUDAS trait “Midline diastema” had two possible expressions: “present” (1) and “not present” (0).

Appendix VI.B.4. Postcranial epigenetic traits

PE001/2 - Allen’s fossa, PE003/4 - Poirier’s facet, PE007/8 - *Fossa hypotrochanterica*, PE009/10 - *Tuberculum fossae trochantericae*, PE019/20 - *Foramen supratrochleare*, PE021/22 - **Foramen intertrochleare*, PE025/26 - *Sulcus praeauricularis*, PE029/30 - *Acromion (Facies articularis inferior)* & PE035/36 - *Incisura vasta*

PE001a/2a - Allen’s fossa - presence; PE001b/2b - Allen’s fossa - degree; PE003a/4a - Poirier’s facet - presence; PE003b/4b - Poirier’s facet - degree; PE007a/8a - *Fossa hypotrochanterica* - presence; PE007b/8b - *Fossa hypotrochanterica* - degree; PE009a/10a - *Tuberculum fossae trochantericae* - presence; PE009b/10b - *Tuberculum fossae trochantericae* - degree; PE019a/20a - *Foramen supratrochleare* - presence; PE019b/20b - *Foramen supratrochleare* - degree; PE021a/22a - *Foramen intertrochleare* - presence; PE021b/22b - *Foramen intertrochleare* - degree; PE025a/26a - *Sulcus praeauricularis* - presence; PE025b/26b - *Sulcus praeauricularis* - degree; PE029a/30a - *Acromion (Facies articularis inferior)* - presence; PE029b/30b - *Acromion (Facies articularis inferior)* - degree; PE035a/36a - *Incisura vasta* - presence & PE035b/36b - *Incisura vasta* - degree

The presence and the degree of expressions were coded for nine traits. A *Foramen intertrochleare* was defined as a *Foramen* or *Foramen*-like opening directly posterior to the radial (*Incisura radials*) and distal to the trochlear notch (*Incisura trochlearis*) of the *Ulna* (see V.A.10. and V.C.1.i.).

Score (presence)	Description
10	not present
20	present
Score (degree)	**Description**
0	not assessable
1	faint
2	moderate
3	pronounced

Figure 175: Allen’s fossa, Poirier’s facet, *Fossa hypotrochanterica*, *Tuberculum fossae trochantericae*, *Foramen supratrochleare*, *Foramen intertrochleare*, *Sulcus praeauricularis*, *Acromion (Facies articularis inferior)* and *Incisura vasta* scale.

PE047/48 - *Facies articularis inferior*

The inferior articular surface (*Facies articularis inferior*) type of a *Talus* could be classified as “single” (1) or “double” (2).

Appendix VII. Diachronic change variables

Appendix VII.A. Cranial and postcranial measurements

CM127 - *74a. Alternative subnasal angle
CM129/130 - 79. Mandibular ramus angle (m)
CM 168 - Cranial thickness (max.)
CM 169 - Cranial thickness (min.)
CM 168/169 - Cranial thickness (max., min.)
PM015/16 - H1. *Humerus* - Maximum length (m)
PM035 - *Humerus* - Cortical thickness (max.)
PM036 - *Humerus* - Cortical thickness (min.)
PM035/36 - *Humerus* - Cortical thickness (max., min.)
PM037/38 - R1. *Radius* - Maximum length (m)
PM063 - *Radius* - Cortical thickness (max.)
PM064 - *Radius* - Cortical thickness (min.)
PM063/64 - *Radius* - Cortical thickness (max., min.)
PM065/66 - U1. *Ulna* - Maximum length (m)
PM085 - *Ulna* - Cortical thickness (max.)
PM086 - *Ulna* - Cortical thickness (min.)
PM085/86 - *Ulna* - Cortical thickness (max., min.)
PM089/90 - F1. *Femur* - Maximum length (m)
PM126 - *Femur* - Cortical thickness (max.)
PM127 - *Femur* - Cortical thickness (min.)
PM126/127 - *Femur* - Cortical thickness (max., min.)
PM130/131 - T1a. *Tibia* - Maximum length (m)
PM162 - *Tibia* - Cortical thickness (max.)
PM163 - *Tibia* - Cortical thickness (min.)
PM162/163 - *Tibia* - Cortical thickness (max., min.)
PM - Cort. thickness (*Rad.*, *Ul.* - max., min.)
PM - Cort. thickness (*Hum.*, *Rad.*, *Ul.* - max., min.)
PM - Cort. thickness (*Fem.*, *Tib.* - max., min.)
PM - Cort. thickness (*Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* - max., min.)

Appendix VII.B. Scaled cranial and postcranial measurements

SCM 168 - Cranial thickness (max.)
SCM 169 - Cranial thickness (min.)
SCM 168/169 - Cranial thickness (max., min.)
SPM035 - *Humerus* - Cortical thickness (max.)
SPM036 - *Humerus* - Cortical thickness (min.)
SPM035/36 - *Humerus* - Cortical thickness (max., min.)
SPM063 - *Radius* - Cortical thickness (max.)
SPM064 - *Radius* - Cortical thickness (min.)
SPM063/64 - *Radius* - Cortical thickness (max., min.)
SPM077/78 - *U18. Longitudinal *Tub. ulnae* diam. (m)
SPM079/80 - *U19. Transverse *Tub. ulnae* diam. (m)
SPM085 - *Ulna* - Cortical thickness (max.)
SPM086 - *Ulna* - Cortical thickness (min.)
SPM085/86 - *Ulna* - Cortical thickness (max., min.)
SPM117/118 - *F34. *Linea aspera* breadth (m)
SPM126 - *Femur* - Cortical thickness (max.)
SPM127 - *Femur* - Cortical thickness (min.)
SPM126/127 - *Femur* - Cortical thickness (max., min.)
SPM162 - *Tibia* - Cortical thickness (max.)
SPM163 - *Tibia* - Cortical thickness (min.)
SPM162/163 - *Tibia* - Cortical thickness (max., min.)
SPM - Cort. thickness (*Rad.*, *Ul.* - max., min.)
SPM - Cort. thickness (*Hum.*, *Rad.*, *Ul.* - max., min.)
SPM - Cort. thickness (*Fem.*, *Tib.* - max., min.)
SPM - Cort. thickness (*Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* - max., min.)

Appendix VII.C. Cranial, dental and postcranial indices

ICM003 - *I51(1). Naso-palatal index
ICM004 - *I54b. Palato-alveolar index
ICM006 - *I62b. Mandibular length-breadth index
ICM007 - *I62c. Ant. mandibular length-breadth index
ICM008 - I62(1). Mandibular height index
ICM010 - *I66b. Ht.-b. index of the *Corp. mand.* at M2
ICM011 - *I66c. Symphyseal index
ICM012 - *I66d. Symphyseal height index
ICM013 - Cranial thickness index
IDM - Asymmetry index (all teeth)
IDM - Asymmetry index (molars)
IDM - Asymmetry index (incisors)
IDM - Asymmetry index (canines and premolars)
IPM001 - HI1 Robusticity index
IPM002 - *HI1b. Modified robusticity index
IPM003 - *IH1c. Pearson's robusticity index
IPM004 - HI2. Diaphyseal index
IPM005 - Humeral cortical thickness index
IPM006 - *RI1b. Modified robusticity index
IPM007 - RI2. Diaphyseal index
IPM009 - Radial cortical thickness index
IPM010 - *UI1b. Modified robusticity index
IPM011 - *UI1c Pearson's robusticity index
IPM012 - UI6. Diaphyseal index
IPM013 - *UI10. Crest circumference length index
IPM014 - Ulnar cortical thickness index
IPM015 - *FI1b. Modified length index
IPM016 - *FI2b. Pearson's robusticity index
IPM017 - FI3. *Index pilastericus*
IPM018 - FI4. *Index platymericus*
IPM019 - *FI16. Subtrochanteric index
IPM020 - *FI17. Subtrochanteric robusticity index
IPM021 - *FI18. *Linea aspera* index
IPM022 - Femoral cortical thickness index
IPM023 - 2nd femoral cortical thickness index
IPM024 - TI1. Mid-shaft diameter index
IPM026 - *TI3b. Modified length index
IPM027 - *TI5. Modified robusticity index
IPM028 - Tibial cortical thickness index
IPM - Cort. thick. - *Radius*, *Ulna* (IPM009, 14)
IPM - Cort. thick. - *Hum.*, *Rad.*, *Ul.* (IPM005, 9, 14)
IPM - Cort. thick. - *Femur*, *Tibia* (IPM022, 28)
IPM - Cort. thick. - *Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* (IPM005, 9, 14, 22, 28)
IPM - Radio-humeral index (brachial index)
IPM - Tibio-femoral index (crural index)
ISPM - *Tub. ulnae* area (SPM077/78·79/80)

Appendix VII.D. Cranial morphological traits

CN006a - Occipital bunning - degree
CN024 - Alveolar prognathism
CN025 - Dental arch breadth
CN028 - Symphyseal height
CN031 - Ramus inversion
CN032 - Ramus angle

Appendix VII.E. Postcranial epigenetic traits

PE007a/8a - *Fossa hypotrochanterica* (m) - presence
PE007b/8b - *Fossa hypotrochanterica* (m) - degree

Appendix VII.F. Cranial and postcranial robusticity traits

CR001 - Relief of the *Planum nuchale*
CR002 - *Inion* (*Protuberantia occipitalis externa*)
CR003 - *Processus mastoideus*
CR010 - *Trigonum mandibulae/Mentum osseum*
CR011 - Corpus thickness
CR012 - *Angulus mandibulae* (gonial eversion)
PR001/2 - Humeral shaft bowing (m)
PR003/4 - Radial shaft bowing (m)
PR005/6 - Radial *Margo interosseus* size (m)
PR007/8 - Ulnar shaft bowing (m)
PR009/10 - Ulnar *Margo interosseus* size (m)
PR011a/12a - Femoral shaft bowing (m)
PR011b/12b - Femoral shaft bowing (m) - degree
PR013/14 - Pilasterism (m)
CR - Cranial robisticity (CR001, 2, 3, 10, 11, 12)
CR - Occipital robisticity (CR001, 2)
CR - Mandibular robusticity (CR010, 11, 12)
PR - Radial & ulnar shaft bowing - (PR003/4, 7/8)
PR - Radial & ulnar *Margo* size (PR005/6, 9/10)

Appendix VII.G. Cranial and postcranial musculoskeletal stress traits

CS001 - *M. trapezius* (*Origo*)
CS004/5 - *M. sternocleidomastoideus* (*Insertio*) (m)
CS010/11 - *M. masseter* (*Insertio*) (m)
CS012/13 - *M. pterygoideus medialis* (*Insertio*) (m)
PS001/2 - *M. pectoralis major* (*Insertio*) (m)
PS003/4 - *M. deltoideus* (*Insertio*) (m)
PS005/6 - *M. biceps brachii* (*Insertio*) (m)
PS007/8 - *M. brachialis* (*Insertio*) (m)
PS011/12 - *M. gluteus maximus* (*Insertio*) (m)
PS015/16 - *M. soleus* (*Origo*) (m)
CPS - *Cranium* and postcranium (CS001, 4/5, 10/11, 12/13, PS001/2, 3/4, 5/6, 7/8, 11/12, 15/16)
CS - *Cranium* (CS001, 4/5, 10/11, 12/13)
CS - *Calvarium* (CS001, 4/5)
CS - *Mandibula* (CS010/11, 12/13)
PS - Postcranium (PS001/2, 3/4, 5/6, 7/8, 11/12, 15/16)
PS - Upper free extremities (PS001/2, 3/4, 5/6, 7/8)
PS - *Humerus* (PS001/2, 3/4)
PS - *Radius* and *Ulna* (PS005/6, 7/8)
PS - *Femur* and *Tibia* (PS011/12, 15/16)

Appendix VII.H. Tooth loss

DL - Tooth loss (all teeth)
DL - Tooth loss (affected individuals)

Appendix VII.I. Dental abrasion

DA - Abrasion (all teeth)
DA - Ant. abrasion (UI1, 2, C, LI1, 2, C)
DA - Post. abrasion (UM1, 2, 3, LM1, 2, 3)
DA - pre-Leiterband - Ant.-post. abrasion comparison
DA - Leiterband - Ant.-post. abrasion comparison

Appendix VII.J. Enamel hypoplasia

DS - Hypoplasia - presence (all teeth)
DS - Hypoplasia - presence (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)
DS - Hypoplasia - presence (UM1, 2, 3, LM1, 2, 3)
DS - Hypoplasia - frequency (all teeth)
DS - Hypoplasia - frequency (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)
DS - Hypoplasia - frequency (UM1, 2, 3, LM1, 2, 3)
DS - Hypoplasia - intensity (all teeth)
DS - Hypoplasia - intensity (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)
DS - Hypoplasia - intensity (UM1, 2, 3, LM1, 2, 3)

Appendix VII.K. Dental caries

DC - Caries - presence (all teeth)
DC - Caries - presence (affected individuals)
DC - Caries - severity (all teeth)
DC - Caries - severity (all lesions)

Appendix VII.L. Age at death

Age at death (with sub-adults)
Age at death (without sub-adults)
Frequ. of sub-adults (Leiterband - pre-Leiterband)
Frequ. of sub-adults - with 02/28-7 as sub-adult (Leiterband - pre-Leiterband)
Frequ. of sub-adults (02/28 - 02/1)
Frequ. of sub-adults - with 02/28-7 as sub-adult (02/28 - 02/1)

Appendix VII.M. Living height

Living height

Appendix VII.N. Living weight

Living weight

Appendix VII.O. Height-weight indices

Quetelet index
Body mass index
Rohrer index
Index ponderalis

Appendix VIII. Dichotomisation key

Appendix VIII.A. Cranial morphological traits

CN001 - Cranial length (*Norma verticalis*)
1 = 7, 8, 9 — 0 = 1, 2, 3, 4, 5, 6
CN002a - Cranial shape (*Norma verticalis*) - main
1 = 6, 7 — 0 = 3, 4, 5
CN002b - Cranial shape (*Norma verticalis*) - additional tendency
1 = 1, 2, 3, 4, 5, 6, 7 — 0 = 0
CN004 - Cranial height (*Norma occipitalis*)
1 = 7, 8, 9 — 0 = 1, 2, 3, 4, 5, 6
CN005a - Cranial shape (*Norma occipitalis*) - main
1 = 8 — 0 = 2, 3, 4, 7
CN005b - Cranial shape (*Norma occipitalis*) - additional tendency
1 = 2, 3, 4, 7, 8 — 0 = 0
CN006a - Occipital bunning - degree
1 = 5, 6, 7, 8, 9 — 0 = 1, 2, 3, 4
CN006b - Occipital bunning - shape
1 = 2, 5 — 0 = 0
CN007a - Sagittal keeling - degree
1 = 5, 6, 7, 8, 9 — 0 = 1, 2, 3, 4
CN007b - Sagittal keeling - shape
1 = 5 — 0 = 0
CN016 - Interorbital breadth
1 = 9 — 0 = 1, 2, 3, 4, 5, 6, 7, 8
CN017a - Shape of the *Sella nasi* - main
1 = 4, 5, 6, 7, 8, 9 — 0= 1, 2, 3
CN017b - Shape of the *Sella nasi* - additional tendency/superstructure
1 = 5, 6, 7, 8 — 0 = 0, 1, 2, 3, 4
CN019 - Orientation of the *Processus frontales maxillae*
1 = 5, 6, 7, 8, 9 — 0 = 1, 2, 3, 4
CN023a - *Margo infranasalis* - main
1 = 4, 5 — 0 = 1, 2, 3
CN023b - *Margo infranasalis* - additional tendency/degree
1 = 3, 4, 5, 6, 7 — 0 = 0, 1, 2
CN024 - Alveolar prognathism
1 = 8, 9 — 0 = 1, 2, 3, 4, 5, 6, 7
CN028 - Symphyseal height
1 = 7, 8, 9 — 0 = 1, 2, 3, 4, 5, 6
CN031 - Ramus inversion
1 = 5, 6, 7, 8, 9 — 0 = 1, 2, 3, 4
CN032 - Ramus angle
1 = 6, 7, 8, 9 — 0 = 1, 2, 3, 4, 5

Appendix VIII.B. Cranial epigenetic traits

CE001 - *Ossa suturae coronalis*
1 = 2 — 0 = 1
CE003 - *Ossa suturae lambdoideae*
1 = 2 — 0 = 1
CE014 - *Os incae*
1 = 2 — 0 = 1
CE015 - *Os incisivum*/*Sutura incisiva*
1 = 2, 3, 4 — 0 = 1
CE021 - *Sutura metopica*
1 = 2 — 0 = 1
CE040b/41b - *Foramen zygomaticofaciale* (m) - number
1 = 1.5, 2, 2.5, 3, 3.5 — 0 = 0, 0.5, 1
CE054a/b - **Foramina paranasalia* (m)
1 = 2, 3 — 0 = 1, 4
CE057b/58b - *Foramen mentale accessorium* (m) - number
1 = 1.5, 2, 2.5 — 0 = 0, 0.5, 1

Appendix VIII.C. Dental epigenetic traits

DE001/2 - Winging UI1 (m)
1 = 1, 4 — 0 = 3
DE005/6 - Shovel UI1 (m)
1 = 2, 3, 4, 5, 6, 7 — 0 = 0, 1
DE007/8 - Double shovel UI1 (m)
1 = 1, 2, 3, 4, 5, 6 — 0 = 0

DE009/10 - Interruption groove UI2 (m)	1 = 1, 2, 3, 4	0 = 0
DE011/12 - *Tuberculum dentale* UI2 (m)	1 = 3, 4, 5, 6	0 = 0, 1, 2
DE013/14 - Canine mesial ridge (“Bushman canine”) UC (m)	1 = 2, 3	0 = 0, 1
DE015/16 - Distal accessory ridge UC (m)	1 = 4, 5	0 = 0, 1, 2, 3
DE017/18 - Premol. mesial & distal access. cusps UP1 (m)	1 = 1	0 = 0
DE019/20 - Premol. mesial & distal access. cusps UP2 (m)	1 = 1	0 = 0
DE027/28 - Hypocone UM2 (m)	1 = 4, 5	0 = 0, 1, 2, 3, 3.5
DE029/30 - Cusp 5 (metaconule) UM1 (m)	1 = 4, 5	0 = 0, 1, 2, 3
DE031/32 - Carabelli’s trait UM1 (m)	1 = 3, 4, 5, 6, 7	0 = 0, 1, 2
DE033/34 - Parastyle UM2 (m)	1 = 1, 2, 3, 4, 5, 6	0 = 0
DE035/36 - Parastyle UM3 (m)	1 = 1, 2, 3, 4, 5, 6	0 = 0
DE039/40 - Premolar root number UP1 (m)	1 = 2, 3	0 = 1
DE041/42 - Upper molar root number UM2 (m)	1 = 3	0 = 1, 2
DE043/44 - Peg-shaped incisor UI2 (m)	1 = 1, 2	0 = 0
DE045/46 - Peg-shaped molar UM3 (m)	1 = 1, 2	0 = 0
DE047/48 - Congenital absence UM3 (m)	1 = 1	0 = 0
DE049/50 - Premol. lingual cusps LP2 (m)	1 = 2, 3, 4, 5, 6, 7, 8, 9	0 = 0, 1
DE053/54 - Groove pattern LM2 (m)	1 = 1	0 = 2, 3
DE055/56 - Cusp number LM1 (m)	1 = 6	0 = 5, 5.5
DE057/58 - Cusp number LM2 (m)	1 = 5.5, 6	0 = 4, 5
DE059/60 - Deflecting wrinkle LM1 (m)	1 = 3	0 = 0, 1, 2
DE063/64 - Protostylid LM1 (m)	1 = 1, 2, 3, 4, 5, 6, 7	0 = 0
DE065/66 - Cusp 7 LM1 (m)	1 = 3, 4	0 = 0, 1, 1.5, 2
DE069/70 - Canine root number LC (m)	1 = 1	0 = 2
DE071/72 - Lower molar root number LM1 (m)	1 = 2	0 = 1
DE073/74 - Lower molar root number LM2 (m)	1 = 2	0 = 1
DE077 - Midline diastema	1 = 1	0 = 0
DE078 - Palatine torus	1 = 1, 2, 3, 4	0 = 0
DE079/80 - Mandibular torus (m)	1 = 1, 2, 3	0 = 0
DE081 - Rocker jaw	1 = 1, 2	0 = 0

Appendix IX. Normalisation protocol

Appendix IX.A. Prehistoric comparative samples

Cranial measurements
CM007/8: removed
CM069: removed
CM073: removed
CM080: SQRT
CM085: LOG10
CM137: removed
CM149: removed
CM153: removed

Dental measurements
DM001/2: removed
DM003/4: LG10(9.35-(DM003/4))
DM009/10: SQRT(9.35-(DM009/10))
DM013/14: LG10(13.05-(DM013/14))
DM021/22: INV
DM033/34: INV
DM037/38: removed
DM039/40: removed
DM041/42: LG10(12.0-(DM041/42))
DM057/58: removed
DM061/62: LG10(13.5-(DM061/62))

Scaled cranial measurements
SCM003: removed
SCM007/8: removed
SCM010/11: SQRT(4.69160-(SCM010/11))
SCM047: SQRT(5.7291-(SCM047))
SCM051: SQRT(7.3877-(SCM051))
SCM069: removed
SCM073: removed
SCM085: INV
SCM100/101: removed
SCM102/103: removed
SCM136: SQRT(5.3602-(SCM136))
SCM137: removed
SCM141: removed
SCM148: removed
SCM149: removed
SCM153: removed

Scaled dental measurements
SDM001/2: INV
SDM003/4: removed
SDM007/8: 1/(1.75145-(SDM007/8))
SDM009/10: removed
SDM011/12: 1/(2.13305-(SDM011/12))
SDM013/14: removed
SDM015/16: INV
SDM017/18: removed
SDM019/20: removed
SDM027/28: 1/(2.16170-(SDM027/28))
SDM029/30: removed
SDM033/34: removed
SDM037/38: INV
SDM039/40: INV
SDM041/42: removed
SDM045/46: removed
SDM047/48: removed
SDM055/56: removed
SDM057/58: 1/(1.89020-(SDM057/58))

Cranial epigenetic traits
CE001: removed

Dental epigenetic traits
DE035/36: removed
DE043/44: removed
DE047/48: removed
DE059/60: removed
DE063/64: removed
DE069/70: removed
DE071/72: removed

Appendix IX.B. Alternative prehistoric comparative samples

Cranial measurements
CM001: removed
CM007/8: removed
CM010/11: removed
CM020: removed
CM051: INV
CM058: removed
CM060: removed
CM069: removed
CM071: removed
CM077: INV
CM085: removed
CM100/101: LOG10
CM135: INV
CM137: removed
CM143: INV
CM148: removed
CM149: removed
CM150: removed
CM153: removed

Dental measurements
DM001/2: removed
DM003/4: removed
DM009/10: SQRT(9.2-(DM009/10))
DM023/24: INV
DM039/40: removed
DM041/42: removed
DM059/60: SQRT(13.85-(DM059/60))
DM061/62: SQRT(13.5-(DM061/62))

Scaled cranial measurements
SCM003: removed
SCM007/8: removed
SCM009/10: removed
SCM030: removed
SCM042: removed
SCM060: INV
SCM068: removed
SCM072: removed
SCM085: removed
SCM088/89: INV
SCM100/101: removed
SCM102/103: removed
SCM133: removed
SCM136: removed
SCM137: removed
SCM148: removed
SCM149: removed
SCM150: removed
SCM153: removed

Scaled dental measurements
SDM001/2: removed
SDM003/4: removed
SDM009/10: removed
SDM013/14: 1/(SQRT(2.09345-(SDM013/14)))
SDM017/18: INV
SDM021/22: removed
SDM027/28: removed

SDM029/30: removed
SDM033/34: INV
SDM035/36: INV
SDM041/42: removed
SDM047/48: removed
SDM057/58: 1/(SQRT(1.89020-(SDM057/58)))
SDM063/64: removed

Cranial epigenetic traits
CE001: removed

Dental epigenetic traits
DE035/36: removed
DE043/44: removed
DE047/48: removed
DE059/60: removed
DE063/64: removed
DE069/70: removed
DE071/72: removed

Appendix IX.C. Prehistoric comparative samples with Wadi Howar sample

Cranial measurements
CM001: removed
CM002: removed
CM003: INV
CM004: removed
CM007/8: removed
CM028: removed
CM042: removed
CM047: SQRT(52.0-(CM047))
CM051: removed
CM068: SQRT(39.0-(CM068))
CM069: removed
CM070: SQRT(32.0-(CM070))
CM071: removed
CM073: removed
CM075: removed
CM080: removed
CM082: removed
CM083: INV
CM085: removed
CM100/101: removed
CM133: removed
CM135: removed
CM136: LG10(47.5-(CM136))
CM137: removed
CM141: removed
CM148: removed
CM149: removed
CM153: removed

Dental measurements
DM001/2: INV
DM009/10: removed
DM011/12: removed
DM013/14: removed
DM021/22: INV
DM027/28: INV
DM033/34: INV
DM037/38: removed
DM039/40: removed
DM041/42: removed
DM047/48: removed
DM049/50: removed
DM055/56: INV
DM057/58: removed
DM059/60: removed
DM063/64: SQRT(13-(DM063/64))

Scaled cranial measurements
SCM001: INV
SCM002: INV
SCM003: removed
SCM007/8: removed
SCM042: removed
SCM045: removed
SCM047: removed
SCM049: removed
SCM051: removed
SCM068: SQRT(4.6019-(SCM068))
SCM069: removed
SCM070: LG10(3.9384-(SCM070))
SCM073: removed
SCM077: removed
SCM080: INV
SCM083: INV
SCM085: removed
SCM088/89: INV
SCM100/101: removed
SCM102/103: removed
SCM133: removed
SCM135: removed
SCM137: removed
SCM141: removed
SCM148: removed
SCM149: removed
SCM150: LG10(3.3009-(SCM150))
SCM153: removed

Scaled dental measurements
SDM001/2: INV
SDM003/4: removed
SDM005/6: removed
SDM007/8: removed
SDM009/10: removed
SDM011/12: removed
SDM013/14: removed
SDM015/16: removed
SDM017/18: removed
SDM019/20: removed
SDM023/24: LG10(1.76890-(SDM023/24))
SDM027/28: LG10(2.16170-(SDM027/28))
SDM029/30: removed
SDM033/34: removed
SDM035/36: removed
SDM037/38: removed
SDM039/40: removed
SDM041/42: removed
SDM045/46: removed
SDM047/48: removed
SDM055/56: removed
SDM057/58: removed
SDM059/60: removed

Cranial epigenetic traits
CE001: removed

Dental epigenetic traits
DE043/44: removed
DE047/48: removed
DE069/70: removed
DE071/72: removed

Appendix IX.D. Alternative prehistoric comparative samples with Wadi Howar sample

Cranial measurements
CM001: removed
CM003: removed
CM004: removed

CM007/8: INV, SQRT
CM028: removed
CM042: removed
CM49: INV
CM051: removed
CM060: removed
CM061: SQRT(21.0-(CM061))
CM068: removed
CM069: removed
CM070: removed
CM071: removed
CM072: removed
CM073: removed
CM077: INV
CM080: INV
CM082: INV
CM083: SQRT
CM085: removed
CM086/87: LOG10
CM100/101: removed
CM122/123: LOG10
CM133: removed
CM135: removed
CM136: removed
CM137: removed
CM143: INV
CM148: removed
CM149: removed
CM150: removed
CM153: removed

Dental measurements
DM001/2: INV
DM003/4: SQRT
DM009/10: removed
DM011/12: removed
DM015/16: SQRT
DM025/26: INV
DM027/28: LOG10
DM035/36: LOG10
DM037/38: removed
DM039/40: removed
DM041/42: removed
DM047/48: removed
DM055/56: INV
DM057/58: removed
DM059/60: removed

Scaled cranial measurements
SCM001: INV
SCM002: INV
SCM003: removed
SCM007/8: removed
SCM035: removed
SCM042: removed
SCM068: removed
SCM072: SQRT(5.1629-(SCM072))
SCM083: LOG10
SCM085: removed
SCM088/89: removed
SCM100/101: removed
SCM102/103: removed
SCM133: removed
SCM135: removed
SCM137: removed
SCM141: removed
SCM148: removed
SCM149: removed
SCM150: removed
SCM153: removed

Scaled dental measurements
SDM001/2: INV
SDM003/4: removed
SDM007/8: 1/(1.75350-(SDM007/8))
SDM009/10: removed
SDM011/12: removed
SDM013/14: removed
SDM015/16: removed
SDM017/18: removed
SDM021/22: removed
SDM027/28: 1/(2.16170-(SDM027/28))
SDM029/30: removed
SDM033/34: INV
SDM035/36: removed
SDM037/38: removed
SDM039/40: removed
SDM041/42: removed
SDM045/46: removed
SDM047/48: removed
SDM055/56: removed
SDM057/58: removed
SDM059/60: removed

Cranial epigenetic traits
CE001: removed

Dental epigenetic traits
DE043/44: removed
DE047/48: removed
DE069/70: removed
DE071/72: removed

Appendix IX.E. Modern comparative samples

Cranial measurements
CM028: removed
CM045: removed
CM049: removed
CM058: removed
CM059: SQRT(14-(CM059))
CM060: removed
CM061: SQRT(21-(CM061))
CM071: SQRT
CM102/103: SQRT(21-(CM102/103))
CM135: removed
CM136: removed
CM137: removed
CM141: removed
CM143: removed
CM148: SQRT(20-(CM148))

Dental measurements
DM001/2: removed
DM005/6: removed
DM007/8: removed
DM009/10: removed
DM017/18: removed
DM019/20: removed
DM023/24: SQRT(10-(DM023/24))
DM025/26: removed
DM031/32: removed
DM033/34: removed
DM037/38: INV
DM041/42: removed
DM043/44: removed
DM045/46: removed
DM047/48: SQRT(14-(DM047/48))
DM049/50: removed
DM051/52: removed
DM055/56: SQRT(10.6-(DM055/56))
DM057/58: removed
DM063/64: removed

Scaled cranial measurements
SCM028: 1/(SCM028)
SCM043: removed

SCM045: removed
SCM058: removed
SCM059: LG10(2.1737-(SCM059))
SCM060: removed
SCM061: LG10(2.8537-(SCM061))
SCM071: LG10
SCM135: removed
SCM136: removed
SCM137: removed
SCM148: removed
SCM150: removed
SCM153: removed

Scaled dental measurements
SDM001/2: removed
SDM003/4: INV
SDM005/6: removed
SDM009/10: removed
SDM011/12: INV
SDM015/16: removed
SDM017/18: removed
SDM019/20: removed
SDM021/22: removed
SDM023/24: removed
SDM025/26: removed
SDM029/30: removed
SDM031/32: removed
SDM033/34: removed
SDM035/36: removed
SDM037/38: LG10
SDM039/40: removed
SDM041/42: removed
SDM045/46: removed
SDM049/50: removed
SDM051/52: removed
SDM053/54: removed
SDM055/56: removed
SDM057/58: removed
SDM059/60: removed
SDM063/64: removed

Dental epigenetic traits
DE033/34: removed
DE069/70: removed
DE071/72: removed

Appendix IX.F. Modern comparative samples with Wadi Howar sample

Cranial measurements
CM001: removed
CM004: removed
CM028: removed
CM042: removed
CM043: removed
CM045: removed
CM047: removed
CM049: removed
CM058: removed
CM059: removed
CM060: removed
CM061: SQRT(21-(CM061))
CM069: removed
CM070: removed
CM071: removed
CM082: removed
CM083: removed
CM086/87: removed
CM100/101: removed
CM102/103: SQRT(22-(CM102/103))
CM122/123: removed
CM133: removed
CM135: removed
CM137: removed
CM141: removed
CM143: removed
CM148: removed
CM150: removed

Dental measurements
DM001/2: removed
DM005/6: removed
DM007/8: LOG10
DM009/10: removed
DM011/12: removed
DM017/18: removed
DM019/20: INV
DM021/22: INV
DM023/24: removed
DM025/26: removed
DM027/28: removed
DM029/30: removed
DM031/32: removed
DM033/34: removed
DM035/36: LOG10
DM037/38: removed
DM041/42: removed
DM043/44: removed
DM047/48: removed
DM049/50: removed
DM051/52: removed
DM053/54: removed
DM055/56: removed
DM057/58: removed
DM059/60: removed
DM061/62: INV
DM063/64: removed

Scaled cranial measurements
SCM001: INV
SCM002: INV
SCM003: INV
SCM028: INV
SCM042: removed
SCM043: removed
SCM045: removed
SCM047: INV
SCM049: INV
SCM058: removed
SCM059: LG10(2.1737-(SCM059))
SCM060: removed
SCM061: removed
SCM069: removed
SCM070: SQRT(4.0702-(SCM070))
SCM071: removed
SCM080: INV
SCM100/101: removed
SCM102/103: LG10(2.80750-(SCM102/103))
SCM122/123: LOG10
SCM133: removed
SCM135: removed
SCM136: removed
SCM137: removed
SCM141: INV
SCM148: removed
SCM150: removed
SCM153: SQRT(3.5000-(SCM153))

Scaled dental measurements
SDM001/2: removed
SDM003/4: removed
SDM005/6: removed
SDM007/8: removed
SDM009/10: removed
SDM011/12: removed
SDM013/14: removed
SDM015/16: removed

SDM017/18: removed
SDM019/20: removed
SDM021/22: removed
SDM023/24: removed
SDM025/26: removed
SDM029/30: removed
SDM031/32: removed
SDM033/34: removed
SDM035/36: removed
SDM037/38: removed
SDM039/40: removed
SDM041/42: removed
SDM043/44: removed
SDM045/46: removed
SDM047/48: removed
SDM049/50: removed
SDM051/52: removed
SDM053/54: removed
SDM055/56: removed
SDM057/58: removed
SDM059/60: removed
SDM063/64: removed

Dental epigenetic traits
DE069/70: removed
DE071/72: removed

Appendix IX.G. Mean individuals

Appendix IX.G.1. Jebel Sahaba/Tushka

Appendix IX.G.1.a. Normalised prehistoric comparative samples with Wadi Howar sample (without Jebel Sahaba/Tushka sample)

Cranial measurements
CM003: removed
CM030: removed
CM043: removed
CM045: removed
CM047: removed
CM049: removed
CM102/103: removed
CM136: removed
CM143: removed

Dental measurements
DM51/52: removed

Scaled cranial measurements
SCM002: removed
SCM028: removed
SCM043: removed
SCM058: removed
SCM071: removed
SCM075: removed
SCM080: removed
SCM088/89: removed

Scaled dental measurements
SDM021/22: removed
SDM023/24: removed
SDM049/50: removed
SDM051/52: removed

Appendix IX.G.1.b. Normalised alternative prehistoric comparative samples with Wadi Howar sample (without Jebel Sahaba/Tushka sample)

Cranial measurements
CM007: removed
CM035: removed
CM049: removed
CM061: removed
CM075: removed
CM080: removed
CM083: removed
CM141: removed
CM143: removed

Dental measurements
DM17/18: removed
DM43/44: removed

Scaled cranial measurements
SCM001: removed
SCM002: removed
SCM047: removed
SCM059: removed
SCM061: removed
SCM070: removed
SCM080: removed
SCM083: removed
SCM086: removed
SCM143: removed

Appendix IX.G.2. A-Group

Appendix IX.G.2.a. Normalised prehistoric comparative samples with Wadi Howar sample (without A-Group sample)

Cranial measurements
CM003: removed
CM072: removed
CM143: removed
CM150: removed

Dental measurements
DM007/8: removed
DM015/16: removed
DM027/28: removed
DM031/32: removed
DM033/34: removed
DM035/36: removed
DM055/56: removed
DM061/62: removed

Scaled cranial measurements
SCM002: removed
SCM004: removed
SCM020: removed
SCM075: removed
SCM082: removed
SCM136: removed

Scaled dental measurements
SDM023/24: removed
SDM027/28: removed
SDM063/64: removed

Appendix IX.G.2.b. Normalised alternative prehistoric comparative samples with Wadi Howar sample (without A-Group sample)

Cranial measurements
CM035: removed
CM049: removed
CM061: removed
CM143: removed

Dental measurements
DM015/16: removed
DM017/18: removed
DM027/28: removed
DM029/30: removed
DM031/32: removed
DM061/62: removed
DM063/64: removed

Scaled cranial measurements
SCM001: removed
SCM002: removed
SCM047: removed
SCM072: removed
SCM082: removed

Scaled dental measurements
SDM063/64: removed

Appendix IX.G.3. Malian Sahara

Appendix IX.G.3.a. Normalised prehistoric comparative samples with Wadi Howar sample (without Malian Sahara sample)

Cranial measurements
CM043: removed
CM045: removed
CM061: removed
CM068: removed
CM072: removed
CM122: removed

Dental measurements
DM023/24: removed
DM025/26: removed
DM033/34: removed
DM055/56: removed

Scaled cranial measurements
SCM043: removed
SCM071: removed
SCM072: removed
SCM122: removed

Scaled dental measurements
SDM049/50: removed
SDM063/64: removed

Appendix IX.G.3.b. Normalised alternative prehistoric comparative samples with Wadi Howar sample (without Malian Sahara sample)

Cranial measurements
CM007/8: removed
CM035: removed
CM058: removed
CM059: removed
CM061: removed
CM077: removed

Dental measurements
DM023/24: removed
DM025/26: removed
DM027/28: removed
DM029/30: removed

Scaled cranial measurements
SCM001: removed
SCM047: removed
SCM049: removed
SCM061: removed
SCM072: removed
SCM082: removed
SCM086: removed
SCM122: removed

Scaled dental measurements
SDM043/44: removed
SDM063/64: removed

Appendix X. *In situ* photographs

Abu Tabari 02/1-2

Figure 176: Abu Tabari 02/1-2 *in situ* (Godhoff/Lange; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1-3

Figure 177: Abu Tabari 02/1-3 *in situ* (Hilpert/Lange; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1-5

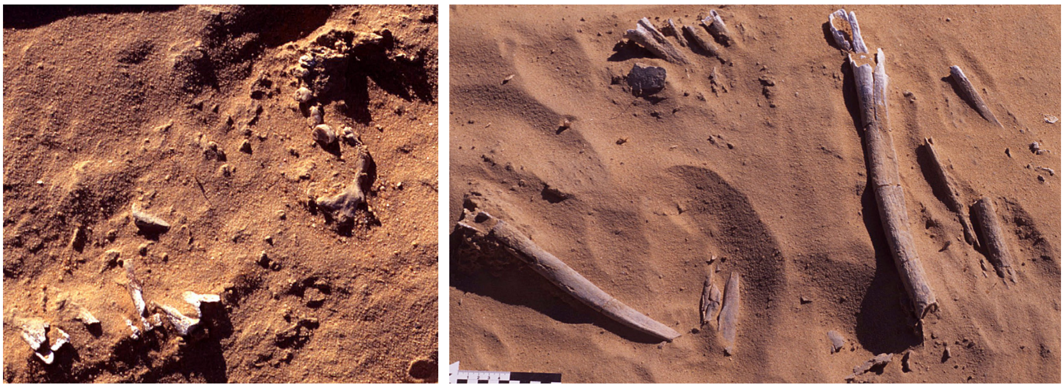


Figure 178: Abu Tabari 02/1-5 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1-6

Figure 179: Abu Tabari 02/1-6 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1-7

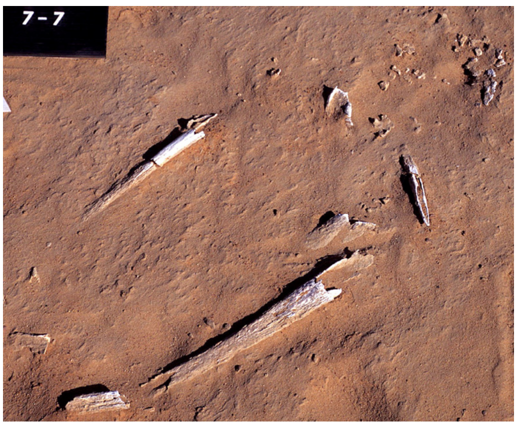


Figure 180: Abu Tabari 02/1-7 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/1-8

Figure 181: Abu Tabari 02/1-8 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-2

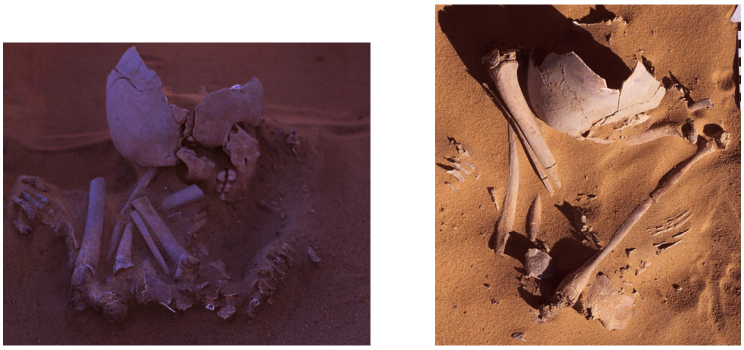


Figure 182: Abu Tabari 02/28-2 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-3

Figure 183: Abu Tabari 02/28-3 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-4

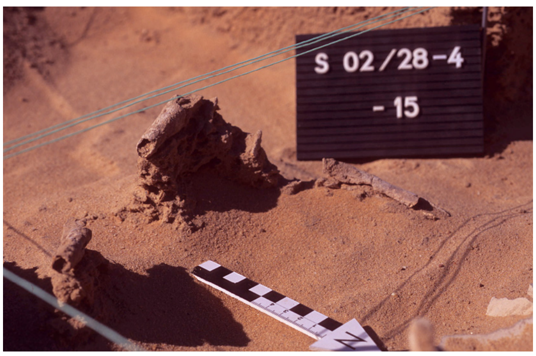


Figure 184: Abu Tabari 02/28-4 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-5

Figure 185: Abu Tabari 02/28-5 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-7

Figure 186: Abu Tabari 02/28-7 *in situ* (D. Haberlah)

Abu Tabari 02/28-8

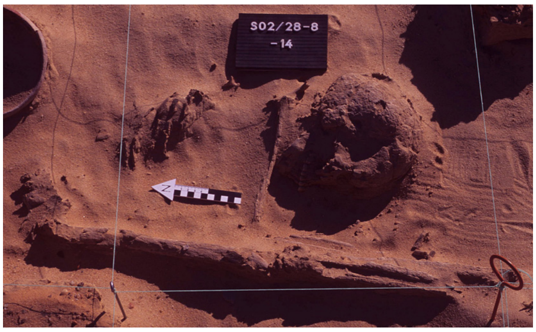


Figure 187: Abu Tabari 02/28-8 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-11

Figure 188: Abu Tabari 02/28-11 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-14

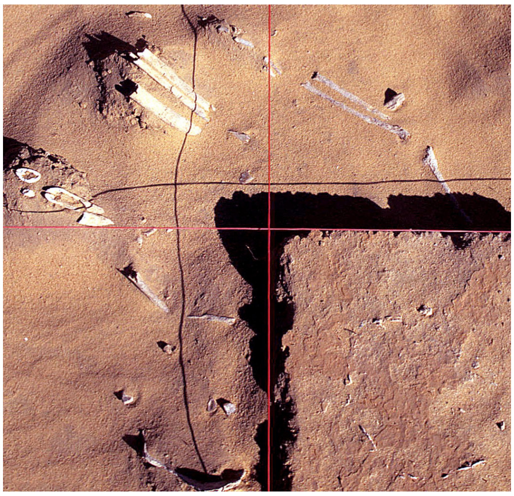


Figure 189: Abu Tabari 02/28-14 *in situ* (A. Willmy; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-15

Figure 190: Abu Tabari 02/28-15 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-21

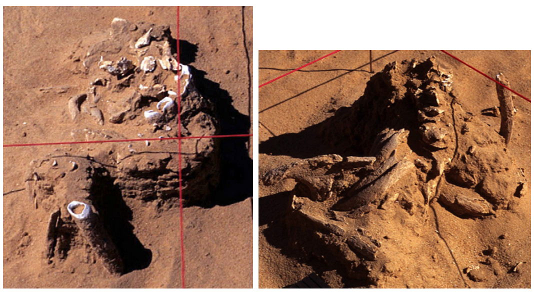


Figure 191: Abu Tabari 02/28-21 *in situ* (A. Willmy; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-22

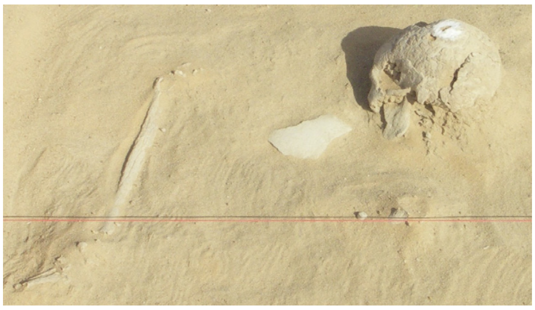


Figure 192: Abu Tabari 02/28-22 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 02/28-23

Figure 193: Abu Tabari 02/28-23 *in situ* (F. Godhoff; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Abu Tabari 03/34-1

Figure 194: Abu Tabari 03/34-1 *in situ* (E. Fäder; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Conical Hill 02/3-4

Figure 195: Conical Hill 02/3-4 *in situ* (Godhoff/Jesse; University of Cologne, *SFB* 389 - ACACIA, *Forschungsstelle Afrika*).

Appendix XI. Preservation data lists

Appendix XI.A. Overview – Wadi Howar

	Full preservation data list (x out of 775)	Full preservation data list (%)	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Additional shortened preservation data list (x out of 113)	Additional shortened preservation data list (%)
Abu Tabari 95/2-3	46	5.94	1	0.49	28	24.78
Abu Tabari 02/1-2	452	58.32	135	65.53	96	84.96
Abu Tabari 02/1-3	302	38.97	108	52.43	80	70.80
Abu Tabari 02/1-5	98	12.65	12	5.83	57	50.44
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	59	7.61	17	8.25	30	26.55
Abu Tabari 02/1-8	254	32.77	120	58.25	31	27.43
Abu Tabari 02/28-2	368	47.48	92	44.66	19	16.81
Abu Tabari 02/28-3	260	33.55	77	37.38	82	72.57
Abu Tabari 02/28-4	7	0.90	0	0.00	12	10.62
Abu Tabari 02/28-5	498	64.26	165	80.10	105	92.92
Abu Tabari 02/28-7	198	25.55	80	38.83	34	30.09
Abu Tabari 02/28-8	300	38.71	110	53.40	62	54.87
Abu Tabari 02/28-11	109	14.06	7	3.40	44	38.94
Abu Tabari 02/28-13	9	1.16	4	1.94	1	0.88
Abu Tabari 02/28-14	236	30.45	101	49.03	27	23.89
Abu Tabari 02/28-15	372	48.00	132	64.08	68	60.18
Abu Tabari 02/28-20	73	9.42	21	10.19	18	15.93
Abu Tabari 02/28-21	335	43.23	118	57.28	70	61.95
Abu Tabari 02/28-22	484	62.45	127	61.65	92	81.42
Abu Tabari 02/28-23	347	44.77	155	75.24	34	30.09
Abu Tabari 03/31	14	1.81	0	0.00	18	15.93
Abu Tabari 03/34-1	231	29.81	107	51.94	49	43.36
Conical Hill 95/4	242	31.23	107	51.94	22	19.47
Conical Hill 95/4-1	17	2.19	8	3.88	2	1.77
Conical Hill 02/3-4	103	13.29	34	16.50	34	30.09
Djabarona 96/1-1	346	44.65	122	59.22	63	55.75
Djabarona 96/1-2	79	10.19	27	13.11	28	24.78
Djabarona 96-4	52	6.71	11	5.34	30	26.55
Djabarona 96/120-3	6	0.77	0	0.00	1	0.88
Djabarona 96/120-4	70	9.03	6	2.91	31	27.43
Djabarona 96/120-5	34	4.39	17	8.25	7	6.19
No.	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00
Max.	498	64.26	165	80.10	105	92.92
Mode			0	0.00	34	30.09
Median	153.50	19.81	55.50	26.94	31.00	27.43
Mean	187.53	24.20	63.16	30.66	39.84	35.26
S.D.	157.21	20.29	56.68	27.51	29.58	26.18

Appendix XI.B. Full preservation data list (775 variables) – Wadi Howar

	Cranial measurements (x out of 167)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Postcranial measurements (x out of 136)	Postcranial measurements (%)	Cranial morphological traits (x out of 32)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 74)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 81)	Dental epigenetic traits (%)
Abu Tabari 95/2-3	0	0.00	0	0.00	28	20.59	2	6.25	0	0.00	0	0.00
Abu Tabari 02/1-2	100	59.88	49	76.56	89	65.44	17	53.13	16	21.62	37	45.68
Abu Tabari 02/1-3	72	43.11	27	42.19	37	27.21	12	37.50	13	17.57	31	38.27
Abu Tabari 02/1-5	0	0.00	5	7.81	42	30.88	0	0.00	0	0.00	8	9.88
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	10	5.99	3	4.69	15	11.03	2	6.25	0	0.00	7	8.64
Abu Tabari 02/1-8	0	0.00	61	95.31	23	16.91	1	3.13	0	0.00	69	85.19
Abu Tabari 02/28-2	30	17.96	34	53.13	77	56.62	25	78.13	39	52.70	44	54.32
Abu Tabari 02/28-3	6	3.59	42	65.63	53	38.97	15	46.88	2	2.70	30	37.04
Abu Tabari 02/28-4	0	0.00	0	0.00	3	2.21	0	0.00	0	0.00	0	0.00
Abu Tabari 02/28-5	66	39.52	62	96.88	93	68.38	26	81.25	29	39.19	58	71.60
Abu Tabari 02/28-7	2	1.20	49	76.56	5	3.68	7	21.88	7	9.46	40	49.38
Abu Tabari 02/28-8	29	17.37	51	79.69	28	20.59	21	65.63	19	25.68	44	54.32
Abu Tabari 02/28-11	2	1.20	0	0.00	49	36.03	4	12.50	6	8.11	2	2.47
Abu Tabari 02/28-13	0	0.00	1	1.56	0	0.00	3	9.38	2	2.70	0	0.00
Abu Tabari 02/28-14	0	0.00	54	84.38	21	15.44	6	18.75	1	1.35	56	69.14
Abu Tabari 02/28-15	78	46.71	54	84.38	43	31.62	18	56.25	18	24.32	46	56.79
Abu Tabari 02/28-20	1	0.60	9	14.06	9	6.62	1	3.13	1	1.35	14	17.28
Abu Tabari 02/28-21	74	44.31	41	64.06	42	30.88	12	37.50	8	10.81	39	48.15
Abu Tabari 02/28-22	99	59.28	41	64.06	88	64.71	26	81.25	44	59.46	36	44.44
Abu Tabari 02/28-23	86	51.50	48	75.00	6	4.41	24	75.00	30	40.54	61	75.31
Abu Tabari 03/31	0	0.00	0	0.00	8	5.88	0	0.00	0	0.00	0	0.00
Abu Tabari 03/34-1	0	0.00	63	98.44	11	8.09	0	0.00	0	0.00	54	66.67
Conical Hill 95/4	48	28.74	34	53.13	0	0.00	17	53.13	23	31.08	46	56.79
Conical Hill 95/4-1	0	0.00	4	6.25	0	0.00	0	0.00	0	0.00	7	8.64
Conical Hill 02/3-4	14	8.38	4	6.25	18	13.24	11	34.38	12	16.22	14	17.28
Djabarona 96/1-1	61	36.53	38	59.38	71	52.21	24	75.00	22	29.73	44	54.32
Djabarona 96/1-2	1	0.60	11	17.19	16	11.76	0	0.00	1	1.35	20	24.69
Djabarona 96-4	1	0.60	5	7.81	22	16.18	0	0.00	0	0.00	7	8.64
Djabarona 96/120-3	0	0.00	0	0.00	3	2.21	0	0.00	0	0.00	0	0.00
Djabarona 96/120-4	2	1.20	2	3.13	37	27.21	3	9.38	2	2.70	0	0.00
Djabarona 96/120-5	13	7.78	0	0.00	0	0.00	6	18.75	0	0.00	6	7.41
No.	32	32	32	32	32	32	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Max.	100	59.88	63	98.44	93	68.38	26	81.25	44	59.46	69	85.19
Mode	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Median	2.00	1.20	19.00	29.69	21.50	15.81	5.00	15.63	2.00	2.70	25.00	30.86
Mean	24.84	14.88	24.75	38.67	29.28	21.53	8.84	27.64	9.22	12.46	25.63	31.64
S.D.	34.47	20.64	23.68	37.00	28.59	21.02	9.45	29.53	12.58	17.01	22.44	27.71

	Postcranial epigenetic traits (x out of 62)	Postcranial epigenetic traits (%)	Cranial robusticity traits (x out of 12)	Cranial robusticity traits (%)	Postcranial robusticity traits (x out of 20)	Postcranial robusticity traits (%)	Cranial musculoskeletal stress traits (x out of 13)	Cranial musculoskeletal stress traits (%)	Postcranial musculoskeletal stress traits (x out of 16)	Postcranial musculoskeletal stress traits (%)	Dental abrasion (x out of 32)	Dental abrasion (%)
Abu Tabari 95/2-3	3	4.84	1	8.33	9	45.00	0	0.00	3	18.75	0	0.00
Abu Tabari 02/1-2	22	35.48	7	58.33	18	90.00	4	30.77	11	68.75	29	90.63
Abu Tabari 02/1-3	4	6.45	9	75.00	14	70.00	3	23.08	8	50.00	24	75.00
Abu Tabari 02/1-5	4	6.45	0	0.00	16	80.00	0	0.00	9	56.25	5	15.63
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	2	3.23	1	8.33	10	50.00	0	0.00	1	6.25	3	9.38
Abu Tabari 02/1-8	1	1.61	0	0.00	4	20.00	0	0.00	2	12.50	31	96.88
Abu Tabari 02/28-2	13	20.97	10	83.33	20	100.00	3	23.08	13	81.25	20	62.50
Abu Tabari 02/28-3	5	8.06	5	41.67	15	75.00	0	0.00	3	18.75	28	87.50
Abu Tabari 02/28-4	0	0.00	0	0.00	3	15.00	0	0.00	1	6.25	0	0.00
Abu Tabari 02/28-5	19	30.65	10	83.33	19	95.00	6	46.15	12	75.00	32	100.00
Abu Tabari 02/28-7	1	1.61	6	50.00	3	15.00	0	0.00	1	6.25	25	78.13
Abu Tabari 02/28-8	1	1.61	8	66.67	10	50.00	2	15.38	2	12.50	28	87.50
Abu Tabari 02/28-11	14	22.58	3	25.00	13	65.00	0	0.00	5	31.25	3	9.38
Abu Tabari 02/28-13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.13
Abu Tabari 02/28-14	3	4.84	1	8.33	11	55.00	0	0.00	2	12.50	27	84.38
Abu Tabari 02/28-15	14	22.58	5	41.67	9	45.00	2	15.38	4	25.00	27	84.38
Abu Tabari 02/28-20	4	6.45	2	16.67	0	0.00	0	0.00	2	12.50	10	31.25
Abu Tabari 02/28-21	13	20.97	4	33.33	12	60.00	4	30.77	3	18.75	28	87.50
Abu Tabari 02/28-22	21	33.87	12	100.00	20	100.00	7	53.85	13	81.25	27	84.38
Abu Tabari 02/28-23	0	0.00	9	75.00	5	25.00	5	38.46	1	6.25	24	75.00
Abu Tabari 03/31	1	1.61	0	0.00	4	20.00	0	0.00	1	6.25	0	0.00
Abu Tabari 03/34-1	4	6.45	0	0.00	5	25.00	1	7.69	1	6.25	32	100.00
Conical Hill 95/4	0	0.00	7	58.33	0	0.00	2	15.38	0	0.00	23	71.88
Conical Hill 95/4-1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	6.25
Conical Hill 02/3-4	6	9.68	7	58.33	4	20.00	3	23.08	0	0.00	3	9.38
Djabarona 96/1-1	3	4.84	9	75.00	15	75.00	2	15.38	2	12.50	21	65.63
Djabarona 96/1-2	1	1.61	2	16.67	1	5.00	1	7.69	1	6.25	8	25.00
Djabarona 96-4	0	0.00	0	0.00	5	25.00	0	0.00	0	0.00	4	12.50
Djabarona 96/120-3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.13
Djabarona 96/120-4	2	3.23	2	16.67	9	45.00	1	7.69	4	25.00	2	6.25
Djabarona 96/120-5	0	0.00	3	25.00	0	0.00	0	0.00	0	0.00	2	6.25
No.	32	32	32	32	32	32	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Max.	22	35.48	12	100.00	20	100.00	7	53.85	13	81.25	32	100.00
Mode	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Median	2.50	4.03	2.50	20.83	7.00	35.00	0.00	0.00	2.00	12.50	15.00	46.88
Mean	5.03	8.11	3.84	32.03	7.94	39.69	1.44	11.06	3.28	20.51	14.69	45.90
S.D.	6.65	10.73	3.85	32.11	6.70	33.48	1.98	15.25	4.07	25.46	12.55	39.20

	Enamel hypoplasia (x out of 32)	Enamel hypoplasia (%)	Dental caries (x out of 32)	Dental caries (%)	*Cribra orbitalia* (x out of 2)	*Cribra orbitalia* (%)
Abu Tabari 95/2-3	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-2	22	68.75	31	96.88	0	0.00
Abu Tabari 02/1-3	24	75.00	24	75.00	0	0.00
Abu Tabari 02/1-5	4	12.50	5	15.63	0	0.00
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	2	6.25	3	9.38	0	0.00
Abu Tabari 02/1-8	31	96.88	31	96.88	0	0.00
Abu Tabari 02/28-2	19	59.38	20	62.50	1	50.00
Abu Tabari 02/28-3	28	87.50	28	87.50	0	0.00
Abu Tabari 02/28-4	0	0.00	0	0.00	0	0.00
Abu Tabari 02/28-5	32	100.00	32	100.00	2	100.00
Abu Tabari 02/28-7	25	78.13	25	78.13	2	100.00
Abu Tabari 02/28-8	27	84.38	28	87.50	2	100.00
Abu Tabari 02/28-11	3	9.38	3	9.38	2	100.00
Abu Tabari 02/28-13	1	3.13	1	3.13	0	0.00
Abu Tabari 02/28-14	27	84.38	27	84.38	0	0.00
Abu Tabari 02/28-15	27	84.38	27	84.38	0	0.00
Abu Tabari 02/28-20	10	31.25	10	31.25	0	0.00
Abu Tabari 02/28-21	25	78.13	30	93.75	0	0.00
Abu Tabari 02/28-22	20	62.50	28	87.50	2	100.00
Abu Tabari 02/28-23	24	75.00	24	75.00	0	0.00
Abu Tabari 03/31	0	0.00	0	0.00	0	0.00
Abu Tabari 03/34-1	28	87.50	32	100.00	0	0.00
Conical Hill 95/4	17	53.13	25	78.13	0	0.00
Conical Hill 95/4-1	2	6.25	2	6.25	0	0.00
Conical Hill 02/3-4	4	12.50	3	9.38	0	0.00
Djabarona 96/1-1	11	34.38	22	68.75	1	50.00
Djabarona 96/1-2	8	25.00	8	25.00	0	0.00
Djabarona 96-4	4	12.50	4	12.50	0	0.00
Djabarona 96/120-3	1	3.13	1	3.13	0	0.00
Djabarona 96/120-4	2	6.25	2	6.25	0	0.00
Djabarona 96/120-5	2	6.25	2	6.25	0	0.00
No.	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00
Max.	32	100.00	32	100.00	2	100.00
Mode	0	0.00	0	0.00	0	0.00
Median	10.50	32.81	15.00	46.88	0.00	0.00
Mean	13.44	41.99	14.94	46.68	0.38	18.75
S.D.	11.72	36.62	12.79	39.97	0.75	37.57

Appendix XI.C. Shortened preservation data list (206 variables) – Wadi Howar

	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
Abu Tabari 95/2-3	0	0.00	0	0.00	1	7.14	0	0.00	0	0.00
Abu Tabari 02/1-2	43	79.63	49	76.56	5	35.71	6	54.55	32	50.79
Abu Tabari 02/1-3	41	75.93	27	42.19	7	50.00	6	54.55	27	42.86
Abu Tabari 02/1-5	0	0.00	5	7.81	0	0.00	0	0.00	7	11.11
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	5	9.26	3	4.69	2	14.29	0	0.00	7	11.11
Abu Tabari 02/1-8	0	0.00	61	95.31	1	7.14	0	0.00	58	92.06
Abu Tabari 02/28-2	0	0.00	34	53.13	13	92.86	10	90.91	35	55.56
Abu Tabari 02/28-3	2	3.70	42	65.63	7	50.00	1	9.09	25	39.68
Abu Tabari 02/28-4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/28-5	37	68.52	62	96.88	11	78.57	8	72.73	47	74.60
Abu Tabari 02/28-7	0	0.00	49	76.56	2	14.29	1	9.09	28	44.44
Abu Tabari 02/28-8	8	14.81	51	79.69	13	92.86	4	36.36	34	53.97
Abu Tabari 02/28-11	2	3.70	0	0.00	3	21.43	1	9.09	1	1.59
Abu Tabari 02/28-13	0	0.00	1	1.56	2	14.29	1	9.09	0	0.00
Abu Tabari 02/28-14	0	0.00	54	84.38	2	14.29	1	9.09	44	69.84
Abu Tabari 02/28-15	25	46.30	54	84.38	8	57.14	6	54.55	39	61.90
Abu Tabari 02/28-20	0	0.00	9	14.06	1	7.14	0	0.00	11	17.46
Abu Tabari 02/28-21	37	68.52	41	64.06	5	35.71	3	27.27	32	50.79
Abu Tabari 02/28-22	36	66.67	41	64.06	13	92.86	8	72.73	29	46.03
Abu Tabari 02/28-23	41	75.93	48	75.00	11	78.57	8	72.73	47	74.60
Abu Tabari 03/31	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 03/34-1	0	0.00	63	98.44	0	0.00	0	0.00	44	69.84
Conical Hill 95/4	15	27.78	34	53.13	11	78.57	6	54.55	41	65.08
Conical Hill 95/4-1	0	0.00	4	6.25	0	0.00	0	0.00	4	6.35
Conical Hill 02/3-4	7	12.96	4	6.25	6	42.86	4	36.36	13	20.63
Djabarona 96/1-1	26	48.15	38	59.38	14	100.00	8	72.73	36	57.14
Djabarona 96/1-2	0	0.00	11	17.19	0	0.00	0	0.00	16	25.40
Djabarona 96-4	0	0.00	5	7.81	0	0.00	0	0.00	6	9.52
Djabarona 96/120-3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Djabarona 96/120-4	1	1.85	2	3.13	2	14.29	1	9.09	0	0.00
Djabarona 96/120-5	7	12.96	0	0.00	4	28.57	0	0.00	6	9.52
No.	32	32	32	32	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Max.	43	79.63	63	98.44	14	100.00	10	90.91	58	92.06
Mode	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Median	0.50	0.93	19.00	29.69	2.00	14.29	1.00	9.09	20.50	32.54
Mean	10.41	19.27	24.75	38.67	4.50	32.14	2.59	23.58	20.91	33.18
S.D.	15.56	28.81	23.68	37.00	4.80	34.28	3.27	29.74	18.23	28.94

Appendix XI.D. Additional shortened preservation data list (113 variables) – Wadi Howar

	Postcranial measurements (x out of 55)	Postcranial measurements (%)	Cranial robusticity traits (x out of 6)	Cranial robusticity traits (%)	Postcranial robusticity traits (x out of 8)	Postcranial robusticity traits (%)	Cranial musculoskeletal stress traits (x out of 2)	Cranial musculoskeletal stress traits (%)	Postcranial musculoskeletal stress traits (x out of 10)	Postcranial musculoskeletal stress traits (%)	Enamel hypoplasia (x out of 32)	Enamel hypoplasia (%)
Abu Tabari 95/2-3	23	41.82	0	0.00	3	37.50	0	0.00	2	20.00	0	0.00
Abu Tabari 02/1-2	52	94.55	4	66.67	8	100.00	1	50.00	9	90.00	22	68.75
Abu Tabari 02/1-3	35	63.64	6	100.00	6	75.00	1	50.00	8	80.00	24	75.00
Abu Tabari 02/1-5	38	69.09	0	0.00	8	100.00	0	0.00	7	70.00	4	12.50
Abu Tabari 02/1-6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/1-7	22	40.00	1	16.67	4	50.00	0	0.00	1	10.00	2	6.25
Abu Tabari 02/1-8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	31	96.88
Abu Tabari 02/28-2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	19	59.38
Abu Tabari 02/28-3	42	76.36	3	50.00	6	75.00	0	0.00	3	30.00	28	87.50
Abu Tabari 02/28-4	10	18.18	0	0.00	2	25.00	0	0.00	0	0.00	0	0.00
Abu Tabari 02/28-5	50	90.91	5	83.33	8	100.00	2	100.00	8	80.00	32	100.00
Abu Tabari 02/28-7	5	9.09	2	33.33	1	12.50	0	0.00	1	10.00	25	78.13
Abu Tabari 02/28-8	23	41.82	4	66.67	5	62.50	1	50.00	2	20.00	27	84.38
Abu Tabari 02/28-11	31	56.36	1	16.67	6	75.00	0	0.00	3	30.00	3	9.38
Abu Tabari 02/28-13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.13
Abu Tabari 02/28-14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	27	84.38
Abu Tabari 02/28-15	31	56.36	4	66.67	4	50.00	0	0.00	2	20.00	27	84.38
Abu Tabari 02/28-20	6	10.91	2	33.33	0	0.00	0	0.00	0	0.00	10	31.25
Abu Tabari 02/28-21	33	60.00	3	50.00	6	75.00	0	0.00	3	30.00	25	78.13
Abu Tabari 02/28-22	48	87.27	6	100.00	8	100.00	1	50.00	9	90.00	20	62.50
Abu Tabari 02/28-23	3	5.45	4	66.67	2	25.00	0	0.00	1	10.00	24	75.00
Abu Tabari 03/31	15	27.27	0	0.00	2	25.00	0	0.00	1	10.00	0	0.00
Abu Tabari 03/34-1	18	32.73	0	0.00	2	25.00	0	0.00	1	10.00	28	87.50
Conical Hill 95/4	0	0.00	5	83.33	0	0.00	0	0.00	0	0.00	17	53.13
Conical Hill 95/4-1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	6.25
Conical Hill 02/3-4	21	38.18	5	83.33	2	25.00	2	100.00	0	0.00	4	12.50
Djabarona 96/1-1	40	72.73	5	83.33	6	75.00	0	0.00	1	10.00	11	34.38
Djabarona 96/1-2	18	32.73	1	16.67	0	0.00	0	0.00	1	10.00	8	25.00
Djabarona 96-4	24	43.64	0	0.00	2	25.00	0	0.00	0	0.00	4	12.50
Djabarona 96/120-3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.13
Djabarona 96/120-4	21	38.18	1	16.67	4	50.00	0	0.00	3	30.00	2	6.25
Djabarona 96/120-5	2	3.64	3	50.00	0	0.00	0	0.00	0	0.00	2	6.25
No.	32	32	32	32	32	32	32	32	32	32	32	32
Min.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Max.	52	94.55	6	100.00	8	100.00	2	100.00	9	90.00	32	100.00
Mode	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Median	19.50	35.45	1.00	16.67	2.00	25.00	0.00	0.00	1.00	10.00	10.50	32.81
Mean	19.09	34.72	2.03	33.85	2.97	37.11	0.25	12.50	2.06	20.63	13.44	41.99
S.D.	16.98	30.86	2.15	35.79	2.90	36.27	0.57	28.40	2.88	28.84	11.72	36.62

Appendix XI.E. Shortened preservation data list (206 variables) – Comparative samples

Appendix XI.E.1. Prehistoric comparative samples

Appendix XI.E.1.a. All samples combined (without "Sudanese Hotchpotch" sample)

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	65	65	65	65	65	65	65	65	65	65	65	65
Min.	22	10.68	6	11.11	0	0.00	4	28.57	2	18.18	3	4.76
Max.	185	89.81	54	100.00	64	100.00	14	100.00	11	100.00	56	88.89
Mode	95	46.12	51	94.44	55	85.94	14	100.00	11	100.00	28	44.44
Median	137.00	66.50	47.00	87.04	40.00	62.50	14.00	100.00	10.00	90.91	28.00	44.44
Mean	130.58	63.39	43.23	80.06	35.46	55.41	12.35	88.24	8.97	81.54	30.57	48.52
S.D.	35.05	17.02	10.55	19.54	17.68	27.63	2.72	19.42	2.28	20.77	10.96	17.39

Appendix XI.E.1.b. All samples combined (with "Sudanese Hotchpotch" sample)

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	83	83	83	83	83	83	83	83	83	83	83	83
Min.	8	3.88	0	0.00	0	0.00	1	7.14	0	0.00	0	0.00
Max.	185	89.81	54	100.00	64	100.00	14	100.00	11	100.00	56	88.89
Mode	95	46.12	51	94.44	55	85.94	14	100.00	11	100.00	24	38.10
Median	122.00	59.22	43.00	79.63	35.00	54.69	13.00	92.86	9.00	81.82	25.00	39.68
Mean	110.87	53.82	35.54	65.82	31.24	48.81	10.72	76.59	7.84	71.30	25.52	40.50
S.D.	50.51	24.52	17.97	33.27	19.13	29.89	4.28	30.58	3.24	29.49	14.07	22.33

Appendix XI.E.1.c. Jebel Sahaba/Tushka

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	21	21	21	21	21	21	21	21	21	21	21	21
Min.	71	34.47	28	51.85	4	6.25	8	57.14	2	18.18	13	20.63
Max.	184	89.32	54	100.00	64	100.00	14	100.00	11	100.00	52	82.54
Mode	174	84.47	51	94.44	47	73.44	14	100.00	9	81.82	24	38.10
Median	147.00	71.36	51.00	94.44	47.00	73.44	14.00	100.00	9.00	81.82	28.00	44.44
Mean	144.38	70.09	46.86	86.77	42.81	66.89	13.14	93.88	9.14	83.12	32.43	51.47
S.D.	32.92	15.98	8.03	14.88	18.67	29.17	1.42	10.17	1.98	18.02	10.46	16.61

Appendix XI.E.1.d. A-Group

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	21	21	21	21	21	21	21	21	21	21	21	21
Min.	84	40.78	29	53.70	4	6.25	5	35.71	4	36.36	14	22.22
Max.	168	81.55	54	100.00	55	85.94	14	100.00	11	100.00	56	88.89
Mode	154	74.76	51	94.44	44	68.75	14	100.00	11	100.00	37	58.73
Median	143.00	69.42	47.00	87.04	41.00	64.06	14.00	100.00	11.00	100.00	34.00	53.97
Mean	135.86	65.95	45.67	84.57	35.29	55.13	12.38	88.44	9.43	85.71	33.10	52.53
S.D.	24.64	11.96	5.97	11.05	14.38	22.46	3.20	22.87	2.31	21.04	10.69	16.97

Appendix XI.E.1.e. Malian Sahara

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	23	23	23	23	23	23	23	23	23	23	23	23
Min.	22	10.68	6	11.11	0	0.00	4	28.57	3	27.27	3	4.76
Max.	185	89.81	54	100.00	62	96.88	14	100.00	11	100.00	50	79.37
Mode	95	46.12	41	75.93	15	23.44	14	100.00	11	100.00	21	33.33
Median	101.00	49.03	41.00	75.93	25.00	39.06	13.00	92.86	9.00	81.82	24.00	38.10
Mean	113.17	54.94	37.70	69.81	28.91	45.18	11.61	82.92	8.39	76.28	26.57	42.17
S.D.	38.89	18.88	13.51	25.02	17.57	27.45	3.03	21.62	2.48	22.56	10.94	17.37

Appendix XI.E.1.f. “Sudanese Hotchpotch”

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	18	18	18	18	18	18	18	18	18	18	18	18
Min.	8	3.88	0	0.00	0	0.00	1	7.14	0	0.00	0	0.00
Max.	105	50.97	39	72.22	58	90.63	14	100.00	9	81.82	25	39.68
Mode	60	29.13	0	0.00	13	20.31	2	14.29	1	9.09	5	7.94
Median	28.00	13.59	4.50	8.33	11.50	17.97	4.00	28.57	3.00	27.27	5.50	8.73
Mean	39.67	19.26	7.78	14.40	16.00	25.00	4.83	34.52	3.78	34.34	7.28	11.55
S.D.	28.75	13.96	9.80	18.14	16.54	25.84	3.70	26.42	2.96	26.92	7.25	11.51

Appendix XI.E.2. Modern comparative samples

Appendix XI.E.2.a. All samples combined

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	108	108	108	108	108	108	108	108	108	108	108	108
Min.	42	20.39	16	29.63	0	0.00	2	14.29	2	18.18	5	7.94
Max.	193	93.69	54	100.00	63	98.44	14	100.00	11	100.00	57	90.48
Mode	133	64.56	46	85.19	0	0.00	14	100.00	11	100.00	30	47.62
Median	134.50	65.29	46.00	85.19	28.50	44.53	14.00	100.00	11.00	100.00	35.00	55.56
Mean	132.31	64.23	43.18	79.96	31.48	49.19	13.52	96.56	10.57	96.13	33.56	53.26
S.D.	40.75	19.78	10.72	19.85	18.20	28.44	1.48	10.58	1.17	10.63	12.93	20.53

Appendix XI.E.2.a. Southern Sudan

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	24	24	24	24	24	24	24	24	24	24	24	24
Min.	47	22.82	17	31.48	0	0.00	10	71.43	6	54.55	6	9.52
Max.	193	93.69	54	100.00	62	96.88	14	100.00	11	100.00	57	90.48
Mode			50	92.59	48	75.00	14	100.00	11	100.00	46	73.02
Median	158.50	76.94	50.00	92.59	44.00	68.75	14.00	100.00	11.00	100.00	43.50	69.05
Mean	138.96	67.46	42.54	78.78	36.92	57.68	13.33	95.24	10.42	94.70	35.75	56.75
S.D.	49.78	24.17	13.82	25.60	18.76	29.32	1.34	9.58	1.21	11.03	16.52	26.22

Appendix XI.E.2.b. Chad

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	22	22	22	22	22	22	22	22	22	22	22	22
Min.	42	20.39	16	29.63	0	0.00	2	14.29	2	18.18	5	7.94
Max.	180	87.38	54	100.00	57	89.06	14	100.00	11	100.00	48	76.19
Mode	171	83.01	54	100.00	0	0.00	14	100.00	11	100.00	47	74.60
Median	115.50	56.07	40.50	75.00	24.00	37.50	14.00	100.00	11.00	100.00	26.00	41.27
Mean	112.36	54.55	36.91	68.35	26.18	40.91	12.55	89.61	9.95	90.50	26.77	42.50
S.D.	52.91	25.68	15.50	28.71	21.47	33.55	2.72	19.43	1.99	18.07	15.04	23.87

Appendix XI.E.2.c. Mandinka

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	22	22	22	22	22	22	22	22	22	22	22	22
Min.	66	32.04	27	50.00	0	0.00	13	92.86	11	100.00	14	22.22
Max.	179	86.89	53	98.15	56	87.50	14	100.00	11	100.00	45	71.43
Mode	137	66.50	46	85.19	12	18.75	14	100.00	11	100.00	31	49.21
Median	119.50	58.01	45.00	83.33	20.50	32.03	14.00	100.00	11.00	100.00	31.00	49.21
Mean	121.86	59.16	43.82	81.14	22.14	34.59	13.95	99.68	11.00	100.00	30.95	49.13
S.D.	22.21	10.78	5.33	9.88	11.92	18.62	0.21	1.52	0.00	0.00	6.83	10.84

Appendix XI.E.2.d. Somalis

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	20	20	20	20	20	20	20	20	20	20	20	20
Min.	95	46.12	35	64.81	14	21.88	14	100.00	8	72.73	16	25.40
Max.	192	93.20	54	100.00	63	98.44	14	100.00	11	100.00	57	90.48
Mode	190	92.23	54	100.00	60	93.75	14	100.00	11	100.00	37	58.73
Median	154.50	75.00	47.50	87.96	43.50	67.97	14.00	100.00	11.00	100.00	43.00	68.25
Mean	153.60	74.56	47.35	87.69	40.80	63.75	14.00	100.00	10.65	96.82	40.80	64.76
S.D.	29.17	14.16	5.45	10.09	15.87	24.80	0.00	0.00	0.81	7.39	10.60	16.83

Appendix XI.E.2.e. Haya

	Shortened preservation data list (x out of 206)	Shortened preservation data list (%)	Cranial measurements (x out of 54)	Cranial measurements (%)	Dental measurements (x out of 64)	Dental measurements (%)	Cranial morphological traits (x out of 14)	Cranial morphological traits (%)	Cranial epigenetic traits (x out of 11)	Cranial epigenetic traits (%)	Dental epigenetic traits (x out of 63)	Dental epigenetic traits (%)
No.	20	20	20	20	20	20	20	20	20	20	20	20
Min.	92	44.66	37	68.52	8	12.50	12	85.71	10	90.91	21	33.33
Max.	188	91.26	54	100.00	60	93.75	14	100.00	11	100.00	49	77.78
Mode	124	60.19	46	85.19	36	56.25	14	100.00	11	100.00	30	47.62
Median	131.50	63.83	46.00	85.19	28.50	44.53	14.00	100.00	11.00	100.00	31.00	49.21
Mean	136.45	66.24	45.95	85.09	31.75	49.61	13.85	98.93	10.90	99.09	34.00	53.97
S.D.	26.92	13.07	4.06	7.52	16.08	25.13	0.49	3.50	0.31	2.80	8.68	13.77

Appendix XI.F. Additional shortened preservation data list (113 variables) – Jebel Sahaba/Tushka

	Additional shortened preservation data list (x out of 113)	Additional shortened preservation data list (%)	Postcranial measurements (x out of 55)	Postcranial measurements (%)	Cranial robusticity traits (x out of 6)	Cranial robusticity traits (%)	Postcranial robusticity traits (x out of 8)	Postcranial robusticity traits (%)	Cranial musculoskeletal stress traits (x out of 2)	Cranial musculoskeletal stress traits (%)	Postcranial musculoskeletal stress traits (x out of 10)	Postcranial musculoskeletal stress traits (%)	Enamel hypoplasia (x out of 32)	Enamel hypoplasia (%)
No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Min.	58	51.33	31	56.36	6	100.00	2	25.00	1	50.00	7	70.00	5	15.63
Max.	106	93.81	50	90.91	6	100.00	8	100.00	2	100.00	10	100.00	32	100.00
Mode	94	83.19	49	89.09	6	100.00	6	75.00	1	50.00	10	100.00	32	100.00
Median	94.00	83.19	45.00	81.82	6.00	100.00	6.00	75.00	1.00	50.00	10.00	100.00	26.00	81.25
Mean	90.67	80.24	44.47	80.85	6.00	100.00	5.93	74.17	1.33	66.67	9.27	92.67	23.67	73.96
S.D.	13.66	12.09	5.21	9.47	0.00	0.00	1.53	19.17	0.49	24.40	0.96	9.61	9.45	29.54

Appendix XII. Measurements

Appendix XII.A. Cranial measurements

	CM001 - 1. Maximum cranial length	CM002 - 3. *Glabello-Lambda* length	CM003 - 8. Maximum cranial breadth	CM004 - 9. Least frontal breadth	CM005 - 10. Maximum frontal breadth	CM006 - 12. Biasterionic breadth	CM007 - 13a. Mastoid width (l)	CM008 - 13a. Mastoid width (r)	CM007/8 - 13a. Mastoid width (m)	CM009 - 17. *Basion-Bregma* height	CM010 - 19a. Mastoid height (l)	CM011 - 19a. Mastoid height (r)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2								14.0	14.00			(32.0)
Abu Tabari 02/1-3							13.0	12.5	12.75		(27.0)	(30.0)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	[(169.0)]	[(161.0)]	[(123.0)]	[(79.0)]		[(105.0)]	8.5		8.50	[(128.0)]	25.0	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			[(129.0)]	(103.5)			(15.0)		15.00		(33.0)	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	[(173.0)]	[(164.0)]	(126.0)	[(75.0)]		[(102.0)]	11.0		11.00	[(128.0)]	(29.0)	
Abu Tabari 02/28-11				(101.0)								
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15						(101.5)						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	(178.5)	[(170.0)]	(120.0)	(90.0)	(105.0)	(94.0)	9.0	(8.0)	8.50	[(150.0)]		(21.0)
Abu Tabari 02/28-23	[(180.0)]	[(170.0)]	(131.0)									
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	[(210.0)]		[(140.0)]			[(125.0)]				[(145.0)]		
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(173.0)	(168.0)	(130.0)			(105.0)				[(131.0)]		
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5							[(9.0)]		9.00		[(25.0)]	

	CM001	CM002	CM003	CM004	CM005	CM006	CM007	CM008	CM007/8	CM009	CM010	CM011
♂ No.	1	0	1	1	0	1	0	0	0	1	0	0
♂ Min.	210.0		140.0	101.0		125.0				145.0		
♂ Max.	210.0		140.0	101.0		125.0				145.0		
♂ Mode												
♂ Median	210.00		140.00	101.00		125.00				145.00		
♂ Mean	210.00		140.00	101.00		125.00				145.00		
♂ S.D.												
♀ No.	4	4	5	3	1	4	5	3	6	3	4	3
♀ Min.	173.0	164.0	120.0	75.0	105.0	94.0	9.0	8.0	8.50	128.0	25.0	21.0
♀ Max.	180.0	170.0	131.0	103.5	105.0	105.0	15.0	14.0	15.00	150.0	33.0	32.0
♀ Mode	173.0	170.0					9.0					
♀ Median	175.75	169.00	129.00	90.00	105.00	101.75	11.00	12.50	11.88	131.00	28.00	30.00
♀ Mean	176.13	168.00	127.20	89.50	105.00	100.63	11.40	11.50	11.71	136.33	28.50	27.67
♀ S.D.	3.66	2.83	4.44	14.26		4.68	2.61	3.12	2.66	11.93	3.42	5.86
No.	5	4	6	4	1	5	5	3	6	4	4	3
Min.	173.0	164.0	120.0	75.0	105.0	94.0	9.0	8.0	8.50	128.0	25.0	21.0
Max.	210.0	170.0	140.0	103.5	105.0	125.0	15.0	14.0	15.00	150.0	33.0	32.0
Mode	173.0	170.0					9.0					
Median	178.50	169.00	129.50	95.50	105.00	102.00	11.00	12.50	11.88	138.00	28.00	30.00
Mean	182.90	168.00	129.33	92.38	105.00	105.50	11.40	11.50	11.71	138.50	28.50	27.67
S.D.	15.48	2.83	6.56	12.98		11.63	2.61	3.12	2.66	10.66	3.42	5.86

All descriptive statistics were calculated without sub-adult values.

	CM010/11 - 19a. Mastoid height (m)	CM012 - 23. Horizontal circumference	CM013 - 24. Transverse arc	CM014 - 25b. *Glabella-Inion* arc	CM015 - 26a. *Glabella-Bregma* arc	CM016 - 27. Parietal sagittal arc	CM017 - 28. Occipital sagittal arc	CM018 - 28(2). *Inion-Opisthion* arc	CM019 - 29d. *Glabella-Bregma* chord	CM020 - 30. *Bregma-Lambda* chord	CM021 - 31. *Lambda-Opisthion* chord	CM022 - 31(2). *Inion-Opisthion* chord
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	32.00											
Abu Tabari 02/1-3	28.50											
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	25.00					114.0	60.0		[(100.0)]	105.0	58.0	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	33.00					[(110.0)]				[(98.0)]		
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	29.00	(480.0)		(320.0)	(114.0)	(134.0)	[(75.0)]	(40.0)	[(103.0)]	(121.0)	[(45.0)]	(33.0)
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15							[(55.0)]				[(52.5)]	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	21.00	(490.0)	(297.0)	(339.0)	120.0	[(125.0)]		55.0	105.5	[(110.0)]	[(37.0)]	54.0
Abu Tabari 02/28-23					[(120.0)]	[(115.0)]			[(105.0)]	[(109.0)]		
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			[(310.0)]			(140.0)				(123.0)		
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				(297.0)	(105.0)	(122.0)	(50.0)	(25.0)	(95.0)	(113.0)	(43.0)	(26.0)
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5	25.00											

	CM010/11	CM012	CM013	CM014	CM015	CM016	CM017	CM018	CM019	CM020	CM021	CM022
♂ No.	0	0	1	0	0	1	0	0	0	1	0	0
♂ Min.			310.0			140.0				123.0		
♂ Max.			310.0			140.0				123.0		
♂ Mode												
♂ Median			310.00			140.00				123.00		
♂ Mean			310.00			140.00				123.00		
♂ S.D.												
♀ No.	6	2	1	3	4	5	3	3	4	5	4	3
♀ Min.	21.00	480.0	297.0	297.0	105.0	110.0	50.0	25.0	95.0	98.0	37.0	26.0
♀ Max.	33.00	490.0	297.0	339.0	120.0	134.0	75.0	55.0	105.5	121.0	52.5	54.0
♀ Mode					120.0							
♀ Median	28.75	485.00	297.00	320.00	117.00	122.00	55.00	40.00	104.00	110.00	44.00	33.00
♀ Mean	28.08	485.00	297.00	318.67	114.75	121.20	60.00	40.00	102.13	110.20	44.38	37.67
♀ S.D.	4.48	7.07		21.03	7.09	9.26	13.23	15.00	4.87	8.29	6.39	14.57
No.	6	2	2	3	4	6	3	3	4	6	4	3
Min.	21.00	480.0	297.0	297.0	105.0	110.0	50.0	25.0	95.0	98.0	37.0	26.0
Max.	33.00	490.0	310.0	339.0	120.0	140.0	75.0	55.0	105.5	123.0	52.5	54.0
Mode					120.0							
Median	28.75	485.00	303.50	320.00	117.00	123.50	55.00	40.00	104.00	111.50	44.00	33.00
Mean	28.08	485.00	303.50	318.67	114.75	124.33	60.00	40.00	102.13	112.33	44.38	37.67
S.D.	4.48	7.07	9.19	21.03	7.09	11.29	13.23	15.00	4.87	9.07	6.39	14.57

	CM023 - 44. Bimalar breadth	CM024 - 45. Bizygomatic breadth	CM025 - 45(3). Mid-orbital chord	CM026 - 46. Bimaxillary breadth	CM027 - 48 Upper facial height	CM028 - 48(1). *Nasospinale-Prosthion* height	CM029 - 48(3). Minimum orbito-alveolar height	CM030 - *50(1). Interorbital breadth	CM031 - 51. Orbital breadth (l)	CM032 - 51. Orbital breadth (r)	CM031/32 - 51. Orbital breadth (m)	CM033 - 52. Orbital height (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2						(22.0)						
Abu Tabari 02/1-3						[(23.0)]						
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2					[(55.0)]	[(19.0)]			(39.0)	(39.0)	39.00	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(112.0)]		[(62.0)]		[(67.0)]	[(21.0)]		(27.0)				
Abu Tabari 02/28-7												
Abu Tabari 02/28-8								[(20.0)]				
Abu Tabari 02/28-11								[(23.0)]				
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15			[(50.0)]			23.0		[(22.0)]				
Abu Tabari 02/28-20												
Abu Tabari 02/28-21						[(23.0)]						
Abu Tabari 02/28-22	(90.0)	[(111.0)]						(23.0)	(38.0)	(36.0)	37.00	[(35.0)]
Abu Tabari 02/28-23						[(16.0)]						
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4						[(32.0)]						
Conical Hill 95/4-1												
Conical Hill 02/3-4							[(43.0)] (l)	[(28.0)]				
Djabarona 96/1-1						(19.0)						
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4								[(21.5)]				
Djabarona 96/120-5												

	CM023	CM024	CM025	CM026	CM027	CM028	CM029	CM030	CM031	CM032	CM031/32	CM033
♂ No.	0	0	0	0	0	1	1	3	0	0	0	0
♂ Min.						32.0	43.0	21.5				
♂ Max.						32.0	43.0	28.0				
♂ Mode												
♂ Median						32.00	43.00	23.00				
♂ Mean						32.00	43.00	24.17				
♂ S.D.								3.40				
♀ No.	2	1	2	0	1	7	0	4	1	1	1	1
♀ Min.	90.0	111.0	50.0		67.0	16.0		20.0	38.0	36.0	37.00	35.0
♀ Max.	112.0	111.0	62.0		67.0	23.0		27.0	38.0	36.0	37.00	35.0
♀ Mode						23.0						
♀ Median	101.00	111.00	56.00		67.00	22.00		22.50	38.00	36.00	37.00	35.00
♀ Mean	101.00	111.00	56.00		67.00	21.00		23.00	38.00	36.00	37.00	35.00
♀ S.D.	15.56		8.49			2.65		2.94				
No.	2	1	2	0	1	8	1	7	1	1	1	1
Min.	90.0	111.0	50.0		67.0	16.0	43.0	20.0	38.0	36.0	37.00	35.0
Max.	112.0	111.0	62.0		67.0	32.0	43.0	28.0	38.0	36.0	37.00	35.0
Mode						23.0		23.0				
Median	101.00	111.00	56.00		67.00	22.50	43.00	23.00	38.00	36.00	37.00	35.00
Mean	101.00	111.00	56.00		67.00	22.38	43.00	23.50	38.00	36.00	37.00	35.00
S.D.	15.56		8.49			4.60		2.93				

	CM034 - 52. Orbital height (r)	CM033/34 - 52. Orbital height (m)	CM035 - 54. Nasal breadth	CM036 - 55. Nasal height	CM037 - 55(1). Nasal aperture height	CM038 - 56. Length of the nasal bones	CM039 - 57. Simotic chord	CM040 - 60. Maxillo-alveolar length	CM041 - 61. External palate breadth	CM042 - *61a(1). Canine alveolar breadth (mx)	CM043 - *61a(1). Canine alveolar breadth (md)	CM044 - *61a(2). 1st premolar alveolar breadth (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2			[(32.0)] [16.0 (r)]					[(59.0)]		(45.0)	(30.0)	
Abu Tabari 02/1-3			(25.0)							39.0	(33.0)	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			[(18.0)] [9.0 (r)]		[(23.0)]							
Abu Tabari 02/28-3			[(25.0)] [(12.5) (r)]									
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			(26.0)		[(27.0)]					(43.0)	(33.5)	(49.5)
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15			(25.0)						68.0	42.5	[(33.0)]	52.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21			(23.0)							[(41.0)]	[(30.5)]	[(47.0)]
Abu Tabari 02/28-22		35.00									[(30.0)]	
Abu Tabari 02/28-23			(22.0)								[(32.5)]	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			(28.0) [14.0 (r)]									
Conical Hill 95/4-1												
Conical Hill 02/3-4			[(23.0)] [11.5 (l)]									
Djabarona 96/1-1			[(24.0)] [12.0 (l)]		[(22.0)]							
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5			[(18.0)] [9.0 (r)]									

	CM034	CM033/34	CM035	CM036	CM037	CM038	CM039	CM040	CM041	CM042	CM043	CM044
♂ No.	0	0	2	0	0	0	0	0	0	0	0	0
♂ Min.			23.0									
♂ Max.			28.0									
♂ Mode												
♂ Median			25.50									
♂ Mean			25.50									
♂ S.D.			3.54									
♀ No.	0	1	9	0	2	0	0	1	1	5	7	3
♀ Min.		35.00	18.0		22.0			59.0	68.0	39.0	30.0	47.0
♀ Max.		35.00	32.0		27.0			59.0	68.0	45.0	33.5	52.0
♀ Mode			25.0								30.0	
♀ Median		35.00	25.00		24.50			59.00	68.00	42.50	32.50	49.50
♀ Mean		35.00	24.44		24.50			59.00	68.00	42.10	31.79	49.50
♀ S.D.			3.71		3.54					2.25	1.55	2.50
No.	0	1	11	0	2	0	0	1	1	5	7	3
Min.		35.00	18.0		22.0			59.0	68.0	39.0	30.0	47.0
Max.		35.00	32.0		27.0			59.0	68.0	45.0	33.5	52.0
Mode			25.0								30.0	
Median		35.00	25.00		24.50			59.00	68.00	42.50	32.50	49.50
Mean		35.00	24.64		24.50			59.00	68.00	42.10	31.79	49.50
S.D.			3.53		3.54					2.25	1.55	2.50

	CM045 - *61a(2). 1st premolar alveolar breadth (md)	CM046 - *61a(3). 2nd premolar alveolar breadth (mx)	CM047 - *61a(3). 2nd premolar alveolar breadth (md)	CM048 - *61a(4). 1st moalr alveolar breadth (mx)	CM049 - *61a(4). 1st moalr alveolar breadth (md)	CM050 - *61a(5). 2nd molar alveolar breadth (mx)	CM051 - *61a(5). 2nd molar alveolar breadth (md)	CM052 - 62. Internal palate length	CM053 - 62(1). Anterior palate length	CM054 - *62a(1). 1st internal dental arch length (mx)	CM055 - *62a(1). 1st internal dental arch length (md)	CM056 - *62a(2). 2nd internal dental arch length (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(39.0)		(45.0)		(54.5)	(60.0)	(62.0)			4.0		7.5
Abu Tabari 02/1-3	(39.0)		(44.0)		(53.0)		(58.0)					
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(42.0)	(53.5)	(46.0)									[(8.0)]
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		57.0		62.5		67.0		[(49.0)]				7.5
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(39.0)]	[(52.0)]	[(47.0)]		[(56.0)]		(61.0)					
Abu Tabari 02/28-22	[(38.0)]		[(42.5)]		[(51.0)]		[(56.5)]					
Abu Tabari 02/28-23	[(42.5)]	[(60.5)]	[(49.5)]		(59.0)		(62.0)					
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4								57.0	43.0			8.0
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1					(51.0)		(60.0)					[(4.0)]
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM045	CM046	CM047	CM048	CM049	CM050	CM051	CM052	CM053	CM054	CM055	CM056
♂ No.	0	0	0	0	0	0	0	1	1	0	0	1
♂ Min.								57.0	43.0			8.0
♂ Max.								57.0	43.0			8.0
♂ Mode												
♂ Median								57.00	43.00			8.00
♂ Mean								57.00	43.00			8.00
♂ S.D.												
♀ No.	6	4	6	1	6	2	6	1	0	1	0	4
♀ Min.	38.0	52.0	42.5	62.5	51.0	60.0	56.5	49.0		4.0		4.0
♀ Max.	42.5	60.5	49.5	62.5	59.0	67.0	62.0	49.0		4.0		8.0
♀ Mode	39.0				51.0		62.0					7.5
♀ Median	39.00	55.25	45.50	62.50	53.75	63.50	60.50	49.00		4.00		7.50
♀ Mean	39.92	55.75	45.67	62.50	54.08	63.50	59.92	49.00		4.00		6.75
♀ S.D.	1.86	3.80	2.44		3.11	4.95	2.25					1.85
No.	6	4	6	1	6	2	6	2	1	1	0	5
Min.	38.0	52.0	42.5	62.5	51.0	60.0	56.5	49.0	43.0	4.0		4.0
Max.	42.5	60.5	49.5	62.5	59.0	67.0	62.0	57.0	43.0	4.0		8.0
Mode	39.0				51.0		62.0					7.5
Median	39.00	55.25	45.50	62.50	53.75	63.50	60.50	53.00	43.00	4.00		7.50
Mean	39.92	55.75	45.67	62.50	54.08	63.50	59.92	53.00	43.00	4.00		7.00
S.D.	1.86	3.80	2.44		3.11	4.95	2.25	5.66				1.70

	CM057 - *62a(2). 2nd internal dental arch length (md)	CM058 - *62a(3). 3rd internal dental arch length (mx)	CM059 - *62a(3). 3rd internal dental arch length (md)	CM060 - *62a(4). 4th internal dental arch length (mx)	CM061 - *62a(4). 4th internal dental arch length (md)	CM062 - *62a(5). 5th internal dental arch length (mx)	CM063 - *62a(5). 5th internal dental arch length (md)	CM064 - *62a(6). 6th internal dental arch length (mx)	CM065 - *62a(6). 6th internal dental arch length (md)	CM066 - 63. Internal palate breadth (mx)	CM067 - *63. Internal palate breadth (md)	CM068 - 63(2). Anterior palate breadth (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		(16.5)	(11.0)		(16.0)		(27.0)	(43.0)	(38.0)	(39.5)	(40.5)	29.0
Abu Tabari 02/1-3											(40.0)	(29.0)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	[(7.0)]		[(11.5)]									
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		[(16.0)]	(11.0)	[(23.0)]	[(19.0)]							(33.0)
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(3.0)	14.0		21.0		31.5		41.0		(38.0)		33.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		(12.0)	(8.0)	(15.0)	(13.0)		(23.0)		(36.0)		(43.0)	(31.5)
Abu Tabari 02/28-22			[(8.0)]		[(16.0)]		[(26.0)]		[(36.0)]		[(35.0)]	
Abu Tabari 02/28-23		(16.0)	[(9.0)]	(22.0)	[(18.0)]		[(29.0)]		[(40.0)]		(42.0)	(35.0)
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4						33.0		43.0		41.0	[(40.0)]	32.0
Conical Hill 95/4-1												
Conical Hill 02/3-4						[(28.0)]				[(23.0)]		
Djabarona 96/1-1		[(9.5)]		[(14.0)]			[(25.0)]					[(23.0)]
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM057	CM058	CM059	CM060	CM061	CM062	CM063	CM064	CM065	CM066	CM067	CM068
♂ No.	1	0	1	0	0	2	0	1	0	2	1	1
♂ Min.	7.0		11.5			28.0		43.0		23.0	40.0	32.0
♂ Max.	7.0		11.5			33.0		43.0		41.0	40.0	32.0
♂ Mode												
♂ Median	7.00		11.50			30.50		43.00		32.00	40.00	32.00
♂ Mean	7.00		11.50			30.50		43.00		32.00	40.00	32.00
♂ S.D.						3.54				12.73		
♀ No.	1	6	5	5	5	1	5	2	4	2	5	7
♀ Min.	3.0	9.5	8.0	14.0	13.0	31.5	23.0	41.0	36.0	38.0	35.0	23.0
♀ Max.	3.0	16.5	11.0	23.0	19.0	31.5	29.0	43.0	40.0	39.5	43.0	35.0
♀ Mode		16.0	11.0		16.0				36.0			29.0
♀ Median	3.00	15.00	9.00	21.00	16.00	31.50	26.00	42.00	37.00	38.75	40.50	31.50
♀ Mean	3.00	14.00	9.40	19.00	16.40	31.50	26.00	42.00	37.50	38.75	40.10	30.50
♀ S.D.		2.77	1.52	4.18	2.30		2.24	1.41	1.91	1.06	3.09	3.97
No.	2	6	6	5	5	3	5	3	4	4	6	8
Min.	3.0	9.5	8.0	14.0	13.0	28.0	23.0	41.0	36.0	23.0	35.0	23.0
Max.	7.0	16.5	11.5	23.0	19.0	33.0	29.0	43.0	40.0	41.0	43.0	35.0
Mode		16.0	11.0		16.0			43.0	36.0		40.0	29.0
Median	5.00	15.00	10.00	21.00	16.00	31.50	26.00	43.00	37.00	38.75	40.25	31.75
Mean	5.00	14.00	9.75	19.00	16.40	30.83	26.00	42.33	37.50	35.38	40.08	30.69
S.D.	2.83	2.77	1.60	4.18	2.30	2.57	2.24	1.15	1.91	8.34	2.76	3.71

	CM069 - *63(2). Anterior palate breadth (md)	CM070 - *63(2)a. 1st internal dental arch breadth (mx)	CM071 - *63(2)a. 1st internal dental arch breadth (md)	CM072 - *63(2)b. 2nd internal dental arch breadth (mx)	CM073 - *63(2)b. 2nd internal dental arch breadth (md)	CM074 - *63(2)c. 3rd internal dental arch breadth (mx)	CM075 - *63(2)c. 3rd internal dental arch breadth (md)	CM076 - *63(2)d. 4th internal dental arch breadth (mx)	CM077 - *63(2)d. 4th internal dental arch breadth (md)	CM078 - *63(2)e. 5th internal dental arch breadth (mx)	CM079 - *63(2)e. 5th internal dental arch breadth (md)	CM080 - 66. Bigonial breadth
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	22.5	25.0	16.0	(32.5)	(29.5)	(38.5)	34.0	(41.0)	39.0	(43.5)	46.0	[(90.0)]
Abu Tabari 02/1-3	(25.5)	24.5	(18.0)		(29.0)		(31.5)		[(37.5)]			[(82.5)]
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	[(26.5)]				[(31.0)]							
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	26.0	(27.5)	(19.5)	(36.0)	(31.0)		(34.5)					[(94.0)]
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	27.5	26.0	(19.5)	38.0		41.0		45.0		47.0		
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(26.5)	(28.5)	(18.0)	(38.0)	(32.5)	[(40.0)]	(37.0)		[(43.0)]		(47.0)	[(97.0)]
Abu Tabari 02/28-22	(26.0)				(30.0)		(32.0)		(38.0)		(42.0)	(79.5)
Abu Tabari 02/28-23	28.0	(29.0)	(18.5)	[(39.0)]	(34.0)		38.0		43.0		49.0	(85.0)
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		26.0				47.0		48.0		47.0		
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		[(18.0)]		[(28.0)]					(41.0)		(47.0)	(91.0)
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM069	CM070	CM071	CM072	CM073	CM074	CM075	CM076	CM077	CM078	CM079	CM080
♂ No.	1	1	0	0	1	1	0	1	0	1	0	0
♂ Min.	26.5	26.0			31.0	47.0		48.0		47.0		
♂ Max.	26.5	26.0			31.0	47.0		48.0		47.0		
♂ Mode												
♂ Median	26.50	26.00			31.00	47.00		48.00		47.00		
♂ Mean	26.50	26.00			31.00	47.00		48.00		47.00		
♂ S.D.												
♀ No.	7	7	6	6	6	3	6	2	6	2	5	7
♀ Min.	22.5	18.0	16.0	28.0	29.0	38.5	31.5	41.0	37.5	43.5	42.0	79.5
♀ Max.	28.0	29.0	19.5	39.0	34.0	41.0	38.0	45.0	43.0	47.0	49.0	97.0
♀ Mode	26.0		18.0	38.0					43.0		47.0	
♀ Median	26.00	26.00	18.25	37.00	30.50	40.00	34.25	43.00	40.00	45.25	47.00	90.00
♀ Mean	26.00	25.50	18.25	35.25	31.00	39.83	34.50	43.00	40.25	45.25	46.20	88.43
♀ S.D.	1.78	3.72	1.29	4.24	1.92	1.26	2.61	2.83	2.44	2.47	2.59	6.33
No.	8	8	6	6	7	4	6	3	6	3	5	7
Min.	22.5	18.0	16.0	28.0	29.0	38.5	31.5	41.0	37.5	43.5	42.0	79.5
Max.	28.0	29.0	19.5	39.0	34.0	47.0	38.0	48.0	43.0	47.0	49.0	97.0
Mode	26.5	26.0	18.0	38.0	31.0				43.0	47.0	47.0	
Median	26.25	26.00	18.25	37.00	31.00	40.50	34.25	45.00	40.00	47.00	47.00	90.00
Mean	26.06	25.56	18.25	35.25	31.00	41.63	34.50	44.67	40.25	45.83	46.20	88.43
S.D.	1.66	3.45	1.29	4.24	1.76	3.73	2.61	3.51	2.44	2.02	2.59	6.33

	CM081 - 67. Minimum chord between the mental foramina	CM082 - 68. Projective length of the body of the mandible	CM083 - 69. Height of the mandibular symphysis	CM084 - 69a. Symphyseal height	CM085 - *69c. Thickness of the mandibular symphysis	CM086 - 69(1). Mental foramen height (l)	CM087 - 69(1). Mental foramen height (r)	CM086/87 - 69(1). Mental foramen height (m)	CM088 - 69(2). 2nd molar mandibular body height (l)	CM089 - 69(2). 2nd molar mandibular body height (r)	CM088/89 - 69(2). 2nd molar mandibular body height (m)	CM090 - *69(2)a. Canine mandibular body height (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(44.0)	[(68.5)]	(36.0)	(36.0)	12.5		(32.0)	32.00	(26.5)	(27.0)	26.75	(32.0)
Abu Tabari 02/1-3	(41.0)	[(77.0)]	(38.0)	(37.0)	(12.5)	(35.0)	(34.0)	34.50	(31.0)	(31.0)	31.00	(36.0)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7			[(39.0)]	[(39.0)]	[(14.0)]							
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			[(31.0)]		13.0	(27.5)	(28.0)	27.75				
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		[(66.0)]	(34.0)	(34.0)	13.0		(34.0)	34.00				
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		[(74.5)]	(35.0)	(36.0)	12.0	(33.0)		33.00	(28.5)		28.50	(33.5)
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		[(74.0)]	[(35.0)]	[(35.0)]	14.0		(34.0)	34.00	(31.0)	(30.0)	30.50	(35.0)
Abu Tabari 02/28-22	[(44.0)]	(74.0)	[(38.0)]	[(38.0)]	(15.0)	[(35.0)]		35.00	[(30.0)]	[(28.5)]	29.25	[(35.0)]
Abu Tabari 02/28-23	(44.0)	(65.0)	(33.0)	(33.0)	13.0	(28.0)	(28.0)	28.00	(23.0)	(23.0)	23.00	(29.0)
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		[(95.0)]	[(46.0)]	[(46.0)]			(41.0)	41.00	(34.0)		34.00	
Conical Hill 95/4-1												
Conical Hill 02/3-4			[(37.5)]		(17.5)	[(39.0)]		39.00		(30.0)	30.00	
Djabarona 96/1-1		(66.0)	(36.0)	[(36.0)]	(13.5)		(32.0)	32.00	(23.0)	(22.0)	22.50	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5			(31.0)		(10.0)					(26.0)	26.00	

	CM081	CM082	CM083	CM084	CM085	CM086	CM087	CM086/87	CM088	CM089	CM088/89	CM090
♂ No.	0	1	3	2	2	1	1	2	1	1	2	0
♂ Min.		95.0	37.5	39.0	14.0	39.0	41.0	39.00	34.0	30.0	30.00	
♂ Max.		95.0	46.0	46.0	17.5	39.0	41.0	41.00	34.0	30.0	34.00	
♂ Mode												
♂ Median		95.00	39.00	42.50	15.75	39.00	41.00	40.00	34.00	30.00	32.00	
♂ Mean		95.00	40.83	42.50	15.75	39.00	41.00	40.00	34.00	30.00	32.00	
♂ S.D.			4.54	4.95	2.47			1.41			2.83	
♀ No.	4	8	9	8	9	4	6	8	7	7	8	6
♀ Min.	41.0	65.0	31.0	33.0	10.0	28.0	28.0	28.00	23.0	22.0	22.50	29.0
♀ Max.	44.0	77.0	38.0	38.0	15.0	35.0	34.0	35.00	31.0	31.0	31.00	36.0
♀ Mode	44.0	66.0	36.0	36.0	12.5	35.0	34.0	32.00	31.0			35.0
♀ Median	44.00	71.25	35.00	36.00	13.00	34.00	33.00	33.50	28.50	27.00	27.63	34.25
♀ Mean	43.25	70.63	35.11	35.63	12.83	32.75	32.33	32.81	27.57	26.79	27.19	33.42
♀ S.D.	1.50	4.74	2.26	1.60	1.39	3.30	2.34	2.24	3.49	3.39	3.22	2.58
No.	4	9	12	10	11	5	7	10	8	8	10	6
Min.	41.0	65.0	31.0	33.0	10.0	28.0	28.0	28.00	23.0	22.0	22.50	29.0
Max.	44.0	95.0	46.0	46.0	17.5	39.0	41.0	41.00	34.0	31.0	34.00	36.0
Mode	44.0	66.0	36.0	36.0	12.5	35.0	34.0	32.00	31.0	30.0		35.0
Median	44.00	74.00	36.00	36.00	13.00	35.00	34.00	34.00	29.25	27.75	28.88	34.25
Mean	43.25	73.33	36.54	37.00	13.36	34.00	33.57	34.25	28.38	27.19	28.15	33.42
S.D.	1.50	9.26	3.76	3.62	1.89	4.00	3.91	3.65	3.95	3.34	3.62	2.58

	CM091 - *69(2)a. Canine mandibular body height (r)	CM090/91 - *69(2)a. Canine mandibular body height (m)	CM092 - *69(2)b. 1st premolar mandibular body height (l)	CM093 - *69(2)b. 1st premolar mandibular body height (r)	CM092/93 - *69(2)b. 1st premolar mandibular body height (m)	CM094 - *69(2)c. 2nd premolar mandibular body height (l)	CM095 - *69(2)c. 2nd premolar mandibular body height (r)	CM094/95 - *69(2)c. 2nd premolar mandibular body height (m)	CM096 - *69(2)d. 1st molar mandibular body height (l)	CM097 - *69(2)d. 1st molar mandibular body height (r)	CM096/97 - *69(2)d. 1st molar mandibular body height (m)	CM098 - *69(2)e. 3rd molar mandibular body height (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(32.0)	32.00	(34.0)	(34.0)	34.00	(33.0)	(32.5)	32.75	(30.5)	(31.0)	30.75	(25.0)
Abu Tabari 02/1-3	(36.5)	36.25	(36.0)	(36.0)	36.00	(36.0)	(35.0)	35.50	(35.0)	(35.0)	35.00	(29.5)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7			[(37.0)]		37.00							
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(33.0)	33.00	(34.5)	(35.0)	34.75					(32.0)	32.00	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		33.50	(34.0)		34.00	(33.0)		33.00	(31.0)		31.00	(28.0)
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(32.5)	33.75	(36.5)	(34.5)	35.50		(34.0)	34.00		(31.0)	31.00	(29.5)
Abu Tabari 02/28-22	[(34.0)]	34.50	[(37.0)]	[(36.0)]	36.50	[(35.0)]	[(34.0)]	34.50	[(33.5)]	[(32.0)]	32.75	[(25.5)]
Abu Tabari 02/28-23		29.00	(29.0)		29.00	(27.5)	(28.0)	27.75	(26.0)	(26.0)	26.00	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	(42.0)	42.00							(39.0)		39.00	(30.0)
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				(34.0)	34.00		(32.0)	32.00		(29.5)	29.50	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5										(27.0)	27.00	

	CM091	CM090/91	CM092	CM093	CM092/93	CM094	CM095	CM094/95	CM096	CM097	CM096/97	CM098
♂ No.	1	1	1	0	1	0	0	0	1	0	1	1
♂ Min.	42.0	42.00	37.0		37.00				39.0		39.00	30.0
♂ Max.	42.0	42.00	37.0		37.00				39.0		39.00	30.0
♂ Mode												
♂ Median	42.00	42.00	37.00		37.00				39.00		39.00	30.00
♂ Mean	42.00	42.00	37.00		37.00				39.00		39.00	30.00
♂ S.D.												
♀ No.	5	7	7	6	8	5	6	7	5	8	9	5
♀ Min.	32.0	29.00	29.0	34.0	29.00	27.5	28.0	27.75	26.0	26.0	26.00	25.0
♀ Max.	36.5	36.25	37.0	36.0	36.50	36.0	35.0	35.50	35.0	35.0	35.00	29.5
♀ Mode			34.0	34.0	34.00	33.0	34.0			31.0	31.00	29.5
♀ Median	33.00	33.50	34.50	34.75	34.38	33.00	33.25	33.00	31.00	31.00	31.00	28.00
♀ Mean	33.60	33.14	34.43	34.92	34.22	32.90	32.58	32.79	31.20	30.44	30.56	27.50
♀ S.D.	1.78	2.25	2.68	0.92	2.32	3.29	2.50	2.51	3.44	2.90	2.77	2.15
No.	6	8	8	6	9	5	6	7	6	8	10	6
Min.	32.0	29.00	29.0	34.0	29.00	27.5	28.0	27.75	26.0	26.0	26.00	25.0
Max.	42.0	42.00	37.0	36.0	37.00	36.0	35.0	35.50	39.0	35.0	39.00	30.0
Mode			34.0	34.0	34.00	33.0	34.0			31.0	31.00	29.5
Median	33.50	33.63	35.25	34.75	34.75	33.00	33.25	33.00	32.25	31.00	31.00	28.75
Mean	35.00	34.25	34.75	34.92	34.53	32.90	32.58	32.79	32.50	30.44	31.40	27.92
S.D.	3.78	3.76	2.65	0.92	2.36	3.29	2.50	2.51	4.43	2.90	3.74	2.18

	CM099 - *69(2)e. 3rd molar mandibular body height (r)	CM098/99 - *69(2)e. 3rd molar mandibular body height (m)	CM100 - 69(3). Mental foramen body thickness (l)	CM101 - 69(3). Mental foramen body thickness (r)	CM100/101 - 69(3). Mental foramen body thickness (m)	CM102 - 69b. 2nd molar mandibular body thickness (l)	CM103 - 69b. 2nd molar mandibular body thickness (r)	CM102/103 - 69b. 2nd molar mandibular body thickness (m)	CM104 - *69b(1). Canine mandibular body thickness (l)	CM105 - *69b(1). Canine mandibular body thickness (r)	CM104/105 - *69b(1). Canine mandibular body thickness (m)	CM106 - *69b(2). 1st premolar mandibular body thickness (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(25.0)	25.00	(13.0)	(13.0)	13.00	(17.0)	17.0	17.00	(12.0)	12.0	12.00	(12.0)
Abu Tabari 02/1-3		29.50	(12.0)	11.5	11.75	13.5	13.5	13.50	(11.0)	11.0	11.00	(10.5)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			13.5	13.0	13.25							
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				12.5	12.50							
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		28.00	12.0		12.00	17.0		17.00	10.5		10.50	11.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(28.0)	28.75		(12.5)	12.50		(16.0)	16.00		(11.5)	11.50	
Abu Tabari 02/28-22	[(24.0)]	24.75	13.0		13.00	17.0		17.00	13.0		13.00	14.0
Abu Tabari 02/28-23			12.0	12.0	12.00	17.0	17.0	17.00	13.0	(12.0)	12.50	12.0
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		30.00		(16.0)	16.00	(18.0)		18.00				
Conical Hill 95/4-1												
Conical Hill 02/3-4							(16.0)	16.00	(15.0)		15.00	
Djabarona 96/1-1				(13.0)	13.00	(17.0)	(16.0)	16.50		(12.0)	12.00	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5							(11.5)	11.50				

	CM099	CM098/99	CM100	CM101	CM100/101	CM102	CM103	CM102/103	CM104	CM105	CM104/105	CM106
♂ No.	0	1	0	1	1	1	1	2	1	0	1	0
♂ Min.		30.00		16.0	16.00	18.0	16.0	16.00	15.0		15.00	
♂ Max.		30.00		16.0	16.00	18.0	16.0	18.00	15.0		15.00	
♂ Mode												
♂ Median		30.00		16.00	16.00	18.00	16.00	17.00	15.00		15.00	
♂ Mean		30.00		16.00	16.00	18.00	16.00	17.00	15.00		15.00	
♂ S.D.								1.41				
♀ No.	3	5	5	6	8	6	6	8	5	5	7	5
♀ Min.	24.0	24.75	12.0	11.5	11.75	13.5	11.5	11.50	10.5	11.0	10.50	10.5
♀ Max.	28.0	29.50	13.0	13.0	13.00	17.0	17.0	17.00	13.0	12.0	13.00	14.0
♀ Mode			12.0	13.0	13.00	17.0	17.0	17.00	13.0	12.0	12.00	12.0
♀ Median	25.00	28.00	12.00	12.50	12.50	17.00	16.00	16.75	12.00	12.00	12.00	12.00
♀ Mean	25.67	27.20	12.40	12.42	12.47	16.42	15.17	15.69	11.90	11.70	11.79	11.90
♀ S.D.	2.08	2.19	0.55	0.58	0.51	1.43	2.21	2.07	1.14	0.45	0.86	1.34
No.	3	6	5	7	9	7	7	10	6	5	8	5
Min.	24.0	24.75	12.0	11.5	11.75	13.5	11.5	11.50	10.5	11.0	10.50	10.5
Max.	28.0	30.00	13.0	16.0	16.00	18.0	17.0	18.00	15.0	12.0	15.00	14.0
Mode			12.0	13.0	13.00	17.0	16.0	17.00	13.0	12.0	12.00	12.0
Median	25.00	28.38	12.00	12.50	12.50	17.00	16.00	16.75	12.50	12.00	12.00	12.00
Mean	25.67	27.67	12.40	12.93	12.86	16.64	15.29	15.95	12.42	11.70	12.19	11.90
S.D.	2.08	2.27	0.55	1.46	1.27	1.44	2.04	1.96	1.63	0.45	1.39	1.34

	CM107 - *69b(2). 1st premolar mandibular body thickness (r)	CM106/107 - *69b(2). 1st premolar mandibular body thickness (m)	CM108 - *69b(3). 2nd premolar mandibular body thickness (l)	CM109 - *69b(3). 2nd premolar mandibular body thickness (r)	CM108/109 - *69b(3). 2nd premolar mandibular body thickness (m)	CM110 - *69b(4). 1st molar mandibular body thickness (l)	CM111 - *69b(4). 1st molar mandibular body thickness (r)	CM110/111 - *69b(4). 1st molar mandibular body thickness (m)	CM112 - *69b(5). 3rd molar mandibular body thickness (l)	CM113 - *69b(5). 3rd molar mandibular body thickness (r)	CM112/113 - *69b(5). 3rd molar mandibular body thickness (m)	CM114 - 70. Ramus height (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	12.0	12.00	(13.0)	13.0	13.00	(14.0)	14.0	14.00	(16.0)	16.0	16.00	
Abu Tabari 02/1-3	11.0	10.75	11.0	11.5	11.25	12.5	12.0	12.25				
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	13.0	13.00					14.5	14.50				
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		11.00	12.0		12.00	14.0		14.00	16.0		16.00	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(12.0)	12.00		(12.0)	12.00		(14.5)	14.50		(17.0)	17.00	[(64.0)]
Abu Tabari 02/28-22		14.00	15.0		15.00	16.0		16.00	17.0		17.00	58.0
Abu Tabari 02/28-23	(12.0)	12.00	12.0	(12.0)	12.00	13.5	13.5	13.50				
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4						(16.0)		16.00	(19.0)		19.00	
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(13.0)	13.00		(12.0)	12.00		(15.0)	15.00				(62.0)
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5							(10.0)	10.00				

	CM107	CM106/107	CM108	CM109	CM108/109	CM110	CM111	CM110/111	CM112	CM113	CM112/113	CM114
♂ No.	0	0	0	0	0	1	0	1	1	0	1	0
♂ Min.						16.0		16.00	19.0		19.00	
♂ Max.						16.0		16.00	19.0		19.00	
♂ Mode												
♂ Median						16.00		16.00	19.00		19.00	
♂ Mean						16.00		16.00	19.00		19.00	
♂ S.D.												
♀ No.	6	8	5	5	7	5	7	9	3	2	4	3
♀ Min.	11.0	10.75	11.0	11.5	11.25	12.5	10.0	10.00	16.0	16.0	16.00	58.0
♀ Max.	13.0	14.00	15.0	13.0	15.00	16.0	15.0	16.00	17.0	17.0	17.00	64.0
♀ Mode	12.0	12.00	12.0	12.0	12.00	14.0	14.5	14.00	16.0		16.00	
♀ Median	12.00	12.00	12.00	12.00	12.00	14.00	14.00	14.00	16.00	16.50	16.50	62.00
♀ Mean	12.17	12.22	12.60	12.10	12.46	14.00	13.36	13.75	16.33	16.50	16.50	61.33
♀ S.D.	0.75	1.08	1.52	0.55	1.23	1.27	1.77	1.74	0.58	0.71	0.58	3.06
No.	6	8	5	5	7	6	7	10	4	2	5	3
Min.	11.0	10.75	11.0	11.5	11.25	12.5	10.0	10.00	16.0	16.0	16.00	58.0
Max.	13.0	14.00	15.0	13.0	15.00	16.0	15.0	16.00	19.0	17.0	19.00	64.0
Mode	12.0	12.00	12.0	12.0	12.00	14.0	14.5	14.00	16.0		16.00	
Median	12.00	12.00	12.00	12.00	12.00	14.00	14.00	14.25	16.50	16.50	17.00	62.00
Mean	12.17	12.22	12.60	12.10	12.46	14.33	13.36	13.98	17.00	16.50	17.00	61.33
S.D.	0.75	1.08	1.52	0.55	1.23	1.40	1.77	1.79	1.41	0.71	1.22	3.06

	CM115 - 70. Ramus height (r)	CM114/115 - 70. Ramus height (m)	CM116 - 70(1). Coronoid height (l)	CM117 - 70(1). Coronoid height (r)	CM116/117 - 70(1). Coronoid height (m)	CM118 - 70(2). Minimum ramus height (l)	CM119 - 70(2). Minimum ramus height (r)	CM118/119 - 70(2). Minimum ramus height (m)	CM120 - 71. Minimum ramus breadth (l)	CM121 - 71. Minimum ramus breadth (r)	CM120/121 - 71. Minimum ramus breadth (m)	CM122 - 71a. Minimum ramus width (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(62.0)	62.00		(52.0)	52.00		(45.0)	45.00		33.0	33.00	
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			(61.5)		61.50							(38.0)
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15			(57.0)		57.00	51.0		51.00	32.0		32.00	32.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		64.00	[(60.0)]		60.00	[(48.0)]		48.00	(36.0)		36.00	(36.0)
Abu Tabari 02/28-22	(54.5)	56.25		[(50.0)]	50.00	46.0	[(44.0)]	45.00	[(35.0)]	(37.0)	36.00	
Abu Tabari 02/28-23				(51.5)	51.50		(41.5)	41.50		(34.0)	34.00	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		62.00	(55.0)		55.00	(47.0)		47.00	[(34.0)]		34.00	[(34.0)]
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM115	CM114/115	CM116	CM117	CM116/117	CM118	CM119	CM118/119	CM120	CM121	CM120/121	CM122
♂ No.	0	0	0	0	0	0	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ S.D.												
♀ No.	2	4	4	3	7	4	3	6	4	3	6	4
♀ Min.	54.5	56.25	55.0	50.0	50.00	46.0	41.5	41.50	32.0	33.0	32.00	32.0
♀ Max.	62.0	64.00	61.5	52.0	61.50	51.0	45.0	51.00	36.0	37.0	36.00	38.0
♀ Mode		62.00						45.00			36.00	
♀ Median	58.25	62.00	58.50	51.50	55.00	47.50	44.00	46.00	34.50	34.00	34.00	35.00
♀ Mean	58.25	61.06	58.38	51.17	55.29	48.00	43.50	46.25	34.25	34.67	34.17	35.00
♀ S.D.	5.30	3.34	2.93	1.04	4.41	2.16	1.80	3.22	1.71	2.08	1.60	2.58
No.	2	4	4	3	7	4	3	6	4	3	6	4
Min.	54.5	56.25	55.0	50.0	50.00	46.0	41.5	41.50	32.0	33.0	32.00	32.0
Max.	62.0	64.00	61.5	52.0	61.50	51.0	45.0	51.00	36.0	37.0	36.00	38.0
Mode		62.00						45.00			36.00	
Median	58.25	62.00	58.50	51.50	55.00	47.50	44.00	46.00	34.50	34.00	34.00	35.00
Mean	58.25	61.06	58.38	51.17	55.29	48.00	43.50	46.25	34.25	34.67	34.17	35.00
S.D.	5.30	3.34	2.93	1.04	4.41	2.16	1.80	3.22	1.71	2.08	1.60	2.58

	CM123 - 71a. Minimum ramus width (r)	CM122/123 - 71a. Minimum ramus width (m)	CM124 - 72. Profile angle	CM125 - 73. Nasal angle	CM126 - 74. Subnasal angle	CM127 - *74a. Alternative subnasal angle	CM128 - 74(2). Dental angle	CM129 - 79. Mandibular ramus angle (l)	CM130 - 79. Mandibular ramus angle (r)	CM129/130 - 79. Mandibular ramus angle (m)	CM131 - 79c. Mental angle	CM132 - 80. Dental arch length of the *Maxilla*
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	32.5	32.50	[(78.0°)]	[(84.0°)]	[(67.0°)]	(59.5°)	[(92.0°)]		(117.0°)	117.00°	(94.5°)	[(58.0)]
Abu Tabari 02/1-3					[(66.0°)]	(56.0°)	[(88.0°)]		[(116°)]	116.00°	(92.0°)	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7						[(53.0°)]					[(79.0°)]	
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			[(72.0°)]	[(76.0°)]	(62.5°)	(61.0°)		(119.5°)		119.50°		
Abu Tabari 02/28-3	(36.0)	36.00			[(61.0°)]	[(55.0°)]	[(87.5°)]	[(126.0°)]		126.00°		
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		38.00	[(79.0°)]	[(82.5°)]	[(61.5°)]	(54.0°)	[(93.0°)]	(123.0°)		123.00°	(96.0°)	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8			[(80.0°)]	[(84.5°)]	(67.0°)	(54.0°)	(88.0°)		[(119.0°)]	119.00°		
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		32.00	[(74.0°)]	[(81.0°)]	[(62.5°)]	(55.5°)	(96.5°)	(118.5°)		118.50°	(78.0°)	55.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		36.00	[(73.0°)]	[(82.0°)]	[(59.0°)]	[(57.0°)]	[(91.0°)]	[(117.0°)]		117.00°	[(83.0°)]	
Abu Tabari 02/28-22	(37.0)	37.00	[(80.5°)]	[(87.0°)]	[(64.5°)]	[(60.0°)]	[(93.0°)]	(126.5°)		126.50°	[(87.5°)]	
Abu Tabari 02/28-23					(67.0°)	(52.0°)	(77.0°)	(121.0°)	(121.5°)	121.25°	(91.0°)	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4					[(62.0°)]	[(54.0°)]	[(99.0°)]	[(110.0°)]		110.00°		55.0
Conical Hill 95/4-1												
Conical Hill 02/3-4						[(52.5°)]					[(76.0°)]	
Djabarona 96/1-1		34.00		[(69.0°)]	[(60.5°)]	[(49.0°)]		(137.0°)		137.00°	(70.0°)	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5					[(62.0°)]	[(52.0°)]			[(120.0°)]	120.00°	[(88.0°)]	

	CM123	CM122/123	CM124	CM125	CM126	CM127	CM128	CM129	CM130	CM129/130	CM131	CM132
♂ No.	0	0	0	0	1	3	1	1	0	1	2	1
♂ Min.					62.0°	52.5°	99.0°	110.0°		110.00°	76.0°	55.0
♂ Max.					62.0°	54.0°	99.0°	110.0°		110.00°	79.0°	55.0
♂ Mode												
♂ Median					62.00°	53.00°	99.00°	110.00°		110.00°	77.50°	55.00
♂ Mean					62.00°	53.17°	99.00°	110.00°		110.00°	77.50°	55.00
♂ S.D.						0.76					2.12	
♀ No.	3	7	6	7	11	11	9	7	4	10	9	2
♀ Min.	32.5	32.00	73.0°	69.0°	59.0°	49.0°	77.0°	117.0°	117.0°	117.00°	70.0°	55.0
♀ Max.	37.0	38.00	80.5°	87.0°	67.0°	60.0°	96.5°	137.0°	121.5°	137.00°	96.0°	58.0
♀ Mode		36.00			67.0°	54.0°	88.0°			117.00°		
♀ Median	36.00	36.00	78.50°	82.50°	62.50°	55.00°	91.00°	123.00°	119.50°	120.63°	88.00°	56.50
♀ Mean	35.17	35.07	77.42°	81.43°	63.45°	54.91°	89.56°	124.14°	119.38°	122.53°	86.67°	56.50
♀ S.D.	2.36	2.28	3.17	5.82	2.94	3.26	5.55	6.69	1.89	6.10	8.40	2.12
No.	3	7	6	7	12	14	10	8	4	11	11	3
Min.	32.5	32.00	73.0°	69.0°	59.0°	49.0°	77.0°	110.0°	117.0°	110.00°	70.0°	55.0
Max.	37.0	38.00	80.5°	87.0°	67.0°	60.0°	99.0°	137.0°	121.5°	137.00°	96.0°	58.0
Mode		36.00			67.0°	54.0°	88.0°			117.00°		55.0
Median	36.00	36.00	78.50°	82.50°	62.25°	54.00°	91.50°	122.00°	119.50°	120.00°	87.50°	55.00
Mean	35.17	35.07	77.42°	81.43°	63.33°	54.54°	90.50°	122.38°	119.38°	121.39°	85.00°	56.00
S.D.	2.36	2.28	3.17	5.82	2.84	2.97	6.03	7.96	1.89	6.91	8.41	1.73

	CM133 - 80a. Dental arch length of the mandible	CM134 - 80(1). External dental arch width (mx)	CM135 - 80(1). External dental arch width (md)	CM136 - *80(1)a. Canine dental arch breadth (mx)	CM137 - *80(1)a. Canine dental arch breadth (md)	CM138 - *80(1)b. 1st premolar dental arch breadth (mx)	CM139 - *80(1)b. 1st premolar dental arch breadth (md)	CM140 - *80(1)c. 2nd premolar dental arch breadth (mx)	CM141 - *80(1)c. 2nd premolar dental arch breadth (md)	CM142 - *80(1)d. 1st molar dental arch breadth (mx)	CM143 - *80(1)d. 1st molar dental arch breadth (md)	CM144 - *80(1)e. 2nd molar dental arch breadth (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	56.0		65.5	(41.0)	(31.0)	(46.0)	(40.0)		(47.0)		(54.0)	(61.0)
Abu Tabari 02/1-3	[(51.5)]		(60.5)	39.0	(32.5)		(39.0)		(43.5)		(53.0)	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(44.5)	(34.5)	(50.0)	43.0	(54.0)	(46.5)			
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		64.5		42.0	32.5	49.0		54.0		60.0		63.5
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(53.0)]		(65.0)	(46.0)	(30.5)	(54.0)		(59.0)			[(57.0)]	
Abu Tabari 02/28-22	[(54.0)]		(60.0)		(31.0)				[(44.0)]		[(53.0)]	
Abu Tabari 02/28-23	56.0		68.5			53.5		59.0	(49.5)		58.0	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		73.0		45.0						71.0		71.0
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(41.0)]											
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM133	CM134	CM135	CM136	CM137	CM138	CM139	CM140	CM141	CM142	CM143	CM144
♂ No.	0	1	0	1	0	0	0	0	0	1	0	1
♂ Min.		73.0		45.0						71.0		71.0
♂ Max.		73.0		45.0						71.0		71.0
♂ Mode												
♂ Median		73.00		45.00						71.00		71.00
♂ Mean		73.00		45.00						71.00		71.00
♂ S.D.												
♀ No.	6	1	5	5	6	5	3	4	5	1	5	2
♀ Min.	41.0	64.5	60.0	39.0	30.5	46.0	39.0	54.0	43.5	60.0	53.0	61.0
♀ Max.	56.0	64.5	68.5	46.0	34.5	54.0	43.0	59.0	49.5	60.0	58.0	63.5
♀ Mode	56.0				31.0			54.0			53.0	
♀ Median	53.50	64.50	65.00	42.00	31.75	50.00	40.00	56.50	46.50	60.00	54.00	62.25
♀ Mean	51.92	64.50	63.90	42.50	32.00	50.50	40.67	56.50	46.10	60.00	55.00	62.25
♀ S.D.	5.63		3.60	2.78	1.48	3.32	2.08	2.89	2.43		2.35	1.77
No.	6	2	5	6	6	5	3	4	5	2	5	3
Min.	41.0	64.5	60.0	39.0	30.5	46.0	39.0	54.0	43.5	60.0	53.0	61.0
Max.	56.0	73.0	68.5	46.0	34.5	54.0	43.0	59.0	49.5	71.0	58.0	71.0
Mode	56.0				31.0						53.0	
Median	53.50	68.75	65.00	43.25	31.75	50.00	40.00	56.50	46.50	65.50	54.00	63.50
Mean	51.92	68.75	63.90	42.92	32.00	50.50	40.67	56.50	46.10	65.50	55.00	65.17
S.D.	5.63	6.01	3.60	2.69	1.48	3.32	2.08	2.89	2.43	7.78	2.35	5.20

	CM145 - *80(1)e. 2nd molar dental arch breadth (md)	CM146 - *80(1)f. 3rd molar dental arch breadth (mx)	CM147 - *80(1)f. 3rd molar dental arch breadth (md)	CM148 - *80(4)a. Canine dental arch length (mx)	CM149 - *80(4)a. Canine dental arch length (md)	CM150 - *80(4)b. 1st premolar dental arch length (mx)	CM151 - *80(4)b. 1st premolar dental arch length (md)	CM152 - *80(4)c. 2nd premolar dental arch length (mx)	CM153 - *80(4)c. 2nd premolar dental arch length (md)	CM154 - *80(4)d. 1st molar dental arch length (mx)	CM155 - *80(4)d. 1st molar dental arch length (md)	CM156 - *80(4)e. 2nd molar dental arch length (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(61.5)		(65.5)	(15.0)	(10.5)	(23.5)	(16.0)		(23.0)	(38.0)	(34.0)	(51.0)
Abu Tabari 02/1-3	(59.0)			(14.0)	(10.5)	(19.5)	(15.0)		(23.5)		(32.0)	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(16.5)	(13.0)	(24.5)	18.0	(31.0)	25.0			
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		64.5		14.0	10.0	22.0		27.0		39.0		47.0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(65.0)		(65.0)	(12.5)		(19.0)		(26.0)				
Abu Tabari 02/28-22	[(58.0)]		(60.0)				[(15.0)]		[(22.0)]		[(31.0)]	
Abu Tabari 02/28-23	62.5		68.5			(25.0)		(32.0)	(25.0)		(35.5)	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		73.0		8.0						31.0		43.0
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1											25.0	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CM145	CM146	CM147	CM148	CM149	CM150	CM151	CM152	CM153	CM154	CM155	CM156
♂ No.	0	1	0	1	0	0	0	0	0	1	0	1
♂ Min.		73.0		8.0						31.0		43.0
♂ Max.		73.0		8.0						31.0		43.0
♂ Mode												
♂ Median		73.00		8.00						31.00		43.00
♂ Mean		73.00		8.00						31.00		43.00
♂ S.D.												
♀ No.	5	1	4	5	4	6	4	4	5	2	5	2
♀ Min.	58.0	64.5	60.0	12.5	10.0	19.0	15.0	26.0	22.0	38.0	25.0	47.0
♀ Max.	65.0	64.5	68.5	16.5	13.0	25.0	18.0	32.0	25.0	39.0	35.5	51.0
♀ Mode				14.0	10.5		15.0		25.0			
♀ Median	61.50	64.50	65.25	14.00	10.50	22.75	15.50	29.00	23.50	38.50	32.00	49.00
♀ Mean	61.20	64.50	64.75	14.40	11.00	22.25	16.00	29.00	23.70	38.50	31.50	49.00
♀ S.D.	2.80		3.52	1.47	1.35	2.54	1.41	2.94	1.30	0.71	4.03	2.83
No.	5	2	4	6	4	6	4	4	5	3	5	3
Min.	58.0	64.5	60.0	8.0	10.0	19.0	15.0	26.0	22.0	31.0	25.0	43.0
Max.	65.0	73.0	68.5	16.5	13.0	25.0	18.0	32.0	25.0	39.0	35.5	51.0
Mode				14.0	10.5		15.0		25.0			
Median	61.50	68.75	65.25	14.00	10.50	22.75	15.50	29.00	23.50	38.00	32.00	47.00
Mean	61.20	68.75	64.75	13.33	11.00	22.25	16.00	29.00	23.70	36.00	31.50	47.00
S.D.	2.80	6.01	3.52	2.93	1.35	2.54	1.41	2.94	1.30	4.36	4.03	4.00

	CM157 - *80(4)e. 2nd molar dental arch length (md)	CM 158 - *104. Maximum temporal line distance (l)	CM 159 - *104. Maximum temporal line distance (r)	CM158/159 - *104. Maximum temporal line distance (m)	CM 160 - *105. Minimal temporal line distance (l)	CM161 - *105. Minimal temporal line distance (r)	CM160/161 - *105. Minimal temporal line distance (m)	CM162 - Cranial thickness (*Os frontale*; medio-occipital to *Frontotemporale*)	CM163 - Cranial thickness (*Os parietale* lateral to *Bregma*)	CM164 - Cranial thickness (*Os parietale* lateral to supero-lateral to *Lambda*)
Abu Tabari 95/2-3										
Abu Tabari 02/1-2	(45.0)									
Abu Tabari 02/1-3	(42.0)									
Abu Tabari 02/1-5										
Abu Tabari 02/1-6										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8										
Abu Tabari 02/28-2										
Abu Tabari 02/28-3										
Abu Tabari 02/28-4										
Abu Tabari 02/28-5									5.0 (r; ca 20.0 occ *b*)	
Abu Tabari 02/28-7								[(6.0)] (l; ca 20.0 sup *ft*)		
Abu Tabari 02/28-8								5.0 (l; 25.0 med-occ *ft*)	(5.5) (r; *b*)	(6.5) (l, 25.0 sup-lat *l*)
Abu Tabari 02/28-11										
Abu Tabari 02/28-13										
Abu Tabari 02/28-14										
Abu Tabari 02/28-15									6.0 (l; 25.0 lat-occ *b*)	
Abu Tabari 02/28-20										
Abu Tabari 02/28-21										
Abu Tabari 02/28-22	[(44.0)]							5.5 (l; 25.0 med-occ *ft*)	5.5 (r; *b*)	(7.0) (l; 25.0 sup-lat *l*)
Abu Tabari 02/28-23	(46.0)							3.0 (l; 30.0 med-occ *ft*)	4.5 (r; *b*)	(4.0) (l; 25.0 sup-lat *l*)
Abu Tabari 03/31										
Abu Tabari 03/34-1										
Conical Hill 95/4								8.5 (r; ca 25.0 med-occ *ft*)		9.5 (l; ca 25.0 sup-lat *l*)
Conical Hill 95/4-1										
Conical Hill 02/3-4										
Djabarona 96/1-1								(3.0) (l; 25.0 med-occ *ft*)	(6.0) (r; *b*)	(4.0) (l; 25.0 sup-lat *l*)
Djabarona 96/1-2										
Djabarona 96-4										
Djabarona 96/120-3										
Djabarona 96/120-4									[(8.0)] (?; ca *b*)	
Djabarona 96/120-5										

	CM157	CM158	CM159	CM158/159	CM160	CM161	CM160/161	CM162	CM163	CM164
♂ No.	0	0	0	0	0	0	0	1	1	1
♂ Min.								8.5	8.0	9.5
♂ Max.								8.5	8.0	9.5
♂ Mode										
♂ Median								8.50	8.00	9.50
♂ Mean								8.50	8.00	9.50
♂ S.D.										
♀ No.	4	0	0	0	0	0	0	5	6	4
♀ Min.	42.0							3.0	4.5	4.0
♀ Max.	46.0							6.0	6.0	7.0
♀ Mode								3.0	5.5	4.0
♀ Median	44.50							5.00	5.50	5.25
♀ Mean	44.25							4.50	5.42	5.38
♀ S.D.	1.71							1.41	0.58	1.60
No.	4	0	0	0	0	0	0	6	7	5
Min.	42.0							3.0	4.5	4.0
Max.	46.0							8.5	8.0	9.5
Mode								3.0	5.5	4.0
Median	44.50							5.25	5.50	6.50
Mean	44.25							5.17	5.79	6.20
S.D.	1.71							2.07	1.11	2.31

	CM165 - Cranial thickness (*Os occipitale*; centre *Fossa cerebralis*)	CM166 - Cranial thickness (*Os occipitale*; centre *Fossa cerebellaris*)	CM167 - Cranial thickness (*Os occipitale*; centre of *Lambda*)	CM168 - Cranial thickness (maximum cranial thickness; location)	CM169 - Cranial thickness (minimum cranial thickness; location)	CM170 - Cranial thickness (location)	CM171 - Cranial thickness (location)
Abu Tabari 95/2-3							
Abu Tabari 02/1-2				7.5	7.5	7.5 (*O front*, r; sup *Lin temp*, front *Sut coron*)	
Abu Tabari 02/1-3	5.0 (r)	(2.0) (l)		(10.0) (*i*)	(2.0)	5.0 (*O front*; occ *C front*)	6.0 (var)
Abu Tabari 02/1-5				8.0	8.0	8.0 (indet)	
Abu Tabari 02/1-6							
Abu Tabari 02/1-7							
Abu Tabari 02/1-8				6.0	[(5.5)]	6.0 (indet.)	[(5.5)] (indet)
Abu Tabari 02/28-2				5.0	1.5	3.5 (*O front*)	5.0 (*O pariet*, l)
Abu Tabari 02/28-3							
Abu Tabari 02/28-4							
Abu Tabari 02/28-5				8.0	4.0	7.0 (*O pariet*, r; parasag; mid betw *b* & *l*)	4.5 (*O pariet*, l; *Tub pariet*)
Abu Tabari 02/28-7		[(3.5)] (l)		(8.0) (*i*)	[(3.0)] (var)	[(6.5)] (*O pariet*, l; cen *Tub pariet*)	[(5.0)] (*O pariet*, l; 25.0 lat-sup *ast*)
Abu Tabari 02/28-8	(4.0) (l)			(13.0) (*i*)	(2.5) (*Fac* temp, r)		
Abu Tabari 02/28-11							
Abu Tabari 02/28-13							
Abu Tabari 02/28-14							
Abu Tabari 02/28-15	4.5 (l)	4.0 (l)	8.0 (*Sulc sin sag sup*; *l*)	12.0 (*i*)	4.0 (cen *Fos cerebel*, l)	5.5 (*O pariet*, l; 25 front-sup *ast*)	
Abu Tabari 02/28-20		(2.0) (?)		[(6.0)]	(2.0)	[(~6.0)] (var indet)	
Abu Tabari 02/28-21				4.5	4.0	4.0 (*O temp*; r; ca 20.0 sup *Proc zyg*)	4.5 (*O pariet*; l?; near *Sulc sin sig*)
Abu Tabari 02/28-22	5.0 (l)	(3.0) (l)	(7.5)	(7.5)	3.0		
Abu Tabari 02/28-23	(4.0) (l)	1.5 (r)		(5.0) (para-sag)	1.5 (*Fos cerebel*; r)	4.5 (*O front*; cent)	
Abu Tabari 03/31							
Abu Tabari 03/34-1							
Conical Hill 95/4				(10.0) para-sag)	8.5		
Conical Hill 95/4-1							
Conical Hill 02/3-4	6.0 (l)			8.0 (*O pariet*)	6.0(*O front*)		
Djabarona 96/1-1				(6.0)	(3.0)		
Djabarona 96/1-2	(3.0) (l)			(4.5)	(3.0)	(4.0) (sup *Fos cerebr sin*)	(4.5) (*O pariet*, ?; para-sag)
Djabarona 96-4	[(4.0)] (l)			(5.5)	4.0	(4.5-5.5) (var indet)	
Djabarona 96/120-3							
Djabarona 96/120-4				[(9.0)]	[(7.0)]	[(9.0)] (*O pariet*, l; ca 30 sup *ast*)	[(~7.0)] (var indet)
Djabarona 96/120-5				(6.5)	(5.0)	(6.5) (para-sag)	(~5.0) (var indet)

	CM 165	CM 166	CM 167	CM 168	CM 169	CM 170	CM 171
♂ No.	2	1	0	6	6	3	1
♂ Min.	4.0	2.0		5.5	2.0	6.0	7.0
♂ Max.	6.0	2.0		10.0	8.5	9.0	7.0
♂ Mode				8.0			
♂ Median	5.00	2.00		8.00	6.50	8.00	7.00
♂ Mean	5.00	2.00		7.75	5.92	7.67	7.00
♂ S.D.	1.41			1.72	2.50	1.53	
♀ No.	6	5	2	12	12	9	6
♀ Min.	3.0	1.5	7.5	4.5	1.5	4.0	4.5
♀ Max.	5.0	4.0	8.0	13.0	7.5	7.5	6.0
♀ Mode	5.0			7.5	3.0	6.5	4.5
♀ Median	4.25	3.00	7.75	7.50	3.00	5.50	4.75
♀ Mean	4.25	2.80	7.75	7.71	3.54	5.61	4.92
♀ S.D.	0.76	1.04	0.35	2.77	1.57	1.32	0.58
No.	8	6	2	18	18	12	7
Min.	3.0	1.5	7.5	4.5	1.5	4.0	4.5
Max.	6.0	4.0	8.0	13.0	8.5	9.0	7.0
Mode	4.0	2.0		8.0	4.0	6.5	4.5
Median	4.25	2.50	7.75	7.75	4.00	6.25	5.00
Mean	4.44	2.67	7.75	7.72	4.33	6.13	5.21
S.D.	0.90	0.98	0.35	2.41	2.18	1.60	0.95

Appendix XII.B. Dental measurements

	DM001 - 81. Crown length UI1 (l)	DM002 - 81. Crown length UI1 (r)	DM001/2 - 81. Crown length UI1 (m)	DM003 - 81. Crown length UI2 (l)	DM004 - 81. Crown length UI2 (r)	DM003/4 - 81. Crown length UI2 (m)	DM005 - 81. Crown length UC (l)	DM006 - 81. Crown length UC (r)	DM005/6 - 81. Crown length UC (m)	DM007 - 81. Crown length UP1 (l)	DM008 - 81. Crown length UP1 (r)	DM007/8 - 81. Crown length UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(8.5)	(8.9)	8.70	(8.4)	(8.4)	8.40		(8.0)	8.00	(7.8)		7.80
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(11.0)	(10.9)	10.95	(8.7)	8.7	8.70	9.0	9.2	9.10	(7.5)	7.9	7.70
Abu Tabari 02/28-2	(10.8)	10.9	10.85		(8.8)	8.80						
02/28-2 (*Dentes decidui*)	(8.2)		8.20	(6.9)	(6.9)	6.90	(8.0)	8.2	8.10	(10.0)	(9.8)	9.90
Abu Tabari 02/28-3		10.5	10.50	8.5	(8.4)	8.45	(8.7)	(8.7)	8.70	(7.2)	[(7.9)]	7.55
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(11.1)	(11.1)	11.10	(7.8)	(7.9)	7.85	(8.6)	8.2	8.40	(7.9)	(7.8)	7.85
Abu Tabari 02/28-7		(9.5)	9.50				(8.2)	(8.3)	8.25	(7.8)	(8.1)	7.95
Abu Tabari 02/28-8	(9.8)	(9.9)	9.85				(7.5)	(7.1)	7.30	(8.0)	(8.2)	8.10
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	11.1	11.0	11.05	9.2	9.4	9.30	9.3	9.3	9.30	8.7	8.9	8.80
02/28-14 (*Dentes decidui*)							(8.5)	(8.0)	8.25	(8.1)	(8.4)	8.25
Abu Tabari 02/28-15	(8.7)	(8.6)	8.65	(7.7)	(7.4)	7.55	(8.0)	(7.9)	7.95	(7.1)	(7.4)	7.25
Abu Tabari 02/28-20		11.0	11.00									
Abu Tabari 02/28-21	(9.2)		9.20	(6.5)		6.50	(7.8)	(8.0)	7.90	[(7.6)]	(7.4)	7.50
Abu Tabari 02/28-22	9.1	(9.1)	9.10				(8.3)	(8.2)	8.25	(6.8)	(6.9)	6.85
Abu Tabari 02/28-23	9.1		9.10							(7.7)	(7.7)	7.70
Abu Tabari 03/31												
Abu Tabari 03/34-1	9.1	9.3	9.20	7.0	7.1	7.05	7.7	7.7	7.70	7.7	7.7	7.70
Conical Hill 95/4	(10.3)		10.30	(8.7)	8.7	8.70	9.1	9.2	9.15	(8.5)	(8.0)	8.25
Conical Hill 95/4-1										7.8		7.80
Conical Hill 02/3-4												
Djabarona 96/1-1	9.5		9.50				7.2	7.2	7.20	[(7.0)]		7.00
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

Abu Tabari 02/28-3's "DM045 - 81(1). Crown width UM2 (l)" was measured without including the parastyle. Abu Tabari 02/28-21's peg-shaped left UM3 was measured but not included in the descriptive statistics. Abu Tabari 02/28-2's and Abu Tabari 02/28-14's milk teeth (*Dentes decidui*) were treated in the same fashion.

	DM001	DM002	DM001/2	DM003	DM004	DM003/4	DM005	DM006	DM005/6	DM007	DM008	DM007/8
♂ No.	4	4	5	3	4	4	3	3	3	3	3	3
♂ Min.	10.3	10.9	10.30	8.7	8.7	8.70	9.0	9.2	9.10	7.5	7.9	7.70
♂ Max.	11.1	11.0	11.05	9.2	9.4	9.30	9.3	9.3	9.30	8.7	8.9	8.80
♂ Mode		10.9		8.7	8.7	8.70		9.2				
♂ Median	10.90	10.95	10.95	8.70	8.75	8.75	9.10	9.20	9.15	8.50	8.00	8.25
♂ Mean	10.80	10.95	10.83	8.87	8.90	8.88	9.13	9.23	9.18	8.23	8.27	8.25
♂ S.D.	0.36	0.06	0.31	0.29	0.34	0.29	0.15	0.06	0.10	0.64	0.55	0.55
♀ No.	9	8	11	6	5	6	9	10	10	12	9	12
♀ Min.	8.5	8.6	8.65	6.5	7.1	6.50	7.2	7.1	7.20	6.8	6.9	6.85
♀ Max.	11.1	11.1	11.10	8.5	8.4	8.45	8.7	8.7	8.70	8.0	8.2	8.10
♀ Mode	9.1		9.50		8.4			8.0	8.25	7.8	7.4	7.80
♀ Median	9.10	9.40	9.20	7.75	7.90	7.70	8.00	8.00	7.98	7.70	7.70	7.70
♀ Mean	9.34	9.61	9.49	7.65	7.84	7.63	8.00	7.93	7.97	7.53	7.68	7.59
♀ S.D.	0.76	0.84	0.74	0.78	0.59	0.77	0.50	0.49	0.47	0.40	0.40	0.38
No.	13	12	16	9	9	10	12	13	13	15	12	15
Min.	8.5	8.6	8.65	6.5	7.1	6.50	7.2	7.1	7.20	6.8	6.9	6.85
Max.	11.1	11.1	11.10	9.2	9.4	9.30	9.3	9.3	9.30	8.7	8.9	8.80
Mode	9.1	10.9	9.50	8.7	8.4	8.70		8.0	8.25	7.8	7.9	7.70
Median	9.50	10.20	9.68	8.40	8.40	8.43	8.25	8.20	8.25	7.70	7.85	7.70
Mean	9.79	10.06	9.91	8.06	8.31	8.13	8.28	8.23	8.25	7.67	7.83	7.72
S.D.	0.95	0.94	0.90	0.88	0.73	0.87	0.67	0.71	0.67	0.52	0.49	0.48

	DM009 - 81. Crown length UP2 (l)	DM010 - 81. Crown length UP2 (r)	DM009/10 - 81. Crown length UP2 (m)	DM011 - 81. Crown length UM1 (l)	DM012 - 81. Crown length UM1 (r)	DM011/12 - 81. Crown length UM1 (m)	DM013 - 81. Crown length UM2 (l)	DM014 - 81. Crown length UM2 (r)	DM013/14 - 81. Crown length UM2 (m)	DM015 - 81. Crown length UM3 (l)	DM016 - 81. Crown length UM3 (r)	DM015/16 - 81. Crown length UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(7.1)		7.10				(11.0)	(11.1)	11.05		(9.5)	9.50
Abu Tabari 02/1-3										(9.1)		9.10
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	(7.2)		7.20									
Abu Tabari 02/1-8	7.9	7.8	7.85	(11.2)	11.2	11.20	10.5	10.5	10.50	9.9	9.8	9.85
Abu Tabari 02/28-2				(13.5)	(13.4)	13.45	12.8	13.2	13.00			
02/28-2 (*Dentes decidui*)	(11.2)	(11.0)	11.10									
Abu Tabari 02/28-3	[(7.3)]	[(8.1)]	7.70	[(10.8)]	(10.9)	10.85	10.5		10.50			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(6.8)	(6.9)	6.85	(11.3)	(11.7)	11.50	(10.0)	(10.2)	10.10	(10.1)	(9.3)	9.70
Abu Tabari 02/28-7	(7.1)	(7.4)	7.25	(12.8)	(12.5)	12.65		(12.9)	12.90	(10.2)	(13.2)	11.70
Abu Tabari 02/28-8	(7.0)	(6.8)	6.90	(12.1)	(11.8)	11.95	(10.8)	(12.1)	11.45	(11.3)	(11.5)	11.40
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	8.4	8.6	8.50	13.5	13.6	13.55	12.8	12.7	12.75			
02/28-14 (*Dentes decidui*)	(10.4)	(10.6)	10.50									
Abu Tabari 02/28-15	(7.4)	(7.0)	7.20	(10.6)	(11.1)	10.85	(10.5)	(10.1)	10.30	(7.8)	(8.1)	7.95
Abu Tabari 02/28-20											(10.6)	10.60
Abu Tabari 02/28-21	[(6.9)]		6.90		[(10.6)]	10.60	(10.7)	(10.7)	10.70	4.7		
Abu Tabari 02/28-22	(7.3)	(7.0)	7.15		(10.7)	10.70	(10.2)	(11.0)	10.60	(10.4)	(10.2)	10.30
Abu Tabari 02/28-23	(7.2)	(6.6)	6.90	(11.4)	(11.2)	11.30	(10.0)	(10.4)	10.20	10.1	9.8	9.95
Abu Tabari 03/31												
Abu Tabari 03/34-1	7.5	7.8	7.65	11.6	11.6	11.60	11.7	11.7	11.70	9.6	9.0	9.30
Conical Hill 95/4	(8.3)		8.30	(13.1)	(12.5)	12.80	(12.1)	(11.1)	11.60	11.6	11.8	11.70
Conical Hill 95/4-1											10.5	10.50
Conical Hill 02/3-4												
Djabarona 96/1-1				11.3		11.30	10.3		10.30	9.0	9.3	9.15
Djabarona 96/1-2							[(11.6)]		11.60	10.6	10.3	10.45
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM009	DM010	DM009/10	DM011	DM012	DM011/12	DM013	DM014	DM013/14	DM015	DM016	DM015/16
♂ No.	4	2	4	4	4	4	4	4	4	2	3	3
♂ Min.	7.2	7.8	7.20	11.2	11.2	11.20	10.5	10.5	10.50	9.9	9.8	9.85
♂ Max.	8.4	8.6	8.50	13.5	13.6	13.55	12.8	13.2	13.00	11.6	11.8	11.70
♂ Mode				13.5			12.8					
♂ Median	8.10	8.20	8.08	13.30	12.95	13.13	12.45	11.90	12.18	10.75	10.60	10.60
♂ Mean	7.95	8.20	7.96	12.83	12.68	12.75	12.05	11.88	11.96	10.75	10.73	10.72
♂ S.D.	0.54	0.57	0.58	1.10	1.09	1.09	1.08	1.28	1.15	1.20	1.01	0.93
♀ No.	10	8	10	8	9	10	11	9	12	10	11	12
♀ Min.	6.8	6.6	6.85	10.6	10.6	10.60	10.0	10.1	10.10	7.8	8.1	7.95
♀ Max.	7.5	8.1	7.70	12.8	12.5	12.65	11.7	12.9	12.90	11.3	13.2	11.70
♀ Mode	7.1	7.0	6.90	11.3		10.85	10.5		10.30	10.1	9.3	
♀ Median	7.15	7.00	7.13	11.35	11.20	11.30	10.50	11.00	10.65	10.10	9.80	9.83
♀ Mean	7.16	7.20	7.16	11.49	11.34	11.33	10.66	11.13	10.95	9.82	10.06	9.92
♀ S.D.	0.22	0.52	0.31	0.70	0.61	0.63	0.58	0.94	0.83	0.99	1.37	1.04
No.	14	10	14	12	13	14	15	13	16	12	14	15
Min.	6.8	6.6	6.85	10.6	10.6	10.60	10.0	10.1	10.10	7.8	8.1	7.95
Max.	8.4	8.6	8.50	13.5	13.6	13.55	12.8	13.2	13.00	11.6	13.2	11.70
Mode	7.1	7.8	6.90	13.5	11.2	10.85	10.5	11.1	10.50	10.1	9.8	11.70
Median	7.25	7.20	7.20	11.50	11.60	11.40	10.70	11.10	10.88	10.10	10.00	9.95
Mean	7.39	7.40	7.39	11.93	11.75	11.74	11.03	11.36	11.20	9.98	10.21	10.08
S.D.	0.49	0.65	0.53	1.04	0.98	1.00	0.95	1.06	0.99	1.03	1.29	1.04

	DM017 - 81. Crown length LI1 (l)	DM018 - 81. Crown length LI1 (r)	DM017/18 - 81. Crown length LI1 (m)	DM019 - 81. Crown length LI2 (l)	DM020 - 81. Crown length LI2 (r)	DM019/20 - 81. Crown length LI2 (m)	DM021 - 81. Crown length LC (l)	DM022 - 81. Crown length LC (r)	DM021/22 - 81. Crown length LC (m)	DM023 - 81. Crown length LP1 (l)	DM024 - 81. Crown length LP1 (r)	DM023/24 - 81. Crown length LP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(5.1)]		5.10	(6.7)	[(6.4)]	6.55	(7.5)	(7.1)	7.30	(7.4)	(7.6)	7.50
Abu Tabari 02/1-3							(6.8)		6.80		(7.3)	7.30
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(6.1)	(6.2)	6.15	(7.2)	7.0	7.10	(7.9)	7.8	7.85	7.9	8.0	7.95
Abu Tabari 02/28-2	6.8	6.7	6.75	7.3	7.0	7.15	8.3	8.2	8.25			
02/28-2 (*Dentes decidui*)				5.5	5.8	5.65	(6.7)	7.0	6.85	(9.0)	(9.3)	9.15
Abu Tabari 02/28-3	(6.2)	(6.2)	6.20	(6.8)	(6.4)	6.60	(7.8)	(7.6)	7.70	[(7.0)]		7.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(6.4)	(6.5)	6.45	6.7	6.7	6.70	(7.8)	(7.8)	7.80	(8.0)	(8.0)	8.00
Abu Tabari 02/28-7				(6.2)	(6.3)	6.25	(7.0)	(6.9)	6.95	(7.2)	(7.2)	7.20
Abu Tabari 02/28-8				(6.7)	(6.7)	6.70	(6.6)		6.60	(7.8)	(7.8)	7.80
Abu Tabari 02/28-11												
Abu Tabari 02/28-13				(6.3)		6.30						
Abu Tabari 02/28-14	6.9	6.6	6.75	7.4	7.4	7.40	8.8	8.7	8.75	9.1	9.0	9.05
02/28-14 (*Dentes decidui*)		(5.8)	5.80	(6.1)	(5.8)	5.95	(7.0)	(7.3)	7.15	(10.1)	(9.7)	9.90
Abu Tabari 02/28-15	(5.7)	(5.6)	5.65	(5.7)	(5.5)	5.60	(6.8)	(6.9)	6.85	(7.5)		7.50
Abu Tabari 02/28-20				7.3		7.30						
Abu Tabari 02/28-21	(5.4)	(5.4)	5.40	(6.4)	(6.3)	6.35	(7.0)	(7.2)	7.10	(8.1)		8.10
Abu Tabari 02/28-22							(7.1)	(7.1)	7.10			
Abu Tabari 02/28-23	(5.7)	(5.7)	5.70	(6.2)		6.20	(6.8)		6.80	(7.3)		7.30
Abu Tabari 03/31												
Abu Tabari 03/34-1	5.8	5.8	5.80	6.2	6.1	6.15	7.4	7.3	7.35	8.1	8.1	8.10
Conical Hill 95/4								8.1	8.10	(8.1)	8.2	8.15
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		(5.7)	5.70				6.4	6.4	6.40	7.6	7.1	7.35
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM017	DM018	DM017/18	DM019	DM020	DM019/20	DM021	DM022	DM021/22	DM023	DM024	DM023/24
♂ No.	3	3	3	4	3	4	3	4	4	3	3	3
♂ Min.	6.1	6.2	6.15	7.2	7.0	7.10	7.9	7.8	7.85	7.9	8.0	7.95
♂ Max.	6.9	6.7	6.75	7.4	7.4	7.40	8.8	8.7	8.75	9.1	9.0	9.05
♂ Mode			6.75	7.3	7.0							
♂ Median	6.80	6.60	6.75	7.30	7.00	7.23	8.30	8.15	8.18	8.10	8.20	8.15
♂ Mean	6.60	6.50	6.55	7.30	7.13	7.24	8.33	8.20	8.24	8.37	8.40	8.38
♂ S.D.	0.44	0.26	0.35	0.08	0.23	0.14	0.45	0.37	0.38	0.64	0.53	0.59
♀ No.	7	7	8	9	8	9	12	9	12	10	7	11
♀ Min.	5.1	5.4	5.10	5.7	5.5	5.60	6.4	6.4	6.40	7.0	7.1	7.00
♀ Max.	6.4	6.5	6.45	6.8	6.7	6.70	7.8	7.8	7.80	8.1	8.1	8.10
♀ Mode	5.7	5.7	5.70	6.7	6.4	6.70	6.8	7.1	6.80	8.1		7.50
♀ Median	5.70	5.70	5.70	6.40	6.35	6.35	7.00	7.10	7.03	7.55	7.60	7.50
♀ Mean	5.76	5.84	5.75	6.40	6.30	6.34	7.08	7.14	7.06	7.60	7.59	7.56
♀ S.D.	0.44	0.38	0.42	0.36	0.38	0.35	0.45	0.41	0.42	0.39	0.40	0.38
No.	10	10	11	14	11	14	15	13	16	13	10	14
Min.	5.1	5.4	5.10	5.7	5.5	5.60	6.4	6.4	6.40	7.0	7.1	7.00
Max.	6.9	6.7	6.75	7.4	7.4	7.40	8.8	8.7	8.75	9.1	9.0	9.05
Mode	5.7	6.2	6.75	6.7	6.4	6.70	6.8	7.1	6.80	8.1	8.0	7.50
Median	5.95	6.00	5.80	6.70	6.40	6.58	7.10	7.30	7.20	7.80	7.90	7.65
Mean	6.01	6.04	5.97	6.65	6.53	6.60	7.33	7.47	7.36	7.78	7.83	7.74
S.D.	0.58	0.46	0.54	0.51	0.51	0.51	0.68	0.64	0.66	0.54	0.57	0.54

	DM025 - 81. Crown length LP2 (l)	DM026 - 81. Crown length LP2 (r)	DM025/26 - 81. Crown length LP2 (m)	DM027 - 81. Crown length LM1 (l)	DM028 - 81. Crown length LM1 (r)	DM027/28 - 81. Crown length LM1 (m)	DM029 - 81. Crown length LM2 (l)	DM030 - 81. Crown length LM2 (r)	DM029/30 - 81. Crown length LM2 (m)	DM031 - 81. Crown length LM3 (l)	DM032 - 81. Crown length LM3 (r)	DM031/32 - 81. Crown length LM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(7.6)	(7.7)	7.65	(11.6)	(11.4)	11.50	(11.7)	(11.5)	11.60	(10.8)	(10.9)	10.85
Abu Tabari 02/1-3	(6.4)	(6.7)	6.55	(10.9)		10.90	(11.3)	(11.6)	11.45	(10.9)		10.90
Abu Tabari 02/1-5	(7.8)		7.80				(11.9)		11.90			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	7.7	8.3	8.00	(11.8)	11.7	11.75	11.9	11.8	11.85		12.2	12.20
Abu Tabari 02/28-2				(12.4)	(13.0)	12.70	13.7	13.3	13.50			
02/28-2 (*Dentes decidui*)	(11.6)	(11.4)	11.50									
Abu Tabari 02/28-3	(7.4)	(7.4)	7.40	(11.0)		11.00	(11.0)	(11.1)	11.05	(11.9)	(11.8)	11.85
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(7.3)	(8.3)	7.80	12.3	(12.5)	12.40	12.0	11.4	11.70	11.9	12.0	11.95
Abu Tabari 02/28-7	(8.0)	(7.9)	7.95	(12.2)	(12.3)	12.25	(12.4)	(12.3)	12.35		(12.7)	12.70
Abu Tabari 02/28-8	(7.8)	(7.1)	7.45				(11.1)	(11.0)	11.05	(10.5)	(11.4)	10.95
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	8.9	9.1	9.00	14.6	14.4	14.50	13.7		13.70			
02/28-14 (*Dentes decidui*)	(12.3)	(12.1)	12.20									
Abu Tabari 02/28-15	(7.2)		7.20	(11.4)		11.40	(11.0)		11.00	(9.1)		9.10
Abu Tabari 02/28-20		(8.8)	8.80							[(13.4)]		13.40
Abu Tabari 02/28-21		(6.9)	6.90		[(10.0)]	10.00	(11.3)	(11.2)	11.25	(11.0)	(10.5)	10.75
Abu Tabari 02/28-22	(7.6)	(7.2)	7.40	(11.5)	(11.6)	11.55	(11.6)	(11.5)	11.55	(11.7)	(11.0)	11.35
Abu Tabari 02/28-23	(8.0)	(7.9)	7.95	11.5	(11.5)	11.50	(11.0)	(11.1)	11.05	(10.8)	(11.1)	10.95
Abu Tabari 03/31												
Abu Tabari 03/34-1	8.2	8.4	8.30	11.9	12.0	11.95	11.9	11.9	11.90	9.9	10.6	10.25
Conical Hill 95/4		(9.1)	9.10		12.8	12.80	13.0		13.00	12.8	12.6	12.70
Conical Hill 95/4-1												
Conical Hill 02/3-4					[(11.7)]	11.70		12.2	12.20			
Djabarona 96/1-1	6.9		6.90	[(11.7)]	12.2	11.95	[(11.5)]	11.7	11.60	12.1	11.7	11.90
Djabarona 96/1-2										13.1	13.9	13.50
Djabarona 96-4					[(11.7)]	11.70						
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM025	DM026	DM025/26	DM027	DM028	DM027/28	DM029	DM030	DM029/30	DM031	DM032	DM031/32
♂ No.	3	4	5	3	6	6	5	3	6	2	2	3
♂ Min.	7.7	8.3	7.80	11.8	11.7	11.70	11.9	11.8	11.85	12.8	12.2	12.20
♂ Max.	8.9	9.1	9.10	14.6	14.4	14.50	13.7	13.3	13.70	13.4	12.6	13.40
♂ Mode		9.1			11.7	11.70	11.9					
♂ Median	7.80	8.95	8.80	12.40	12.25	12.23	13.00	12.20	12.60	13.10	12.40	12.70
♂ Mean	8.13	8.83	8.54	12.93	12.55	12.53	12.84	12.43	12.69	13.10	12.40	12.77
♂ S.D.	0.67	0.38	0.60	1.47	1.08	1.09	0.90	0.78	0.82	0.42	0.28	0.60
♀ No.	11	10	12	10	8	11	12	11	12	12	11	13
♀ Min.	6.4	6.7	6.55	10.9	10.0	10.00	11.0	11.0	11.00	9.1	10.5	9.10
♀ Max.	8.2	8.4	8.30	12.3	12.5	12.40	12.4	12.3	12.35	13.1	13.9	13.50
♀ Mode	7.6	7.9	7.40	11.5		11.50	11.0	11.5	11.05	10.8		10.95
♀ Median	7.60	7.55	7.43	11.55	11.80	11.50	11.40	11.50	11.50	10.95	11.40	10.95
♀ Mean	7.49	7.55	7.45	11.60	11.69	11.49	11.48	11.48	11.46	11.14	11.60	11.31
♀ S.D.	0.53	0.58	0.51	0.45	0.79	0.68	0.45	0.39	0.41	1.07	1.00	1.11
No.	14	14	17	13	14	17	17	14	18	14	13	16
Min.	6.4	6.7	6.55	10.9	10.0	10.00	11.0	11.0	11.00	9.1	10.5	9.10
Max.	8.9	9.1	9.10	14.6	14.4	14.50	13.7	13.3	13.70	13.4	13.9	13.50
Mode	7.6	8.3	7.80	11.5	11.7	11.50	11.9	11.5	11.05	10.8		12.70
Median	7.65	7.90	7.80	11.70	11.85	11.70	11.70	11.55	11.65	11.35	11.70	11.60
Mean	7.63	7.91	7.77	11.91	12.06	11.86	11.88	11.69	11.87	11.42	11.72	11.58
S.D.	0.60	0.79	0.73	0.93	0.99	0.96	0.87	0.61	0.81	1.22	0.97	1.17

	DM033 - 81(1). Crown width UI1 (l)	DM034 - 81(1). Crown width UI1 (r)	DM033/34 - 81(1). Crown width UI1 (m)	DM035 - 81(1). Crown width UI2 (l)	DM036 - 81(1). Crown width UI2 (r)	DM035/36 - 81(1). Crown width UI2 (m)	DM037 - 81(1). Crown width UC (l)	DM038 - 81(1). Crown width UC (r)	DM037/38 - 81(1). Crown width UC (m)	DM039 - 81(1). Crown width UP1 (l)	DM040 - 81(1). Crown width UP1 (r)	DM039/40 - 81(1). Crown width UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(7.9)]	(8.1)	8.00	8.0	7.6	7.80		[(8.5)]	8.50			
Abu Tabari 02/1-3							(8.7)		8.70			
Abu Tabari 02/1-5		(8.9)	8.90									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7											(11.1)	11.10
Abu Tabari 02/1-8	7.5	7.3	7.40	6.7	6.7	6.70	9.4	9.3	9.35	9.6	10.1	9.85
Abu Tabari 02/28-2	9.0	9.0	9.00		(7.9)	7.90						
02/28-2 (*Dentes decidui*)	6.5		6.50	6.1	(6.4)	6.25	6.6	(6.7)	6.65	(10.3)	(10.3)	10.30
Abu Tabari 02/28-3		8.3	8.30	7.6	7.7	7.65	9.7	9.6	9.65			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	7.5	8.0	7.75	6.0	6.2	6.10	8.5	8.5	8.50		10.6	10.60
Abu Tabari 02/28-7		(7.5)	7.50				(8.6)	(8.8)	8.70	(10.2)	(10.0)	10.10
Abu Tabari 02/28-8	(7.8)	(7.5)	7.65				(8.4)	(8.7)	8.55	(10.2)		10.20
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	8.2	(8.3)	8.25	7.7	(7.2)	7.45	(9.8)	(9.7)	9.75	11.0	11.1	11.05
02/28-14 (*Dentes decidui*)							(7.3)		7.30	(10.3)		10.30
Abu Tabari 02/28-15	7.0	7.0	7.00	6.4	6.5	6.45	8.4	(8.4)	8.40	(9.5)	(9.5)	9.50
Abu Tabari 02/28-20		[(8.4)]	8.40									
Abu Tabari 02/28-21	7.4		7.40	6.3		6.30	7.7	8.0	7.85	[(9.8)]		9.80
Abu Tabari 02/28-22	7.4		7.40				7.9	8.1	8.00	[(9.0)]	(9.5)	9.25
Abu Tabari 02/28-23	7.4		7.40							10.6	10.4	10.50
Abu Tabari 03/31												
Abu Tabari 03/34-1	(7.9)	[(8.4)]	8.15	(6.9)	[(6.9)]	6.90	(9.3)	(9.2)	9.25	10.3	10.1	10.20
Conical Hill 95/4	8.1		8.10	8.7	8.1	8.40	9.5	9.5	9.50			
Conical Hill 95/4-1										10.2		10.20
Conical Hill 02/3-4												
Djabarona 96/1-1	(6.5)		6.50				6.7	6.7	6.70			
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM033	DM034	DM033/34	DM035	DM036	DM035/36	DM037	DM038	DM037/38	DM039	DM040	DM039/40
♂ No.	4	5	6	3	4	4	3	3	3	2	3	3
♂ Min.	7.5	7.3	7.40	6.7	6.7	6.70	9.4	9.3	9.35	9.6	10.1	9.85
♂ Max.	9.0	9.0	9.00	8.7	8.1	8.40	9.8	9.7	9.75	11.0	11.1	11.10
♂ Mode											11.1	
♂ Median	8.15	8.40	8.33	7.70	7.55	7.68	9.50	9.50	9.50	10.30	11.10	11.05
♂ Mean	8.20	8.38	8.34	7.70	7.48	7.61	9.57	9.50	9.53	10.30	10.77	10.67
♂ S.D.	0.62	0.68	0.58	1.00	0.64	0.72	0.21	0.20	0.20	0.99	0.58	0.71
♀ No.	9	7	11	6	5	6	10	10	11	8	6	9
♀ Min.	6.5	7.0	6.50	6.0	6.2	6.10	6.7	6.7	6.70	9.0	9.5	9.25
♀ Max.	7.9	8.4	8.30	8.0	7.7	7.80	9.7	9.6	9.65	10.6	10.6	10.60
♀ Mode	7.4	7.5	7.40				8.4	8.5	8.50	10.2	9.5	10.20
♀ Median	7.40	8.00	7.50	6.65	6.90	6.68	8.45	8.50	8.50	10.20	10.05	10.20
♀ Mean	7.42	7.83	7.55	6.87	6.98	6.87	8.39	8.45	8.44	9.98	10.02	10.04
♀ S.D.	0.45	0.51	0.51	0.79	0.66	0.72	0.83	0.78	0.76	0.51	0.45	0.44
No.	13	12	17	9	9	10	13	13	14	10	9	12
Min.	6.5	7.0	6.50	6.0	6.2	6.10	6.7	6.7	6.70	9.0	9.5	9.25
Max.	9.0	9.0	9.00	8.7	8.1	8.40	9.8	9.7	9.75	11.0	11.1	11.10
Mode	7.4	8.3	7.40				8.4	8.5	8.50	10.2	11.1	10.20
Median	7.50	8.20	7.75	6.90	7.20	7.18	8.60	8.70	8.63	10.20	10.10	10.20
Mean	7.66	8.06	7.83	7.14	7.20	7.17	8.66	8.69	8.67	10.04	10.27	10.20
S.D.	0.61	0.62	0.65	0.90	0.67	0.78	0.89	0.82	0.82	0.58	0.59	0.56

	DM041 - 81(1). Crown width UP2 (l)	DM042 - 81(1). Crown width UP2 (r)	DM041/42 - 81(1). Crown width UP2 (m)	DM043 - 81(1). Crown width UM1 (l)	DM044 - 81(1). Crown width UM1 (r)	DM043/44 - 81(1). Crown width UM1 (m)	DM045 - 81(1). Crown width UM2 (l)	DM046 - 81(1). Crown width UM2 (r)	DM045/46 - 81(1). Crown width UM2 (m)	DM047 - 81(1). Crown width UM3 (l)	DM048 - 81(1). Crown width UM3 (r)	DM047/48 - 81(1). Crown width UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2							[(12.9)]	[(12.8)]	12.85		[(11.9)]	11.90
Abu Tabari 02/1-3		(9.1)	9.10							(11.5)		11.50
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	(9.9)		9.90									
Abu Tabari 02/1-8	10.0	9.8	9.90	(12.1)	11.9	12.00	11.9	12.2	12.05	11.3	11.1	11.20
Abu Tabari 02/28-2				13.2	13.3	13.25	14.1	14.0	14.05			
02/28-2 (*Dentes decidui*)	(11.4)	(11.1)	11.25									
Abu Tabari 02/28-3							[(13.4)]		13.40			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	9.8	9.9	9.85		(12.7)	12.70	13.1	12.6	12.85	13.0	11.6	12.30
Abu Tabari 02/28-7	(9.7)	(9.9)	9.80	(12.7)	(12.4)	12.55		(12.4)	12.40	(12.7)	(12.6)	12.65
Abu Tabari 02/28-8	(9.8)	(9.6)	9.70	(11.6)	[(11.6)]	11.60	(11.1)	(11.7)	11.40	(11.4)	(11.3)	11.35
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	11.4	(12.0)	11.70	14.2	13.6	13.90	14.6	(14.0)	14.30			
02/28-14 (*Dentes decidui*)	(11.9)		11.90									
Abu Tabari 02/28-15	(9.7)	(9.6)	9.65	(11.7)	(11.3)	11.50	(11.6)	(11.3)	11.45	11.8	11.6	11.70
Abu Tabari 02/28-20											(12.4)	12.40
Abu Tabari 02/28-21	[(9.6)]		9.60							5.4		5.40
Abu Tabari 02/28-22	(9.8)		9.80	[(12.2)]		12.20	(12.3)	(12.4)	12.35	12.3	12.2	12.25
Abu Tabari 02/28-23	10.4	10.2	10.30	12.2	12.4	12.30	11.3	12.2	11.75	11.8	11.7	11.75
Abu Tabari 03/31												
Abu Tabari 03/34-1	9.9	10.4	10.15	12.6	(12.7)	12.65	12.5	12.3	12.40	11.8	12.1	11.95
Conical Hill 95/4										12.6	12.7	12.65
Conical Hill 95/4-1											11.9	11.90
Conical Hill 02/3-4												
Djabarona 96/1-1				11.5		11.50	11.1		11.10	11.3	11.2	11.25
Djabarona 96/1-2								[(13.1)]	13.10	14.0	13.6	13.80
Djabarona 96-4							[(12.9)]	[(12.3)]	12.60			
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM041	DM042	DM041/42	DM043	DM044	DM043/44	DM045	DM046	DM045/46	DM047	DM048	DM047/48
♂ No.	3	2	3	3	3	3	4	4	4	2	3	3
♂ Min.	9.9	9.8	9.90	12.1	11.9	12.00	11.9	12.2	12.05	11.3	11.1	11.20
♂ Max.	11.4	12.0	11.70	14.2	13.6	13.90	14.6	14.0	14.30	12.6	12.7	12.65
♂ Mode			9.90					14.0				
♂ Median	10.00	10.90	9.90	13.20	13.30	13.25	13.50	13.15	13.33	11.95	12.40	12.40
♂ Mean	10.43	10.90	10.50	13.17	12.93	13.05	13.38	13.13	13.25	11.95	12.07	12.08
♂ S.D.	0.84	1.56	1.04	1.05	0.91	0.97	1.21	1.01	1.10	0.92	0.85	0.78
♀ No.	8	7	9	7	6	8	9	9	11	10	11	12
♀ Min.	9.6	9.1	9.10	11.5	11.3	11.50	11.1	11.3	11.10	11.3	11.2	11.25
♀ Max.	10.4	10.4	10.30	12.7	12.7	12.70	13.4	13.1	13.40	14.0	13.6	13.80
♀ Mode	9.8	9.9	9.80	12.2	12.7	11.50	11.1	12.4	12.85	11.8	11.9	11.90
♀ Median	9.80	9.90	9.80	12.20	12.40	12.25	12.30	12.40	12.40	11.80	11.90	11.90
♀ Mean	9.84	9.81	9.77	12.07	12.18	12.13	12.14	12.31	12.28	12.16	11.97	12.03
♀ S.D.	0.24	0.43	0.34	0.48	0.59	0.52	0.89	0.54	0.76	0.85	0.67	0.69
No.	11	9	12	10	9	11	13	13	15	12	14	15
Min.	9.6	9.1	9.10	11.5	11.3	11.50	11.1	11.3	11.10	11.3	11.1	11.20
Max.	11.4	12.0	11.70	14.2	13.6	13.90	14.6	14.0	14.30	14.0	13.6	13.80
Mode	9.8	9.9	9.90	12.2	12.7	11.50	12.9	12.2	12.85	11.8	11.9	11.90
Median	9.80	9.90	9.83	12.20	12.40	12.30	12.50	12.40	12.40	11.80	11.90	11.90
Mean	10.00	10.06	9.95	12.40	12.43	12.38	12.52	12.56	12.54	12.13	11.99	12.04
S.D.	0.51	0.82	0.62	0.82	0.75	0.75	1.12	0.78	0.93	0.82	0.68	0.68

	DM049 - 81(1). Crown width LI1 (l)	DM050 - 81(1). Crown width LI1 (r)	DM049/50 - 81(1). Crown width LI1 (m)	DM051 - 81(1). Crown width LI2 (l)	DM052 - 81(1). Crown width LI2 (r)	DM051/52 - 81(1). Crown width LI2 (m)	DM053 - 81(1). Crown width LC (l)	DM054 - 81(1). Crown width LC (r)	DM053/54 - 81(1). Crown width LC (m)	DM055 - 81(1). Crown width LP1 (l)	DM056 - 81(1). Crown width LP1 (r)	DM055/56 - 81(1). Crown width LP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(6.7)	(6.7)	6.70	[(7.0)]	[(7.0)]	7.00	[(7.8)]	[(7.7)]	7.75	[(9.1)]	[(8.6)]	8.85
Abu Tabari 02/1-3	(6.0)	(6.1)	6.05	(6.6)	(6.6)	6.60	(7.9)	[(8.0)]	7.95	(8.4)	(8.5)	8.45
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	6.0	6.0	6.00	6.7	6.4	6.55		7.7	7.70	7.7	7.7	7.70
Abu Tabari 02/28-2	6.9	7.0	6.95	(7.5)	7.6	7.55	(9.0)	(9.2)	9.10			
02/28-2 (*Dentes decidui*)				5.2	5.1	5.15	6.3	6.1	6.20	8.8	8.3	8.55
Abu Tabari 02/28-3	6.8	6.8	6.80	7.5	(7.1)	7.30	8.9	8.9	8.90			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	6.3	6.3	6.30	6.5	6.2	6.35	(7.9)	7.8	7.85	9.2	9.4	9.30
Abu Tabari 02/28-7				(6.3)	(6.2)	6.25	(7.1)	(7.1)	7.10	(8.2)	(8.3)	8.25
Abu Tabari 02/28-8				(6.0)	(6.1)	6.05	(7)	(7.0)	7.00	(8.6)	(8.4)	8.50
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	6.7	(6.9)	6.80	6.9	6.4	6.65	9.2	(8.8)	9.00	10.2	10.0	10.10
02/28-14 (*Dentes decidui*)		[(5.3)]	5.30	[(5.3)]	(6.1)	5.70	7.0	6.5	6.75	(9.2)	(9.5)	9.35
Abu Tabari 02/28-15	5.8	5.8	5.80	6.2	5.5	5.85	7.3	(7.3)	7.30	(8.0)		8.00
Abu Tabari 02/28-20				(7.5)		7.50						
Abu Tabari 02/28-21	5.7	5.6	5.65	[(6.0)]	5.9	5.95	7.1	[(6.9)]	7.00	8.1		8.10
Abu Tabari 02/28-22							7.1	7.2	7.15			
Abu Tabari 02/28-23	7.2	(7.2)	7.20	6.3		6.30	7.4		7.40	8.3		8.30
Abu Tabari 03/31												
Abu Tabari 03/34-1	(6.4)	(5.9)	6.15		(6.3)	6.30	[(7.3)]	(7.7)	7.50	8.9	8.9	8.90
Conical Hill 95/4								9.1	9.10		8.7	8.70
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		[(5.0)]	5.00				[(6.0)]	6.4	6.20	7.2	7.3	7.25
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DM049	DM050	DM049/50	DM051	DM052	DM051/52	DM053	DM054	DM053/54	DM055	DM056	DM055/56
♂ No.	3	3	3	4	3	4	2	4	4	2	3	3
♂ Min.	6.0	6.0	6.00	6.7	6.4	6.55	9.0	7.7	7.70	7.7	7.7	7.70
♂ Max.	6.9	7.0	6.95	7.5	7.6	7.55	9.2	9.2	9.10	10.2	10.0	10.10
♂ Mode				7.5	6.4				9.10			
♂ Median	6.70	6.90	6.80	7.20	6.40	7.08	9.10	8.95	9.05	8.95	8.70	8.70
♂ Mean	6.53	6.63	6.58	7.15	6.80	7.06	9.10	8.70	8.73	8.95	8.80	8.83
♂ S.D.	0.47	0.55	0.51	0.41	0.69	0.54	0.14	0.69	0.68	1.77	1.15	1.21
♀ No.	8	9	9	9	9	10	12	11	12	10	7	10
♀ Min.	5.7	5.0	5.00	6.0	5.5	5.85	6.0	6.4	6.20	7.2	7.3	7.25
♀ Max.	7.2	7.2	7.20	7.5	7.1	7.30	8.9	8.9	8.90	9.2	9.4	9.30
♀ Mode				6.3	6.2	6.30	7.1	7.7	7.00			
♀ Median	6.35	6.10	6.15	6.30	6.20	6.30	7.30	7.30	7.35	8.35	8.50	8.38
♀ Mean	6.36	6.16	6.18	6.49	6.32	6.40	7.40	7.45	7.43	8.40	8.49	8.39
♀ S.D.	0.52	0.68	0.67	0.49	0.51	0.46	0.70	0.67	0.66	0.59	0.64	0.57
No.	11	12	12	13	12	14	14	15	16	12	10	13
Min.	5.7	5.0	5.00	6.0	5.5	5.85	6.0	6.4	6.20	7.2	7.3	7.25
Max.	7.2	7.2	7.20	7.5	7.6	7.55	9.2	9.2	9.10	10.2	10.0	10.10
Mode	6.7		6.80	7.5	6.4	6.30	7.1	7.7	9.10			
Median	6.40	6.20	6.23	6.60	6.35	6.45	7.35	7.70	7.60	8.35	8.55	8.45
Mean	6.41	6.28	6.28	6.69	6.44	6.59	7.64	7.79	7.75	8.49	8.58	8.49
S.D.	0.49	0.66	0.63	0.55	0.57	0.56	0.89	0.86	0.87	0.79	0.77	0.72

	DM057 - 81(1). Crown width LP2 (l)	DM058 - 81(1). Crown width LP2 (r)	DM057/58 - 81(1). Crown width LP2 (m)	DM059 - 81(1). Crown width LM1 (l)	DM060 - 81(1). Crown width LM1 (r)	DM059/60 - 81(1). Crown width LM1 (m)	DM061 - 81(1). Crown width LM2 (l)	DM062 - 81(1). Crown width LM2 (r)	DM061/62 - 81(1). Crown width LM2 (m)	DM063 - 81(1). Crown width LM3 (l)	DM064 - 81(1). Crown width LM3 (r)	DM063/64 - 81(1). Crown width LM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(9.3)	[(9.5)]	9.40	(12.0)	(11.8)	11.90	[(11.8)]	[(11.7)]	11.75	[(10.7)]	[(11.1)]	10.90
Abu Tabari 02/1-3	(8.6)	(8.8)	8.70	(10.8)	(10.9)	10.85	(10.7)	(10.3)	10.50	(10.7)		10.70
Abu Tabari 02/1-5	(9.8)		9.80				(11.9)		11.90			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	8.7	8.6	8.65	11.2	10.9	11.05	11.3	10.8	11.05		11.2	11.20
Abu Tabari 02/28-2				13.1	13.0	13.05	12.5	12.5	12.50			
02/28-2 (*Dentes decidui*)	10.7	10.7	10.70									
Abu Tabari 02/28-3	(9.4)		9.40				11.1		11.10	11.1	11.5	11.30
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	9.0	9.3	9.15	(12.0)	12.2	12.10	11.7	11.9	11.80	11.8	11.9	11.85
Abu Tabari 02/28-7	(8.7)	(8.7)	8.70	(11.2)		11.20	(11.0)	(10.8)	10.90		(10.5)	10.50
Abu Tabari 02/28-8	(9.6)	(9.0)	9.30	(11.1)		11.10	(10.9)	(10.6)	10.75	(9.9)	(10.3)	10.10
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10.5	(10.3)	10.40	13.1	14.0	13.55	13.1		13.10			
02/28-14 (*Dentes decidui*)	11.5	11.3	11.40									
Abu Tabari 02/28-15	(8.3)		8.30	(10.8)		10.80	(9.9)		9.90	9.9		9.90
Abu Tabari 02/28-20										[(11.9)]		11.90
Abu Tabari 02/28-21		[(8.6)]	8.60				(10.8)	[(10.9)]	10.85	10.6	10.6	10.60
Abu Tabari 02/28-22		(8.3)	8.30	(11.6)		11.60	(11.7)		11.70	10.9	10.8	10.85
Abu Tabari 02/28-23	8.7	8.6	8.65	11.3	11.4	11.35	11.1	11.0	11.05	11.0	11.0	11.00
Abu Tabari 03/31												
Abu Tabari 03/34-1	9.0	8.8	8.90	11.5	11.5	11.50	11.1	10.8	10.95	9.3	10.4	9.85
Conical Hill 95/4							12.7		12.70	11.0	10.9	10.95
Conical Hill 95/4-1												
Conical Hill 02/3-4								(10.9)	10.90		(11.1)	11.10
Djabarona 96/1-1	6.8		6.80		11.5	11.50	[(10.6)]	10.4	10.50	10.1	10.4	10.25
Djabarona 96/1-2								[(12.0)]	12.00	12.2	11.8	12.00
Djabarona 96-4					[(11.2)]	11.20	[(11.3)]		11.30			
Djabarona 96/120-3												
Djabarona 96/120-4										[(11.0)]	[(10.9)]	10.95
Djabarona 96/120-5												

	DM057	DM058	DM057/58	DM059	DM060	DM059/60	DM061	DM062	DM061/62	DM063	DM064	DM063/64
♂ No.	3	2	3	3	4	4	6	3	7	3	4	5
♂ Min.	8.7	8.6	8.65	11.2	10.9	11.05	11.3	10.8	10.90	11.0	10.9	10.95
♂ Max.	10.5	10.3	10.40	13.1	14.0	13.55	13.1	12.5	13.10	11.9	11.2	11.90
♂ Mode				13.1			11.3			11.0	10.9	10.95
♂ Median	9.80	9.45	9.80	13.10	12.10	12.13	12.20	10.90	11.90	11.00	11.00	11.10
♂ Mean	9.67	9.45	9.62	12.47	12.28	12.21	12.13	11.40	11.92	11.30	11.03	11.22
♂ S.D.	0.91	1.20	0.89	1.10	1.48	1.27	0.75	0.95	0.87	0.52	0.15	0.39
♀ No.	10	9	12	9	6	10	12	10	13	12	11	13
♀ Min.	6.8	8.3	6.80	10.8	10.9	10.80	9.9	10.3	9.90	9.3	10.3	9.85
♀ Max.	9.6	9.5	9.40	12.0	12.2	12.10	11.8	12.0	12.00	12.2	11.9	12.00
♀ Mode	9.0	8.8	9.40	12.0	11.5	11.50	11.1	10.8	10.50	10.7	10.4	
♀ Median	8.85	8.80	8.70	11.30	11.50	11.43	11.05	10.85	10.95	10.70	10.80	10.70
♀ Mean	8.74	8.84	8.68	11.37	11.55	11.39	11.03	11.04	11.06	10.68	10.94	10.75
♀ S.D.	0.79	0.37	0.71	0.45	0.43	0.42	0.53	0.61	0.61	0.82	0.58	0.67
No.	13	11	15	12	10	14	18	13	20	15	15	18
Min.	6.8	8.3	6.80	10.8	10.9	10.80	9.9	10.3	9.90	9.3	10.3	9.85
Max.	10.5	10.3	10.40	13.1	14.0	13.55	13.1	12.5	13.10	12.2	11.9	12.00
Mode	8.7	8.6	9.40	12.0	10.9	11.20	11.1	10.8	10.50	11.0	11.1	10.95
Median	9.00	8.80	8.70	11.40	11.50	11.43	11.20	10.90	11.08	10.90	10.90	10.93
Mean	8.95	8.95	8.87	11.64	11.84	11.63	11.40	11.12	11.36	10.81	10.96	10.88
S.D.	0.88	0.56	0.81	0.78	0.99	0.80	0.80	0.68	0.81	0.79	0.49	0.64

Appendix XII.C. Postcranial measurements

	PM001 - C1. *Clavicula* - Maximum length (l)	PM002 - C1. *Clavicula* - Maximum length (r)	PM001/2 - C1. *Clavicula* - Maximum length (m)	PM003 - C4. Vertical diameter of the mid-shaft (l)	PM004 - C4. Vertical diameter of the mid-shaft (r)	PM003/4 - C4. Vertical diameter of the mid-shaft (m)	PM005 - C5. Sagittal diameter of the mid-shaft (l)	PM006 - C5. Sagittal diameter of the mid-shaft (r)	PM005/6 - C5. Sagittal diameter of the mid-shaft (m)	PM007 - C6. Circumference of the mid-shaft (l)	PM008 - C6. Circumference of the mid-shaft (r)	PM007/8 - C6. Circumference of the mid-shaft (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(135.0)]	[(135.0)]	135.00	11.0	10.0	10.50	10.0	10.0	10.00	32.0	32.0	32.00
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3					(10.5)	10.50		(12.5)	12.50		(34.0)	34.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(130.0)]	[(125.0)]	127.50	10.0	10.0	10.00	12.0	(12.0)	12.00	36.0	(36.0)	36.00
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		[(110.0)]	110.00		(9.0)	9.00		(11.0)	11.00		(30.5)	30.50
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	[(130.0)]		130.00	9.5		9.50	12.0		12.00	33.0		33.00
Abu Tabari 02/28-20				[(9.5)]		9.50	[(13.5)]		13.50	[(37.0)]		37.00
Abu Tabari 02/28-21	[(125.0)]		125.00	(9.0)	(9.0)	9.00	(10.5)	(11.0)	10.75	(31.0)	(32.0)	31.50
Abu Tabari 02/28-22	[(132.5)]		132.50	8.5	9.5	9.00	11.0	11.5	11.25	31.0	33.0	32.00
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4					(11.0)	11.00		(13.5)	13.50		(37.5)	37.50
Djabarona 96/1-1	[(127.5)]		127.50	(9.0)		9.00	(9.5)		9.50	(32.0)		32.00
Djabarona 96/1-2					(9.0)	9.00		(12.0)	12.00		(31.0)	31.00
Djabarona 96-4												
Djabarona 96/120-3					(9.5)	9.50		(10.5)	10.50		(30.0)	30.00
Djabarona 96/120-4												
Djabarona 96/120-5												

All long bone lengths reported for Abu Tabari 02/01-8, -2 and -14 represent diaphyseal lengths. Furthermore, these individuals' measurements were not included in the descriptive statistics.

	PM001	PM002	PM001/2	PM003	PM004	PM003/4	PM005	PM006	PM005/6	PM007	PM008	PM007/8
♂ No.	0	0	0	1	1	2	1	1	2	1	1	2
♂ Min.				9.5	11.0	9.50	13.5	13.5	13.50	37.0	37.5	37.00
♂ Max.				9.5	11.0	11.00	13.5	13.5	13.50	37.0	37.5	37.50
♂ Mode									13.50			
♂ Median				9.50	11.00	10.25	13.50	13.50	13.50	37.00	37.50	37.25
♂ Mean				9.50	11.00	10.25	13.50	13.50	13.50	37.00	37.50	37.25
♂ S.D.						1.06			0.00			0.35
♀ No.	6	3	7	6	8	10	6	8	10	6	8	10
♀ Min.	125.0	110.0	110.00	8.5	9.0	9.00	9.5	10.0	9.50	31.0	30.0	30.00
♀ Max.	135.0	135.0	135.00	11.0	10.5	10.50	12.0	12.5	12.50	36.0	36.0	36.00
♀ Mode	130.0		127.50	9.0	9.0	9.00	12.0	12.0	12.00	32.0	32.0	32.00
♀ Median	130.00	125.00	127.50	9.25	9.50	9.25	10.75	11.25	11.13	32.00	32.00	32.00
♀ Mean	130.00	123.33	126.79	9.50	9.56	9.50	10.83	11.31	11.15	32.50	32.31	32.20
♀ S.D.	3.54	12.58	8.13	0.89	0.56	0.62	1.03	0.84	0.98	1.87	1.98	1.77
No.	6	3	7	7	9	12	7	9	12	7	9	12
Min.	125.0	110.0	110.00	8.5	9.0	9.00	9.5	10.0	9.50	31.0	30.0	30.00
Max.	135.0	135.0	135.00	11.0	11.0	11.00	13.5	13.5	13.50	37.0	37.5	37.50
Mode	130.0		127.50	9.5	9.0	9.00	12.0	12.0	12.00	32.0	32.0	32.00
Median	130.00	125.00	127.50	9.50	9.50	9.50	11.00	11.50	11.63	32.00	32.00	32.00
Mean	130.00	123.33	126.79	9.50	9.72	9.63	11.21	11.56	11.54	33.14	32.89	33.04
S.D.	3.54	12.58	8.13	0.82	0.71	0.71	1.38	1.07	1.27	2.41	2.53	2.54

	PM009 - *Clavicula* - Cortical thickness (ant.)	PM010 - *Clavicula* - Cortical thickness (post.)	PM011 - *Clavicula* - Cortical thickness (sup.)	PM012 - *Clavicula* - Cortical thickness (inf.)	PM013 - *Clavicula* - Cortical thickness (max.)	PM014 - *Clavicula* - Cortical thickness (min.)
Abu Tabari 95/2-3						
Abu Tabari 02/1-2	3.0 (l; acrom mid)	3.5 (l; acrom mid)	3.5 (l; acrom mid)	3.0 (l; acrom mid)	3.5	3.0
Abu Tabari 02/1-3						
Abu Tabari 02/1-5						
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3	(4.0) (r; stern mid)	(3.5) (r; stern mid)	(3.5) (r; stern mid)	(3.5) (r; stern mid)	(4.0)	(3.5)
Abu Tabari 02/28-4						
Abu Tabari 02/28-5						
Abu Tabari 02/28-7						
Abu Tabari 02/28-8	(3.0) (l; stern mid)	(3.0) (l; stern mid)	(3.0) (l; stern mid)	(3.0) (l; stern mid)	(3.0)	(3.0)
Abu Tabari 02/28-11						
Abu Tabari 02/28-13						
Abu Tabari 02/28-14						
Abu Tabari 02/28-15						
Abu Tabari 02/28-20	(3.0) (prob l; ca mid)	(4.0) (prob l; ca mid)	(2.5) (prob l; ca mid)	(2.5) (prob l; ca mid)	(4.0)	(2.5)
Abu Tabari 02/28-21	3.0 (r; ca 20.0 acrom mid)	3.5 (r; ca 20.0 acrom mid)	3.0 (r; ca 20.0 acrom mid)	2.5 (r; ca 20.0 acrom mid)	3.5	2.5
Abu Tabari 02/28-22	3.0 (r; ca mid)	3.5 (r; ca mid)	4.0 (r; ca mid)	2.5 (r; ca mid)	4.0	2.5
Abu Tabari 02/28-23						
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4			4.5 (r; ca mid)	3.5 (r; ca mid)	4.5	3.5
Djabarona 96/1-1						
Djabarona 96/1-2			(3.0) (r; ca mid)	(2.0) (r; ca mid)	(3.0)	(2.0)
Djabarona 96-4						
Djabarona 96/120-3	(4.0) (r; mid)		(3.0) (r; mid)		(4.0)	(3.0)
Djabarona 96/120-4						
Djabarona 96/120-5						

	PM009	PM010	PM011	PM012	PM013	PM014
♂ No.	1	1	2	2	2	2
♂ Min.	3.0	4.0	2.5	2.5	4.0	2.5
♂ Max.	3.0	4.0	4.5	3.5	4.5	3.5
♂ Mode						
♂ Median	3.00	4.00	3.50	3.00	4.25	3.00
♂ Mean	3.00	4.00	3.50	3.00	4.25	3.00
♂ S.D.			1.41	0.71	0.35	0.71
♀ No.	6	5	7	6	7	7
♀ Min.	3.0	3.0	3.0	2.0	3.0	2.0
♀ Max.	4.0	3.5	4.0	3.5	4.0	3.5
♀ Mode	3.0	3.5	3.0	3.0	4.0	3.0
♀ Median	3.00	3.50	3.00	2.75	3.50	3.00
♀ Mean	3.33	3.40	3.29	2.75	3.57	2.79
♀ S.D.	0.52	0.22	0.39	0.52	0.45	0.49
No.	7	6	9	8	9	9
Min.	3.0	3.0	2.5	2.0	3.0	2.0
Max.	4.0	4.0	4.5	3.5	4.5	3.5
Mode	3.0	3.5	3.0	2.5	4.0	3.0
Median	3.00	3.50	3.00	2.75	4.00	3.00
Mean	3.29	3.50	3.33	2.81	3.72	2.83
S.D.	0.49	0.32	0.61	0.53	0.51	0.50

	PM015 - H1. *Humerus* - Maximum length (l)	PM016 - H1. *Humerus* - Maximum length (r)	PM015/16 - H1. *Humerus* - Maximum length (m)	PM017 - H4a. Maximum bi-epicondylar width (l)	PM018 - H4a. Maximum bi-epicondylar width (r)	PM017/18 - H4a. Maximum bi-epicondylar width (m)	PM019 - H5. Maximum diameter of the mid-shaft (l)	PM020 - H5. Maximum diameter of the mid-shaft (r)	PM019/20 - H5. Maximum diameter of the mid-shaft (m)	PM021 - H6. Minimum diameter of the mid-shaft (l)	PM022 - H6. Minimum diameter of the mid-shaft (r)	PM021/22 - H6. Minimum diameter of the mid-shaft (m)
Abu Tabari 95/2-3	[(330.0)]		330.00				23.5		23.50	16.0		16.00
Abu Tabari 02/1-2	[(340.0)]	[(340.0)]	340.00				20.5	19.0	19.75	15.0	14.5	14.75
Abu Tabari 02/1-3	[(330.0)]	[(335.0)]	332.50				19.0	20.0	19.50	14.5	15.0	14.75
Abu Tabari 02/1-5	[(345.0)]	[(345.0)]	345.00					(21.5)	21.50		(15.5)	15.50
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		[(310.0)]	310.00					[(19.5)]	19.50		[(15.5)]	15.50
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		187.0	187.00	(37.0)		37.00	13.0	14.0	13.50	11.5	10.5	11.00
Abu Tabari 02/28-3		[(330.0)]	330.00				[(21.0)]	(19.0)	20.00	(17.0)	(17.0)	17.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(275.0)]	[(275.0)]	275.00				22.5	23.0	22.75	15.0	16.0	15.50
Abu Tabari 02/28-7	[(290.0)]		290.00				[(17.0)]		17.00	[(13.0)]		13.00
Abu Tabari 02/28-8		[(270.0)]	270.00									
Abu Tabari 02/28-11					[(60.0)]	60.00						
Abu Tabari 02/28-13												
Abu Tabari 02/28-14		[(155.0)]	155.00					[(13.5)]	13.50		[(13.0)]	13.00
Abu Tabari 02/28-15												
Abu Tabari 02/28-20							[(19.0)]	[(19.0)]	19.00	[(16.0)]	[(16.0)]	16.00
Abu Tabari 02/28-21	[(300.0)]		300.00				(20.5)	(21.0)	20.75	(18.0)	(16.0)	17.00
Abu Tabari 02/28-22	[(310.0)]		310.00				22.0	(22.0)	22.00	16.5	(16.0)	16.25
Abu Tabari 02/28-23							[(20.0)]		20.00	[(15.0)]		15.00
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4							[(16.0)]	[(16.0)]	16.00	[(14.5)]	[(14.5)]	14.50
Djabarona 96/1-1	[(310.0)]	[(310.0)]	310.00				(17.5)	(19.5)	18.50	(17.0)	(17.0)	17.00
Djabarona 96/1-2		[(285.0)]	285.00					(19.0)	19.00		(16.0)	16.00
Djabarona 96-4							[(18.0)]	[(18.0)]	18.00	[(16.0)]	[(16.0)]	16.00
Djabarona 96/120-3												
Djabarona 96/120-4		[(345.0)]	345.00					(19.5)	19.50		(13.0)	13.00
Djabarona 96/120-5												

	PM015	PM016	PM015/16	PM017	PM018	PM017/18	PM019	PM020	PM019/20	PM021	PM022	PM021/22
♂ No.	2	3	4	0	1	1	4	6	7	4	6	7
♂ Min.	330.0	310.0	310.00	0.0	60.0	60.00	16.0	16.0	16.00	14.5	13.0	13.00
♂ Max.	345.0	345.0	345.00	0.0	60.0	60.00	23.5	21.5	23.50	16.0	16.0	16.00
♂ Mode		345.0	345.00					19.5	19.50	16.0	15.5	16.00
♂ Median	337.50	345.00	337.50		60.00	60.00	18.50	19.25	19.50	16.00	15.50	15.50
♂ Mean	337.50	333.33	332.50		60.00	60.00	19.13	18.92	19.57	15.63	15.08	15.21
♂ S.D.	10.61	20.21	16.58				3.17	1.83	2.41	0.75	1.16	1.11
♀ No.	7	7	10	0	0	0	9	8	10	9	8	10
♀ Min.	275.0	270.0	270.00				17.0	19.0	17.00	13.0	14.5	13.00
♀ Max.	340.0	340.0	340.00				22.5	23.0	22.75	18.0	17.0	17.00
♀ Mode	310.0		310.00				20.5	19.0	20.00	15.0	16.0	17.00
♀ Median	310.00	310.00	305.00				20.50	19.75	19.88	15.00	16.00	15.75
♀ Mean	307.86	306.43	304.25				20.00	20.31	19.93	15.67	15.94	15.63
♀ S.D.	22.33	29.68	24.55				1.87	1.53	1.65	1.56	0.86	1.29
No.	9	10	14	0	1	1	13	14	17	13	14	17
Min.	275.0	270.0	270.00		60.0	60.00	16.0	16.0	16.00	13.0	13.0	13.00
Max.	345.0	345.0	345.00		60.0	60.00	23.5	23.0	23.50	18.0	17.0	17.00
Mode	330.0	345.0	310.00				20.5	19.0	19.50	16.0	16.0	16.00
Median	310.00	320.00	310.00		60.00	60.00	20.00	19.50	19.50	16.00	16.00	15.50
Mean	314.44	314.50	312.32		60.00	60.00	19.73	19.71	19.78	15.65	15.57	15.46
S.D.	23.64	29.10	25.62				2.24	1.75	1.93	1.33	1.05	1.20

	PM023 - H7. Least circumference of the shaft (l)	PM024 - H7. Least circumference of the shaft (r)	PM023/24 - H7. Least circumference of the shaft (m)	PM025 - H7a. Mid-shaft circumference (l)	PM026 - H7a. Mid-shaft circumference (r)	PM025/26 - H7a. Mid-shaft circumference (m)	PM027 - *H19. *Tuberositas deltoidea* breadth (l)	PM028 - *H19. *Tuberositas deltoidea* breadth (r)	PM027/28 - *H19. *Tuberositas deltoidea* breadth (m)	PM029 - *H20. *Crista tuberculi majoris* breadth (l)	PM030 - *H20. *Crista tuberculi majoris* breadth (r)	PM029/30 - *H20. *Crista tuberculi majoris* breadth (m)
Abu Tabari 95/2-3	59.0		59.00	65.0		65.00						
Abu Tabari 02/1-2	55.0	55.0	55.00	58.0	57.0	57.50				6.0	5.0	5.50
Abu Tabari 02/1-3	53.0	55.0	54.00	57.0	58.0	57.50		3.5	3.50			
Abu Tabari 02/1-5		(57.0)	57.00		(60.0)	60.00						
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					[(56.0)]	56.00						
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	38.0	38.0	38.00	38.0	40.0	39.00						
Abu Tabari 02/28-3		(56.0)	56.00	(61.0)	(58.0)	59.50						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	54.0	58.0	56.00	58.0	64.0	61.00				7.0	7.0	7.00
Abu Tabari 02/28-7				[(51.0)]		51.00						
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14					[(42.0)]	42.00						
Abu Tabari 02/28-15												
Abu Tabari 02/28-20				[(58.0)]	[(58.0)]	58.00						
Abu Tabari 02/28-21	(61.0)	(60.0)	60.50	(61.0)	(62.0)	61.50				[(6.5)]		6.50
Abu Tabari 02/28-22	58.0	(57.0)	57.50	62.0	(63.0)	62.50				9.0		9.00
Abu Tabari 02/28-23				[(55.0)]		55.00						
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4				[(50.0)]	[(50.0)]	50.00						
Djabarona 96/1-1	(53.0)	(59.0)	56.00	(55.0)	(60.0)	57.50				(5.0)		5.00
Djabarona 96/1-2		(52.0)	52.00		(56.0)	56.00						
Djabarona 96-4				[(55.0)]	[(55.0)]	55.00						
Djabarona 96/120-3												
Djabarona 96/120-4		(54.0)	54.00		(57.0)	57.00					(6.0)	6.00
Djabarona 96/120-5												

	PM023	PM024	PM023/24	PM025	PM026	PM025/26	PM027	PM028	PM027/28	PM029	PM030	PM029/30
♂ No.	1	2	3	4	6	7	0	0	0	0	1	1
♂ Min.	59.0	54.0	54.00	50.0	50.0	50.00					6.0	6.00
♂ Max.	59.0	57.0	59.00	65.0	60.0	65.00					6.0	6.00
♂ Mode												
♂ Median	59.00	55.50	57.00	56.50	56.50	57.00					6.00	6.00
♂ Mean	59.00	55.50	56.67	57.00	56.00	57.29					6.00	6.00
♂ S.D.		2.12	2.52	6.27	3.41	4.61						
♀ No.	6	8	8	9	8	10	0	1	1	5	2	5
♀ Min.	53.0	52.0	52.00	51.0	56.0	51.00		3.5	3.50	5.0	5.0	5.00
♀ Max.	61.0	60.0	60.50	62.0	64.0	62.50		3.5	3.50	9.0	7.0	9.00
♀ Mode	53.0	55.0	56.00	58.0	58.0	57.50						
♀ Median	54.50	56.50	56.00	58.00	59.00	57.50		3.50	3.50	6.50	6.00	6.50
♀ Mean	55.67	56.50	55.88	57.56	59.75	57.90		3.50	3.50	6.70	6.00	6.60
♀ S.D.	3.20	2.56	2.49	3.54	2.96	3.44				1.48	1.41	1.56
No.	7	10	11	13	14	17	0	1	1	5	3	6
Min.	53.0	52.0	52.00	50.0	50.0	50.00		3.5	3.50	5.0	5.0	5.00
Max.	61.0	60.0	60.50	65.0	64.0	65.00		3.5	3.50	9.0	7.0	9.00
Mode	53.0	55.0	56.00	58.0	58.0	57.50						
Median	55.00	56.50	56.00	58.00	58.00	57.50		3.50	3.50	6.50	6.00	6.25
Mean	56.14	56.30	56.09	57.38	58.14	57.65		3.50	3.50	6.70	6.00	6.50
S.D.	3.18	2.41	2.40	4.27	3.59	3.84				1.48	1.00	1.41

	PM031 - *Humerus* - Cortical thickness (ant.)	PM032 - *Humerus* - Cortical thickness (post.)	PM033 - *Humerus* - Cortical thickness (med.)	PM034 - *Humerus* - Cortical thickness (lat.)	PM035 - *Humerus* - Cortical thickness (max.)	PM036 - *Humerus* - Cortical thickness (min.)
Abu Tabari 95/2-3				5.5 (l; ca mid)	5.5	5.5
Abu Tabari 02/1-2	5.5 (l; ca 45.0 dist mid)	5.5 (l; ca 45.0 dist mid)	5.0 (l; ca 45.0 dist mid)	5.5 (l; ca 45.0 dist mid)	5.5	5.0
Abu Tabari 02/1-3		4.0 (r; mid)			4.0	4.0
Abu Tabari 02/1-5	(6.0) (r; ca 45.0 dist mid)	(4.0) (r; ca 45.0 dist mid)	(5.0) (r; ca 45.0 dist mid)	(4.0) (r; ca 45.0 dist mid)	(6.0)	(4.0)
Abu Tabari 02/1-6						
Abu Tabari 02/1-7	[(4.5)] (r; ca 10.0 prox mid)	(4.0) (r; ca 10.0 prox mid)	[(4.0)] (r; ca 10.0 prox mid)	[(3.5)] (r; ca 10.0 prox mid)	(6.0) (r; ca 10.0 prox mid)	[(3.5)]
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3	(5.0) (l; ca mid)	(3.5) (l; ca mid)	(4.5) (l; ca mid)	(4.0) (l; ca mid)	(5.0)	(3.5)
Abu Tabari 02/28-4						
Abu Tabari 02/28-5	3.5 (r; ca 30.0 prox mid)				3.5	3.5
Abu Tabari 02/28-7	[(3.0)] (l; ca mid)	[(3.0)] (l; ca mid)		[(3.5)] (l; ca mid)	[(3.5)]	[(3.0)]
Abu Tabari 02/28-8						
Abu Tabari 02/28-11	(5.5) (r; ca 80.0 prox *Fos coron*)	(4.5) (r; ca 80.0 prox *Fos coron*)	(8.0) (r; ca 80.0 prox *Fos coron*)	(5.0) (r; ca 80.0 prox *Fos coron*)	(8.0)	(4.5)
Abu Tabari 02/28-13						
Abu Tabari 02/28-14	[(4.0)] (r; ca mid)	[(3.5)] (r; ca mid)	[(3.5)] (r; ca mid)	[(3.5)] (r; ca mid)	[(4.0)]	[(3.5)]
Abu Tabari 02/28-15						
Abu Tabari 02/28-20					[(5.0)] (l/r?; ca mid)	[(5.0)]
Abu Tabari 02/28-21	4.0 (r; ca 50.0 prox mid)	3.0 (r; ca 50.0 prox mid)	3.0 (r; ca 50.0 prox mid)	3.0 (r; ca 50.0 prox mid)	4.0	3.0
Abu Tabari 02/28-22	4.0 (r; ca 40.0 prox mid)	3.0 (r; ca 40.0 prox mid)	3.0 (r; ca 40.0 prox mid)	3.5 (r; ca 40.0 prox mid)	4.0	3.0
Abu Tabari 02/28-23	[(3.5)] (l; prox mid)	(4.0) (l; prox mid)	[(3.5)] (l; prox mid)	[(4.5)] (l; prox mid)	(5.0) (l; prox mid)	(3.0) (l; prox mid)
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4		(4.0) (l/r; ca mid)			(4.0)	(4.0)
Djabarona 96/1-1					(4.5) (r; mid)	(4.5)
Djabarona 96/1-2	(3.0) (r; prox mid)	(6.0) (r; prox mid)			(6.0)	(3.0)
Djabarona 96-4					[(4.0)] (?)	[(3.5)] (?)
Djabarona 96/120-3						
Djabarona 96/120-4			(4.0) (r; mid)	(4.0) (r; mid)	(4.0)	(4.0)
Djabarona 96/120-5						

	PM031	PM032	PM033	PM034	PM035	PM036
♂ No.	3	4	4	5	8	8
♂ Min.	4.5	4.0	4.0	3.5	4.0	3.5
♂ Max.	6.0	4.5	8.0	5.5	8.0	5.5
♂ Mode		4.0	4.0	4.0	4.0	4.0
♂ Median	5.50	4.00	4.50	4.00	5.25	4.00
♂ Mean	5.33	4.13	5.25	4.40	5.31	4.25
♂ S.D.	0.76	0.25	1.89	0.82	1.39	0.71
♀ No.	8	8	5	6	10	10
♀ Min.	3.0	3.0	3.0	3.0	3.5	3.0
♀ Max.	5.5	6.0	5.0	5.5	6.0	5.0
♀ Mode	3.5	3.0	3.0	3.5	4.0	3.0
♀ Median	3.75	3.75	3.50	3.75	4.25	3.25
♀ Mean	3.94	4.00	3.80	4.00	4.50	3.55
♀ S.D.	0.90	1.16	0.91	0.89	0.85	0.72
No.	11	12	9	11	18	18
Min.	3.0	3.0	3.0	3.0	3.5	3.0
Max.	6.0	6.0	8.0	5.5	8.0	5.5
Mode	5.5	4.0	5.0	4.0	4.0	3.0
Median	4.00	4.00	4.00	4.00	4.75	3.75
Mean	4.32	4.04	4.44	4.18	4.86	3.86
S.D.	1.06	0.94	1.53	0.84	1.16	0.78

	PM037 - R1. *Radius* - Maximum length (l)	PM038 - R1. *Radius* - Maximum length (r)	PM037/38 - R1. *Radius* - Maximum length (m)	PM039 - R3. Minimum circumference (l)	PM040 - R3. Minimum circumference (r)	PM039/40 - R3. Minimum circumference (m)	PM041 - R4. Maximum transverse shaft diameter (l)	PM042 - R4. Maximum transverse shaft diameter (r)	PM041/42 - R4. Maximum transverse shaft diameter (m)	PM043 - R4a. Transverse mid-shaft diameter (l)	PM044 - R4a. Transverse mid-shaft diameter (r)	PM043/44 - R4a. Transverse mid-shaft diameter (m)
Abu Tabari 95/2-3								[(18.0)]	18.00			
Abu Tabari 02/1-2	247.5		247.50	37.0		37.00	14.5		14.50	13.5		13.50
Abu Tabari 02/1-3				34.0		34.00	14.0		14.00			
Abu Tabari 02/1-5	[(260.0)]		260.00	[(37.0)]		37.00	[(15.0)]		15.00	[(13.5)]		13.50
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2							10.5	11.0	10.75	(9.5)	(9.0)	9.25
Abu Tabari 02/28-3		[(250.0)]	250.00							(13.5)	(13.5)	13.50
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(225.0)]	[(225.0)]	225.00	35.5	37.5	36.50	15.5	15.5	15.50	14.5	15.0	14.75
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		[(220.0)]	220.00					[(14.0)]	14.00		[(12.5)]	12.50
Abu Tabari 02/28-11	[(235.0)]	[(235.0)]	235.00		37.0	37.00	(15.0)		15.00	(13.5)	(14.5)	14.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14											[(10.5)]	10.50
Abu Tabari 02/28-15		[(265.0)]	265.00		38.0	38.00		16.0	16.00		14.0	14.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	[(245.0)]		245.00	37.5	(37.0)	37.25	(16.0)	(15.5)	15.75	(15.0)	(15.0)	15.00
Abu Tabari 02/28-23											[(12.0)]	12.00
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(240.0)]	[(240.0)]	240.00	(36.0)		36.00	(13.5)	(14.0)	13.75	(12.0)	(10.0)	11.00
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		[(275.0)]	275.00								[(14.0)]	14.00
Djabarona 96/120-5												

	PM037	PM038	PM037/38	PM039	PM040	PM039/40	PM041	PM042	PM041/42	PM043	PM044	PM043/44
♂ No.	2	2	3	1	1	2	2	1	3	2	2	3
♂ Min.	235.0	235.0	235.00	37.0	37.0	37.00	15.0	18.0	15.00	13.5	14.0	13.50
♂ Max.	260.0	275.0	275.00	37.0	37.0	37.00	15.0	18.0	18.00	13.5	14.5	14.00
♂ Mode						37.00	15.0		15.00	13.5		14.00
♂ Median	247.50	255.00	260.00	37.00	37.00	37.00	15.00	18.00	15.00	13.50	14.25	14.00
♂ Mean	247.50	255.00	256.67	37.00	37.00	37.00	15.00	18.00	16.00	13.50	14.25	13.83
♂ S.D.	17.68	28.28	20.21			0.00	0.00		1.73	0.00	0.35	0.29
♀ No.	4	5	7	5	3	6	5	5	7	5	7	8
♀ Min.	225.0	220.0	220.00	34.0	37.0	34.00	13.5	14.0	13.75	12.0	10.0	11.00
♀ Max.	247.5	265.0	265.00	37.5	38.0	38.00	16.0	16.0	16.00	15.0	15.0	15.00
♀ Mode								15.5	14.00	13.5	15.0	13.50
♀ Median	242.50	240.00	245.00	36.00	37.50	36.75	14.50	15.50	14.50	13.50	13.50	13.50
♀ Mean	239.38	240.00	241.79	36.00	37.50	36.46	14.70	15.00	14.79	13.70	13.14	13.28
♀ S.D.	10.08	18.37	15.32	1.37	0.50	1.38	1.04	0.94	0.94	1.15	1.80	1.37
No.	6	7	10	6	4	8	7	6	10	7	9	11
Min.	225.0	220.0	220.00	34.0	37.0	34.00	13.5	14.0	13.75	12.0	10.0	11.00
Max.	260.0	275.0	275.00	37.5	38.0	38.00	16.0	18.0	18.00	15.0	15.0	15.00
Mode				37.0	37.0	37.00	15.0	15.5	14.00	13.5	15.0	13.50
Median	242.50	240.00	246.25	36.50	37.25	37.00	15.00	15.50	15.00	13.50	14.00	13.50
Mean	242.08	244.29	246.25	36.17	37.38	36.59	14.79	15.50	15.15	13.64	13.39	13.43
S.D.	11.88	20.30	17.29	1.29	0.48	1.19	0.86	1.48	1.26	0.94	1.64	1.18

	PM045 - R5. Minimum sagittal shaft diameter (l)	PM046 - R5. Minimum sagittal shaft diameter (r)	PM045/46 - R5. Minimum sagittal shaft diameter (m)	PM047 - R5a. Sagittal mid-shaft diameter (l)	PM048 - R5a. Sagittal mid-shaft diameter (r)	PM047/48 - R5a. Sagittal mid-shaft diameter (m)	PM049 - R5(4). Neck circumference (l)	PM050 - R5(4). Neck circumference (r)	PM049/50 - R5(4). Neck circumference (m)	PM051 - R5(5). Mid-shaft circumference (l)	PM052 - R5(5). Mid-shaft circumference (r)	PM051/52 - R5(5). Mid-shaft circumference (m)
Abu Tabari 95/2-3		[(12.0)]	12.00					(44.0)	44.00			
Abu Tabari 02/1-2	11.5		11.50	10.5		10.50	36.5		36.50	37.5		37.50
Abu Tabari 02/1-3	12.0		12.00									
Abu Tabari 02/1-5				(11.0)		11.00						
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	7.5	8.0	7.75	(7.5)	(7.5)	7.50				(25.5)	(25.5)	25.50
Abu Tabari 02/28-3				(11.0)	(10.5)	10.75				(35.0)	(35.0)	35.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	10.5	10.0	10.25	10.5	10.0	10.25				38.5	39.5	39.00
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		[(10.0)]	10.00		(10.0)	10.00					(34.0)	34.00
Abu Tabari 02/28-11	(10.5)		10.50	(10.5)	(10.5)	10.50	41.0		41.00	(38.0)		38.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				(8.5)	[(8.5)]	8.50				[(29.0)]	[(30.0)]	29.50
Abu Tabari 02/28-15		12.0	12.00		12.0	12.00					40.0	40.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	11.0	(10.5)	10.75	(11.5)	(10.5)	11.00				(40.0)	(39.0)	39.50
Abu Tabari 02/28-23					[(10.0)]	10.00					[(34.0)]	34.00
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1							(36.0)		36.00	[(36.0)]		36.00
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		(10.0)	10.00					(30.5)	30.50			
Djabarona 96/120-5												

	PM045	PM046	PM045/46	PM047	PM048	PM047/48	PM049	PM050	PM049/50	PM051	PM052	PM051/52
♂ No.	1	2	3	2	1	2	1	2	3	1	0	1
♂ Min.	10.5	10.0	10.00	10.5	10.5	10.50	41.0	30.5	30.50	38.0		38.00
♂ Max.	10.5	12.0	12.00	11.0	10.5	11.00	41.0	44.0	44.00	38.0		38.00
♂ Mode												
♂ Median	10.50	11.00	10.50	10.75	10.50	10.75	41.00	37.25	41.00	38.00		38.00
♂ Mean	10.50	11.00	10.83	10.75	10.50	10.75	41.00	37.25	38.50	38.00		38.00
♂ S.D.		1.41	1.04	0.35		0.35		9.55	7.09			
♀ No.	4	4	6	4	6	7	2	0	2	5	6	8
♀ Min.	10.5	10.0	10.00	10.5	10.0	10.00	36.0		36.00	35.0	34.0	34.00
♀ Max.	12.0	12.0	12.00	11.5	12.0	12.00	36.5		36.50	40.0	40.0	40.00
♀ Mode		10.0	12.00	10.5	10.0	10.00					34.0	34.00
♀ Median	11.25	10.25	11.13	10.75	10.25	10.50	36.25		36.25	37.50	37.00	36.75
♀ Mean	11.25	10.63	11.08	10.88	10.50	10.64	36.25		36.25	37.40	36.92	36.88
♀ S.D.	0.65	0.95	0.88	0.48	0.77	0.70	0.35		0.35	1.98	2.87	2.46
No.	5	6	9	6	7	9	3	2	5	6	6	9
Min.	10.5	10.0	10.00	10.5	10.0	10.00	36.0	30.5	30.50	35.0	34.0	34.00
Max.	12.0	12.0	12.00	11.5	12.0	12.00	41.0	44.0	44.00	40.0	40.0	40.00
Mode	10.5	10.0	12.00	10.5	10.5	10.50					34.0	34.00
Median	11.00	10.25	10.75	10.75	10.50	10.50	36.50	37.25	36.50	37.75	37.00	37.50
Mean	11.10	10.75	11.00	10.83	10.50	10.67	37.83	37.25	37.60	37.50	36.92	37.00
S.D.	0.65	0.99	0.88	0.41	0.71	0.63	2.75	9.55	5.16	1.79	2.87	2.33

	PM053 - *R5(7). Maximum circumference (l)	PM054 - *R5(7). Maximum circumference (r)	PM053/54 - *R5(7). Maximum circumference (m)	PM055 - *R10. Longitudinal *Tuberositas radii* diameter (l)	PM056 - *R10. Longitudinal *Tuberositas radii* diameter (r)	PM055/56 - *R10. Longitudinal *Tuberositas radii* diameter (m)	PM057 - *R11. Transverse *Tuberositas radii* diameter (l)	PM058 - *R11. Transverse *Tuberositas radii* diameter (r)	PM057/58 - *R11. Transverse *Tuberositas radii* diameter (m)
Abu Tabari 95/2-3		(46.0)	46.00						
Abu Tabari 02/1-2	39.0		39.00	24.0		24.00	11.5		11.50
Abu Tabari 02/1-3	40.0		40.00						
Abu Tabari 02/1-5									
Abu Tabari 02/1-6									
Abu Tabari 02/1-7									
Abu Tabari 02/1-8									
Abu Tabari 02/28-2	28.0	28.5	28.25				(7.5)		7.50
Abu Tabari 02/28-3									
Abu Tabari 02/28-4									
Abu Tabari 02/28-5	39.0	40.5	39.75	21.0		21.00	9.5		9.50
Abu Tabari 02/28-7									
Abu Tabari 02/28-8		[(38.0)]	38.00						
Abu Tabari 02/28-11	(41.0)		41.00	(19.5)		19.50	(10.5)		10.50
Abu Tabari 02/28-13									
Abu Tabari 02/28-14									
Abu Tabari 02/28-15		42.0	42.00						
Abu Tabari 02/28-20									
Abu Tabari 02/28-21									
Abu Tabari 02/28-22	(43.0)	(40.0)	41.50		23.0	23.00		12.0	12.00
Abu Tabari 02/28-23									
Abu Tabari 03/31									
Abu Tabari 03/34-1									
Conical Hill 95/4									
Conical Hill 95/4-1									
Conical Hill 02/3-4									
Djabarona 96/1-1	[(36.0)]		36.00	(25.0)		25.00	(11.0)		11.00
Djabarona 96/1-2									
Djabarona 96-4									
Djabarona 96/120-3									
Djabarona 96/120-4					[(21.0)]	21.00		[(10.5)]	10.50
Djabarona 96/120-5									

	PM053	PM054	PM053/54	PM055	PM056	PM055/56	PM057	PM058	PM057/58
♂ No.	1	1	2	1	1	2	1	1	2
♂ Min.	41.0	46.0	41.00	19.5	21.0	19.50	10.5	10.5	10.50
♂ Max.	41.0	46.0	46.00	19.5	21.0	21.00	10.5	10.5	10.50
♂ Mode									10.50
♂ Median	41.00	46.00	43.50	19.50	21.00	20.25	10.50	10.50	10.50
♂ Mean	41.00	46.00	43.50	19.50	21.00	20.25	10.50	10.50	10.50
♂ S.D.			3.54			1.06			0.00
♀ No.	5	4	7	3	1	4	3	1	4
♀ Min.	36.0	38.0	36.00	21.0	23.0	21.00	9.5	12.0	9.50
♀ Max.	43.0	42.0	42.00	25.0	23.0	25.00	11.5	12.0	12.00
♀ Mode	39.0								
♀ Median	39.00	40.25	39.75	24.00	23.00	23.50	11.00	12.00	11.25
♀ Mean	39.40	40.13	39.46	23.33	23.00	23.25	10.67	12.00	11.00
♀ S.D.	2.51	1.65	2.05	2.08		1.71	1.04		1.08
No.	6	5	9	4	2	6	4	2	6
Min.	36.0	38.0	36.00	19.5	21.0	19.50	9.5	10.5	9.50
Max.	43.0	46.0	46.00	25.0	23.0	25.00	11.5	12.0	12.00
Mode	39.0					21.00			10.50
Median	39.50	40.50	40.00	22.50	22.00	22.00	10.75	11.25	10.75
Mean	39.67	41.30	40.36	22.38	22.00	22.25	10.63	11.25	10.83
S.D.	2.34	2.99	2.81	2.56	1.41	2.09	0.85	1.06	0.88

	PM059 - *Radius* – Cortical thickness (ant.)	PM060 - *Radius* - Cortical thickness (post.)	PM061 - *Radius* - Cortical thickness (med.; *Margo interosseus*)	PM062 - *Radius* - Cortical thickness (lat.)	PM063 - *Radius* - Cortical thickness (max.)	PM064 - *Radius* - Cortical thickness (min.)
Abu Tabari 95/2-3		4.0 (r; prox mid)			4.0	4.0
Abu Tabari 02/1-2	4.5 (r; prox mid)	4.0 (r; prox mid)	4.0 (r; prox mid)	5.5 (r; prox mid)	5.5	4.0
Abu Tabari 02/1-3		3.5 (l; mid)			3.5	3.5
Abu Tabari 02/1-5	(3.5) (l; ca 25.0 prox mid)		(6.0) (l; ca 25.0 prox mid)		(6.0)	(3.5)
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3		(4.5) (l; ca 45.0 dist mid)	(3.5) (l; ca 45.0 dist mid)		(4.5)	(3.5)
Abu Tabari 02/28-4						
Abu Tabari 02/28-5	3.0 (r; ca 50.0 dist mid)				3.0	3.0
Abu Tabari 02/28-7						
Abu Tabari 02/28-8	(3.0) (r; ca 40.0 dist mid)	(4.0) (r; ca 40.0 dist mid)	(3.5) (r; ca 40.0 dist mid)	(3.0) (r; ca 40.0 dist mid)	(4.0)	(3.0)
Abu Tabari 02/28-11	(3.5) (l; ca 20.0 dist mid)	(4.0) (l; ca 20.0 dist mid)	(4.5) (l; ca 20.0 dist mid)	(3.5) (l; ca 20.0 dist mid)	(4.5)	(3.5)
Abu Tabari 02/28-13						
Abu Tabari 02/28-14						
Abu Tabari 02/28-15	(4.0) (r; ca 65.0 prox mid)	4.0 (r; ca 65.0 prox mid)	(4.0) (r; ca 65.0 prox mid)	(4.5) (r; ca 65.0 prox mid)	(4.5)	(4.0)
Abu Tabari 02/28-20						
Abu Tabari 02/28-21	2.5 (l; ca 25.0 dist *For nut*)				2.5	2.5
Abu Tabari 02/28-22	3.0 (r; ca 20.0 dist mid)	3.0 (r; ca 20.0 dist mid)	3.5 (r; ca 20.0 dist mid)	3.0 (r; ca 20.0 dist mid)	3.5	3.0
Abu Tabari 02/28-23	(3.0) (r; dist mid)	3.0 (r; dist mid)	5.0 (r; dist mid)	3.0 (r; dist mid)	5.0	3.0
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4						
Djabarona 96/1-1					(3.5) (r; dist mid)	(3.5)
Djabarona 96/1-2						
Djabarona 96-4						
Djabarona 96/120-3						
Djabarona 96/120-4			(4.0) (r; mid)	(4.5) (r; mid)	(4.5)	(4.0)
Djabarona 96/120-5						

	PM059	PM060	PM061	PM062	PM063	PM064
♂ No.	2	2	3	2	4	4
♂ Min.	3.5	4.0	4.0	3.5	4.0	3.5
♂ Max.	3.5	4.0	6.0	4.5	6.0	4.0
♂ Mode	3.5	4.0			4.5	4.0
♂ Median	3.50	4.00	4.50	4.00	4.50	3.75
♂ Mean	3.50	4.00	4.83	4.00	4.75	3.75
♂ S.D.	0.00	0.00	1.04	0.71	0.87	0.29
♀ No.	7	7	6	5	10	10
♀ Min.	2.5	3.0	3.5	3.0	2.5	2.5
♀ Max.	4.5	4.5	5.0	5.5	5.5	4.0
♀ Mode	3.0	4.0	3.5	3.0	3.5	3.0
♀ Median	3.00	4.00	3.75	3.00	3.75	3.25
♀ Mean	3.29	3.71	3.92	3.80	3.95	3.30
♀ S.D.	0.70	0.57	0.58	1.15	0.93	0.48
No.	9	9	9	7	14	14
Min.	2.5	3.0	3.5	3.0	2.5	2.5
Max.	4.5	4.5	6.0	5.5	6.0	4.0
Mode	3.0	4.0	4.0	3.0	4.5	3.5
Median	3.00	4.00	4.00	3.50	4.25	3.50
Mean	3.33	3.78	4.22	3.86	4.18	3.43
S.D.	0.61	0.51	0.83	0.99	0.95	0.47

	PM065 - U1. *Ulna* - Maximum length (l)	PM066 - U1. *Ulna* - Maximum length (r)	PM065/66 - U1. *Ulna* - Maximum length (m)	PM067 - U3. Least circumference (l)	PM068 - U3. Least circumference (r)	PM067/68 - U3. Least circumference (m)	PM069 - U3b. *Tuberositas ulnae* circumference (l)	PM070 - U3b. *Tuberositas ulnae* circumference (r)	PM069/70 - U3b. *Tuberositas ulnae* circumference (m)	PM071 - *U3c. Crest circumference (l)	PM072 - *U3c. Crest circumference (r)	PM071/72 - *U3c. Crest circumference (m)
Abu Tabari 95/2-3	[(270.0)]	[(270.0)]	270.00	[(43.0)]		43.00				(48.0)		48.00
Abu Tabari 02/1-2	[(267.5)]	(265.0)	266.25	34.5	33.0	33.75	56.0	55.0	55.50	48.5		48.50
Abu Tabari 02/1-3	[(265.0)]		265.00	[(33.0)]		33.00	(51.0)		51.00	47.5		47.50
Abu Tabari 02/1-5	[(275.0)]	[(275.0)]	275.00	(34.5)		34.50		(65.0)	65.00		45.0	45.00
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(149.0)		149.00	24.0	(23.0)	23.50				(34.0)	(32.5)	33.25
Abu Tabari 02/28-3		[(265.0)]	265.00		(34.0)	34.00	[(59.0)]		59.00	(44.0)	(45.0)	44.50
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(235.0)]	[(235.0)]	235.00	35.0	37.0	36.00	51.0	(51.0)	51.00	41.0	44.0	42.50
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		[(230.0)]	230.00									
Abu Tabari 02/28-11	[(250.0)]		250.00	35.0	35.0	35.00	[(54.0)]	56.0	55.00	41.0	44.0	42.50
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		[(280.0)]	280.00		36.0	36.00					47.0	47.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(240.0)]		240.00				(59.0)		59.00	(45.0)		45.00
Abu Tabari 02/28-22	[(260.0)]		260.00	(35.0)		35.00	(60.0)	57.5	58.75	(45.0)	46.0	45.50
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(260.0)]	[(260.0)]	260.00		(30.5)	30.50		(53.0)	53.00			
Djabarona 96/1-2				[(30.0)]	[(30.0)]	30.00						
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		[(280.0)]	280.00		(30.0)	30.00		(49.0)	49.00		[(39.0)]	39.00
Djabarona 96/120-5												

	PM065	PM066	PM065/66	PM067	PM068	PM067/68	PM069	PM070	PM069/70	PM071	PM072	PM071/72
♂ No.	3	3	4	3	2	4	1	3	3	2	3	4
♂ Min.	250.0	270.0	250.00	34.5	30.0	30.00	54.0	49.0	49.00	41.0	39.0	39.00
♂ Max.	275.0	280.0	280.00	43.0	35.0	43.00	54.0	65.0	65.00	48.0	45.0	48.00
♂ Mode												
♂ Median	270.00	275.00	272.50	35.00	32.50	34.75	54.00	56.00	55.00	44.50	44.00	43.75
♂ Mean	265.00	275.00	268.75	37.50	32.50	35.63	54.00	56.67	56.33	44.50	42.67	43.63
♂ S.D.	13.23	5.00	13.15	4.77	3.54	5.41		8.02	8.08	4.95	3.21	3.82
♀ No.	6	6	9	5	6	8	6	4	7	6	4	7
♀ Min.	235.0	230.0	230.00	30.0	30.0	30.00	51.0	51.0	51.00	41.0	44.0	42.50
♀ Max.	267.5	280.0	280.00	35.0	37.0	36.00	60.0	57.5	59.00	48.5	47.0	48.50
♀ Mode	260.0	265.0	265.00	35.0		36.00	51.0		51.00	45.0		
♀ Median	260.00	262.50	260.00	34.50	33.50	33.88	57.50	54.00	55.50	45.00	45.50	45.50
♀ Mean	254.58	255.83	255.69	33.50	33.42	33.53	56.00	54.13	55.32	45.17	45.50	45.79
♀ S.D.	13.64	19.34	16.76	2.12	2.84	2.29	4.10	2.78	3.69	2.66	1.29	2.04
No.	9	9	13	8	8	12	7	7	10	8	7	11
Min.	235.0	230.0	230.00	30.0	30.0	30.00	51.0	49.0	49.00	41.0	39.0	39.00
Max.	275.0	280.0	280.00	43.0	37.0	43.00	60.0	65.0	65.00	48.5	47.0	48.50
Mode	260.0	265.0	265.00	35.0	30.0	36.00	51.0		51.00	41.0	45.0	45.00
Median	260.00	265.00	265.00	34.75	33.50	34.25	56.00	55.00	55.25	45.00	45.00	45.00
Mean	258.06	262.22	259.71	35.00	33.19	34.23	55.71	55.21	55.63	45.00	44.29	45.00
S.D.	13.68	18.22	16.43	3.65	2.78	3.52	3.82	5.21	4.88	2.94	2.56	2.84

	PM073 - U11. Dorso-ventral shaft diameter (l)	PM074 - U11. Dorso-ventral shaft diameter (r)	PM073/74 - U11. Dorso-ventral shaft diameter (m)	PM075 - U12. Transverse shaft diameter (l)	PM076 - U12. Transverse shaft diameter (r)	PM075/76 - U12. Transverse shaft diameter (m)	PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)	PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)	PM077/78 - *U18. Longitudinal *Tuberositas ulnae* diameter (m)	PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)	PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)	PM079/80 - *U19. Transverse *Tuberositas ulnae* diameter (m)
Abu Tabari 95/2-3	(11.0)		11.00	(17.0)		17.00						
Abu Tabari 02/1-2	13.0		13.00	17.0		17.00	17.0	14.0	15.50	9.5	7.5	8.50
Abu Tabari 02/1-3	12.5		12.50	17.0		17.00	13.0		13.00	7.5		7.50
Abu Tabari 02/1-5		12.5	12.50		16.5	16.50	15.5		15.50	6.5		6.50
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(9.0)	10.0	9.50	(11.5)	11.5	11.50						
Abu Tabari 02/28-3	(12.0)	(12.0)	12.00	(17.0)	(17.5)	17.25					(10.0)	10.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	12.5	13.0	12.75	14.5	15.0	14.75	14.0	14.5	14.25	7.0	5.5	6.25
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	(12.5)	(12.0)	12.25	[(14.0)]	[(14.0)]	14.00						
Abu Tabari 02/28-11	(11.5)	(12.5)	12.00	(15.5)	(16.0)	15.75	(18.0)	(15.0)	16.50	(7.5)	(7.0)	7.25
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		13.5	13.50		17.0	17.00						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(16.0)		16.00	(12.0)		12.00	(12.5)		12.50	8.0		8.00
Abu Tabari 02/28-22	(14.5)	14.0	14.25	(15.0)	16.5	15.75		(18.0)	18.00		(10.0)	10.00
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(11.0)	(11.0)	11.00	(14.0)	(13.0)	13.50						
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		(11.0)	11.00		(15.0)	15.00		(15.0)	15.00		(15.0)	15.00
Djabarona 96/120-5												

	PM073	PM074	PM073/74	PM075	PM076	PM075/76	PM077	PM078	PM077/78	PM079	PM080	PM079/80
♂ No.	2	3	4	2	3	4	2	2	3	2	2	3
♂ Min.	11.0	11.0	11.00	15.5	15.0	15.00	15.5	15.0	15.00	6.5	7.0	6.50
♂ Max.	11.5	12.5	12.50	17.0	16.5	17.00	18.0	15.0	16.50	7.5	15.0	15.00
♂ Mode		12.5	11.00					15.0				
♂ Median	11.25	12.50	11.50	16.25	16.00	16.13	16.75	15.00	15.50	7.00	11.00	7.25
♂ Mean	11.25	12.00	11.63	16.25	15.83	16.06	16.75	15.00	15.67	7.00	11.00	9.58
♂ S.D.	0.35	0.87	0.75	1.06	0.76	0.88	1.77	0.00	0.76	0.71	5.66	4.71
♀ No.	8	6	9	8	6	9	4	3	5	4	4	6
♀ Min.	11.0	11.0	11.00	12.0	13.0	12.00	12.5	14.0	12.50	7.0	5.5	6.25
♀ Max.	16.0	14.0	16.00	17.0	17.5	17.25	17.0	18.0	18.00	9.5	10.0	10.00
♀ Mode	12.5	12.0		17.0		17.00					10.0	10.00
♀ Median	12.50	12.50	12.75	14.75	15.75	15.75	13.50	14.50	14.25	7.75	8.75	8.25
♀ Mean	13.00	12.58	13.03	15.06	15.50	15.36	14.13	15.50	14.65	8.00	8.25	8.38
♀ S.D.	1.56	1.11	1.44	1.82	1.79	1.90	2.02	2.18	2.21	1.08	2.18	1.46
No.	10	9	13	10	9	13	6	5	8	6	6	9
Min.	11.0	11.0	11.00	12.0	13.0	12.00	12.5	14.0	12.50	6.5	5.5	6.25
Max.	16.0	14.0	16.00	17.0	17.5	17.25	18.0	18.0	18.00	9.5	15.0	15.00
Mode	12.5	12.5	11.00	17.0	16.5	17.00		15.0	15.50	7.5	10.0	10.00
Median	12.50	12.50	12.50	15.25	16.00	15.75	14.75	15.00	15.25	7.50	8.75	8.00
Mean	12.65	12.39	12.60	15.30	15.61	15.58	15.00	15.30	15.03	7.67	9.17	8.78
S.D.	1.56	1.02	1.41	1.72	1.47	1.64	2.21	1.57	1.80	1.03	3.36	2.69

	PM081 - *Ulna* - Cortical thickness (ant.)	PM082 - *Ulna* - Cortical thickness (post.)	PM083 - *Ulna* - Cortical thickness (med.)	PM084 - *Ulna* - Cortical thickness (lat.; *Margo interosseus*)	PM085 - *Ulna* - Cortical thickness (max.)	PM086 - *Ulna* - Cortical thickness (min.)
Abu Tabari 95/2-3	4.5 (l; ca 60.0 dist *Inc troch*)				4.5	4.5
Abu Tabari 02/1-2	4.0 (r; 40.0-50.0 dist mid)	3.5 (r; 40.0-50.0 dist mid)	4.0 (r; 40.0-50.0 dist mid)	6.0 (r; 40.0-50.0 dist mid)	6.0	3.5
Abu Tabari 02/1-3		2.5 (l; at meas U3)			2.5	2.5
Abu Tabari 02/1-5	(3.0) (r; ca 20.0 dist mid)	(4.0) (r; ca 20.0 dist mid)	(3.0) (r; ca 20.0 dist mid)	(6.0) (r; ca 20.0 dist mid)	(6.0)	(3.0)
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3	(3.5) (r; ca 15.0 dist mid)	(3.0) (r; ca 15.0 dist mid)			(3.5)	(3.0)
Abu Tabari 02/28-4						
Abu Tabari 02/28-5						
Abu Tabari 02/28-7						
Abu Tabari 02/28-8	(3.5) (r; ca 10.0 dist mid)	(4.5) (r; ca 10.0 dist mid)	(4.0) (r; ca 10.0 dist mid)		(4.5)	(3.5)
Abu Tabari 02/28-11	(3.0) (l; ca mid)	4.5 (l; ca mid)	4.5 (l; ca mid)	(5.5) (l; ca mid)	(5.5)	(3.0)
Abu Tabari 02/28-13						
Abu Tabari 02/28-14						
Abu Tabari 02/28-15	4.0 (r; ca 25.0 prox mid)	(6.5) (r; ca 25.0 prox mid)	4.0 (r; ca 25.0 prox mid)	6.0 (r; ca 25.0 prox mid)	(6.5)	4.0
Abu Tabari 02/28-20						
Abu Tabari 02/28-21	4.5 (l; ca 50.0 dist mid)	3.0 (l; ca 50.0 dist mid)	3.0 (l; ca 50.0 dist mid)	3.5 (l; ca 50.0 dist mid)	4.5	3.5
Abu Tabari 02/28-22	3.5 (r; ca mid)	4.0 (r; ca mid)	4.0 (r; ca mid)	5.5 (r; ca mid)	5.5	2.5 (r; ca mid)
Abu Tabari 02/28-23						
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4						
Djabarona 96/1-1						
Djabarona 96/1-2					(3.0) (at meas U3)	(3.0)
Djabarona 96-4						
Djabarona 96/120-3						
Djabarona 96/120-4	(3.0) (r; mid)	(3.0) (r; mid)	(4.5) (r; mid)		(4.5)	(3.0)
Djabarona 96/120-5						

	PM081	PM082	PM083	PM084	PM085	PM086
♂ No.	4	3	3	2	4	4
♂ Min.	3.0	3.0	3.0	5.5	4.5	3.0
♂ Max.	4.5	4.5	4.5	6.0	6.0	4.5
♂ Mode	3.0		4.5		4.5	3.0
♂ Median	3.00	4.00	4.50	5.75	5.00	3.00
♂ Mean	3.38	3.83	4.00	5.75	5.13	3.38
♂ S.D.	0.75	0.76	0.87	0.35	0.75	0.75
♀ No.	6	7	5	4	8	8
♀ Min.	3.5	2.5	3.0	3.5	2.5	2.5
♀ Max.	4.5	6.5	4.0	6.0	6.5	4.0
♀ Mode	3.5	3.0	4.0	6.0	4.5	3.5
♀ Median	3.75	3.50	4.00	5.75	4.50	3.50
♀ Mean	3.83	3.86	3.80	5.25	4.50	3.31
♀ S.D.	0.41	1.35	0.45	1.19	1.44	0.46
No.	10	10	8	6	12	12
Min.	3.0	2.5	3.0	3.5	2.5	2.5
Max.	4.5	6.5	4.5	6.0	6.5	4.5
Mode	3.0	3.0	4.0	6.0	4.5	3.0
Median	3.50	3.75	4.00	5.75	4.50	3.25
Mean	3.65	3.85	3.88	5.42	4.71	3.33
S.D.	0.58	1.16	0.58	0.97	1.25	0.54

	PM087 - P22. Maximum *Acetabulum* breadth (l)	PM088 - P22. Maximum *Acetabulum* breadth (r)	PM087/88 - P22. Maximum acetabulum breadth (m)	PM089 - F1. *Femur* - Maximum length (l)	PM090 - F1. *Femur* - Maximum length (r)	PM089/90 - F1. *Femur* - Maximum length (m)	PM091 - F2. Physiological length (l)	PM092 - F2. Physiological length (r)	PM091/92 - F2. Physiological length (m)	PM093 - F6. Anterior-posterior mid-shaft diameter (l)	PM094 - F6. Anterior-posterior mid-shaft diameter (r)	PM093/94 - F6. Anterior-posterior mid-shaft diameter (m)
Abu Tabari 95/2-3		(51.0)	51.00	[(460.0)]	[(460.0)]	460.00				29.0	31.5	30.25
Abu Tabari 02/1-2				[(480.0)]	[(480.0)]	480.00				29.0	30.0	29.50
Abu Tabari 02/1-3					[(430.0)]	430.00				[(30.0)]		30.00
Abu Tabari 02/1-5	(43.5)		43.50	[(455.0)]	[(455.0)]	455.00				(27.5)	(29.0)	28.25
Abu Tabari 02/1-6												
Abu Tabari 02/1-7				[(380.0)]		380.00				[(26.5)]		26.50
Abu Tabari 02/1-8				[(300.0)]	[(300.0)]	300.00				18.0	(18.0)	18.00
Abu Tabari 02/28-2				256.0	258.0	257.00				16.5	17.5	17.00
Abu Tabari 02/28-3	[(44.0)]	[(44.0)]	44.00		[(460.0)]	460.00				(30.0)	(30.5)	30.25
Abu Tabari 02/28-4										[(33.0)]		33.00
Abu Tabari 02/28-5				[(395.0)]		395.00				(26.0)	29.0	27.50
Abu Tabari 02/28-7												
Abu Tabari 02/28-8				[(360.0)]		360.00				[(26.0)]		26.00
Abu Tabari 02/28-11					[(420.0)]	420.00					[(28.0)]	28.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15				[(490.0)]	[(490.0)]	490.00					[(29.0)]	29.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21				[(425.0)]		425.00				(31.0)		31.00
Abu Tabari 02/28-22					[(445.0)]	445.00				[(29.0)]	[(29.5)]	29.25
Abu Tabari 02/28-23												
Abu Tabari 03/31				[(510.0)]		510.00				[(33.0)]		33.00
Abu Tabari 03/34-1					[(450.0)]	450.00					(24.0)	24.00
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4				[(455.0)]	[(455.0)]	455.00					(29.0)	29.00
Djabarona 96/1-1				[(430.0)]	[(430.0)]	430.00				(27.5)	(27.0)	27.25
Djabarona 96/1-2											(23.0)	23.00
Djabarona 96-4					[(460.0)]	460.00					(30.0)	30.00
Djabarona 96/120-3												
Djabarona 96/120-4										[(27.0)]		27.00
Djabarona 96/120-5												

	PM087	PM088	PM087/88	PM089	PM090	PM089/90	PM091	PM092	PM091/92	PM093	PM094	PM093/94
♂ No.	1	1	2	5	5	7	0	0	0	6	5	9
♂ Min.	43.5	51.0	43.50	380.0	420.0	380.00				26.5	28.0	26.50
♂ Max.	43.5	51.0	51.00	510.0	460.0	510.00				33.0	31.5	33.00
♂ Mode				455.0	460.0	460.00				33.0	29.0	33.00
♂ Median	43.50	51.00	47.25	455.00	455.00	455.00				28.25	29.00	29.00
♂ Mean	43.50	51.00	47.25	452.00	450.00	448.57				29.33	29.50	29.44
♂ S.D.			5.30	46.45	16.96	40.07				2.96	1.32	2.36
♀ No.	1	1	1	6	7	10	0	0	0	8	8	11
♀ Min.	44.0	44.0	44.00	360.0	430.0	360.00				26.0	23.0	23.00
♀ Max.	44.0	44.0	44.00	490.0	490.0	490.00				31.0	30.5	31.00
♀ Mode					430.0	430.00				29.0	29.0	
♀ Median	44.00	44.00	44.00	427.50	450.00	437.50				29.00	29.00	29.00
♀ Mean	44.00	44.00	44.00	430.00	455.00	436.50				28.56	27.75	27.89
♀ S.D.				49.50	23.27	38.52				1.88	2.83	2.62
No.	2	2	3	11	12	17	0	0	0	14	13	20
Min.	43.5	44.0	43.50	360.0	420.0	360.00				26.0	23.0	23.00
Max.	44.0	51.0	51.00	510.0	490.0	510.00				33.0	31.5	33.00
Mode				455.0	460.0	460.00				29.0	29.0	30.25
Median	43.75	47.50	44.00	455.00	455.00	450.00				29.00	29.00	29.00
Mean	43.75	47.50	46.17	440.00	452.92	441.47				28.89	28.42	28.59
S.D.	0.35	4.95	4.19	47.12	20.17	38.40				2.33	2.46	2.57

	PM095 - F7. Medio-lateral mid-shaft diameter (l)	PM096 - F7. Medio-lateral mid-shaft diameter (r)	PM095/96 - F7. Medio-lateral mid-shaft diameter (m)	PM097 - F8. Mid-shaft circumference (l)	PM098 - F8. Mid-shaft circumference (r)	PM097/98 - F8. Mid-shaft circumference (m)	PM099 - F9. Subtrochanteric transverse diameter (l)	PM100 - F9. Subtrochanteric transverse diameter (r)	PM099/100 - F9. Subtrochanteric transverse diameter (m)	PM101 - F10. Subtrochanteric sagittal diameter (l)	PM102 - F10. Subtrochanteric sagittal diameter (r)	PM101/102 - F10. Subtrochanteric sagittal diameter (m)
Abu Tabari 95/2-3		23.0	23.00		96.0	96.00						
Abu Tabari 02/1-2	25.5	25.0	25.25	85.0	86.0	85.50	26.5	25.5	26.00	24.0	23.5	23.75
Abu Tabari 02/1-3	[(23.0)]		23.00	[(81.0)]		81.00	(26.5)		26.50	(21.0)		21.00
Abu Tabari 02/1-5	(23.0)	23.0	23.00	(78.0)	(78.0)	78.00	(27.0)	(28.0)	27.50		(24.5)	24.50
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	[(23.0)]		23.00	[(76.0)]		76.00	[(24.5)]		24.50	[(17.0)]		17.00
Abu Tabari 02/1-8	17.5	(18.0)	17.75	52.0	(53.0)	52.50		(18.5)	18.50		(16.0)	16.00
Abu Tabari 02/28-2	14.5	14.5	14.50	48.5	49.5	49.00	22.0	23.0	22.50	(20.0)	17.5	18.75
Abu Tabari 02/28-3	(23.5)	(23.5)	23.50	(83.0)	(81.0)	82.00	(30.5)	(30.0)	30.25	(23.5)	(23.0)	23.25
Abu Tabari 02/28-4	[(28.0)]		28.00	[(94.0)]		94.00						
Abu Tabari 02/28-5	(24.0)	(25.5)	24.75		82.0	82.00	(26.5)		26.50	(19.0)	19.0	19.00
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	[(19.5)]		19.50	[(70.0)]		70.00	[(25.0)]		25.00	[(19.0)]		19.00
Abu Tabari 02/28-11		[(25.0)]	25.00		(77.0)	77.00		(28.0)	28.00		(20.0)	20.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	(16.0)	(16.0)	16.00	(51.0)	(53.0)	52.00						
Abu Tabari 02/28-15		(27.5)	27.50		[(82.0)]	82.00	(28.0)	[(27.0)]	27.50	(25.0)		25.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(26.0)]		26.00	(80.0)		80.00	(26.0)		26.00	[(22.5)]		22.50
Abu Tabari 02/28-22	27.0	[(26.0)]	26.50	(82.0)	(87.0)	84.50	29.0	28.0	28.50	(23.0)	24.0	23.50
Abu Tabari 02/28-23												
Abu Tabari 03/31	(30.0)		30.00	[(97.0)]		97.00	36.0		36.00	27.0		27.00
Abu Tabari 03/34-1		19.5	19.50		(68.0)	68.00	(24.0)	25.0	24.50	(18.5)	19.0	18.75
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4		(22.0)	22.00		(80.0)	80.00	(27.0)		27.00	(24.0)		24.00
Djabarona 96/1-1	(22.0)	(21.0)	21.50	(74.0)	(74.0)	74.00	(26.0)	(26.0)	26.00	(22.0)	(22.0)	22.00
Djabarona 96/1-2		(19.0)	19.00		(66.0)	66.00		(26.0)	26.00		(21.0)	21.00
Djabarona 96-4		(23.0)	23.00		(85.0)	85.00		(27.0)	27.00		(24.0)	24.00
Djabarona 96/120-3												
Djabarona 96/120-4	[(23.0)]		23.00	[(76.0)]		76.00						
Djabarona 96/120-5												

	PM095	PM096	PM095/96	PM097	PM098	PM097/98	PM099	PM100	PM099/100	PM101	PM102	PM101/102
♂ No.	5	5	9	5	5	9	4	3	6	3	3	6
♂ Min.	23.0	22.0	22.00	76.0	77.0	76.00	24.5	27.0	24.50	17.0	20.0	17.00
♂ Max.	30.0	25.0	30.00	97.0	96.0	97.00	36.0	28.0	36.00	27.0	24.5	27.00
♂ Mode	23.0	23.0	23.00	76.0		76.00	27.0	28.0	27.00			24.00
♂ Median	23.00	23.00	23.00	78.00	80.00	80.00	27.00	28.00	27.25	24.00	24.00	24.00
♂ Mean	25.40	23.20	24.44	84.20	83.20	84.33	28.63	27.67	28.33	22.67	22.83	22.75
♂ S.D.	3.36	1.10	2.74	10.40	7.79	8.96	5.06	0.58	3.95	5.13	2.47	3.60
♀ No.	8	8	11	7	8	11	10	7	11	10	7	11
♀ Min.	19.5	19.0	19.00	70.0	66.0	66.00	24.0	25.0	24.50	18.5	19.0	18.75
♀ Max.	27.0	27.5	27.50	85.0	87.0	85.50	30.5	30.0	30.25	25.0	24.0	25.00
♀ Mode			19.50		82.0	82.00	26.5	26.0	26.00	19.0	19.0	21.00
♀ Median	23.75	24.25	23.50	81.00	81.50	81.00	26.50	26.00	26.00	22.25	22.00	22.00
♀ Mean	23.81	23.38	23.27	79.29	78.25	77.73	26.80	26.79	26.61	21.75	21.64	21.70
♀ S.D.	2.40	3.18	3.03	5.35	7.98	6.95	1.90	1.73	1.62	2.29	2.06	2.14
No.	13	13	20	12	13	20	14	10	17	13	10	17
Min.	19.5	19.0	19.00	70.0	66.0	66.00	24.0	25.0	24.50	17.0	19.0	17.00
Max.	30.0	27.5	30.00	97.0	96.0	97.00	36.0	30.0	36.00	27.0	24.5	27.00
Mode	23.0	23.0	23.00	76.0	82.0	82.00	26.5	28.0	26.00	24.0	19.0	21.00
Median	23.50	23.00	23.00	80.50	81.00	80.50	26.50	27.00	26.50	22.50	22.50	22.50
Mean	24.42	23.31	23.80	81.33	80.15	80.70	27.32	27.05	27.22	21.96	22.00	22.07
S.D.	2.79	2.51	2.89	7.83	7.98	8.40	3.02	1.50	2.69	2.91	2.12	2.68

	PM103 - *F10(1). Subtrochanteric circumference (l)	PM104 - *F10(1). Subtrochanteric circumference (r)	PM103/104 - *F10(1). Subtrochanteric circumference (m)	PM105 - F15. Vertical neck diameter (l)	PM106 - F15. Vertical neck diameter (r)	PM105/106 - F15. Vertical neck diameter (m)	PM107 - F16. Sagittal neck diameter (l)	PM108 - F16. Sagittal neck diameter (r)	PM107/108 - F16. Sagittal neck diameter (m)	PM109 - F17. Neck circumference (l)	PM110 - F17. Neck circumference (r)	PM109/110 - F17. Neck circumference (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	81.0	81.0	81.00	28.0		28.00	26.0		26.00	88.0		88.00
Abu Tabari 02/1-3	(77.5)		77.50									
Abu Tabari 02/1-5		(79.0)	79.00									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	[(68.0)]		68.00									
Abu Tabari 02/1-8		(53.0)	53.00									
Abu Tabari 02/28-2	59.0	64.0	61.50				18.0	18.5	18.25			
Abu Tabari 02/28-3	(83.0)	(82.0)	82.50									
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(75.0)		75.00	24.5		24.50	20.5		20.50	72.5		72.50
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		(78.0)	78.00		(28.0)	28.00		(23.0)	23.00		(86.0)	86.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(85.0)		85.00									
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(80.0)]		80.00									
Abu Tabari 02/28-22	(81.0)	(82.0)	81.50					[(25.0)]	25.00			
Abu Tabari 02/28-23												
Abu Tabari 03/31	97.0		97.00									
Abu Tabari 03/34-1	(67.0)	67.0	67.00									
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4	(80.0)		80.00									
Djabarona 96/1-1	(77.0)	(77.0)	77.00									
Djabarona 96/1-2		(72.0)	72.00									
Djabarona 96-4		(80.0)	80.00									
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PM103	PM104	PM103/104	PM105	PM106	PM105/106	PM107	PM108	PM107/108	PM109	PM110	PM109/110
♂ No.	3	3	6	0	1	1	0	1	1	0	1	1
♂ Min.	68.0	78.0	68.00		28.0	28.00		23.0	23.00		86.0	86.00
♂ Max.	97.0	80.0	97.00		28.0	28.00		23.0	23.00		86.0	86.00
♂ Mode			80.00									
♂ Median	80.00	79.00	79.50		28.00	28.00		23.00	23.00		86.00	86.00
♂ Mean	81.67	79.00	80.33		28.00	28.00		23.00	23.00		86.00	86.00
♂ S.D.	14.57	1.00	9.35									
♀ No.	9	6	10	2	0	2	2	1	3	2	0	2
♀ Min.	67.0	67.0	67.00	24.5	0.0	24.50	20.5	25.0	20.50	72.5		72.50
♀ Max.	85.0	82.0	85.00	28.0	0.0	28.00	26.0	25.0	26.00	88.0		88.00
♀ Mode	81.0	82.0										
♀ Median	80.00	79.00	78.75	26.25		26.25	23.25	25.00	25.00	80.25		80.25
♀ Mean	78.50	76.83	77.85	26.25		26.25	23.25	25.00	23.83	80.25		80.25
♀ S.D.	5.30	6.18	5.39	2.47		2.47	3.89		2.93	10.96		10.96
No.	12	9	16	2	1	3	2	2	4	2	1	3
Min.	67.0	67.0	67.00	24.5	28.0	24.50	20.5	23.0	20.50	72.5	86.0	72.50
Max.	97.0	82.0	97.00	28.0	28.0	28.00	26.0	25.0	26.00	88.0	86.0	88.00
Mode	81.0	82.0	80.00			28.00						
Median	80.00	79.00	79.50	26.25	28.00	28.00	23.25	24.00	24.00	80.25	86.00	86.00
Mean	79.29	77.56	78.78	26.25	28.00	26.83	23.25	24.00	23.63	80.25	86.00	82.17
S.D.	7.82	5.03	6.94	2.47		2.02	3.89	1.41	2.43	10.96		8.43

	PM111 - F18. Verticaler head diameter (l)	PM112 - F18. Verticaler head diameter (r)	PM111/112 - F18. Verticaler head diameter (m)	PM113 - F19. Transverse head diameter (l)	PM114 - F19. Transverse head diameter (r)	PM113/114 - F19. Transverse head diameter (m)	PM115 - F20. Head circumferen ce (l)	PM116 - F20. Head circumferen ce (r)	PM115/116 - F20. Head circumferen ce (m)	PM117 - *F34. *Linea aspera* breadth (l)	PM118 - *F34. *Linea aspera* breadth (r)	PM117/118 - *F34. *Linea aspera* breadth (m)
Abu Tabari 95/2-3		(49.0)	49.00		(49.0)	49.00						
Abu Tabari 02/1-2				(43.0)	(43.5)	43.25				6.5	6.5	6.50
Abu Tabari 02/1-3										5.5		5.50
Abu Tabari 02/1-5										(4.5)	(5.0)	4.75
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8										(4.0)		4.00
Abu Tabari 02/28-2												
Abu Tabari 02/28-3											[(5.5)]	5.50
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(38.0)	(37.0)	37.50				(6.5)	6.0	6.25
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15											(6.0)	6.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22										[(5.0)]	[(5.0)]	5.00
Abu Tabari 02/28-23												
Abu Tabari 03/31										(6.5)		6.50
Abu Tabari 03/34-1											(7.0)	7.00
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4											(4.5)	4.50
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PM111	PM112	PM111/112	PM113	PM114	PM113/114	PM115	PM116	PM115/116	PM117	PM118	PM117/118
♂ No.	0	1	1	0	1	1	0	0	0	2	2	3
♂ Min.		49.0	49.00		49.0	49.00				4.5	4.5	4.50
♂ Max.		49.0	49.00		49.0	49.00				6.5	5.0	6.50
♂ Mode												
♂ Median		49.00	49.00		49.00	49.00				5.50	4.75	4.75
♂ Mean		49.00	49.00		49.00	49.00				5.50	4.75	5.25
♂ S.D.										1.41	0.35	1.09
♀ No.	0	0	0	2	2	2	0	0	0	4	6	7
♀ Min.				38.0	37.0	37.50				5.0	5.0	5.00
♀ Max.				43.0	43.5	43.25				6.5	7.0	7.00
♀ Mode										6.5	6.0	5.50
♀ Median				40.50	40.25	40.38				6.00	6.00	6.00
♀ Mean				40.50	40.25	40.38				5.88	6.00	5.96
♀ S.D.				3.54	4.60	4.07				0.75	0.71	0.68
No.	0	1	1	2	3	3	0	0	0	6	8	10
Min.		49.0	49.00	38.0	37.0	37.50				4.5	4.5	4.50
Max.		49.0	49.00	43.0	49.0	49.00				6.5	7.0	7.00
Mode										6.5	5.0	6.50
Median		49.00	49.00	40.50	43.50	43.25				6.00	5.75	5.75
Mean		49.00	49.00	40.50	43.17	43.25				5.75	5.69	5.75
S.D.				3.54	6.01	5.75				0.88	0.84	0.83

	PM119 - *F35. *L. intertroch*. brdth. (l)	PM120 - *F35. *L. intertroch*. brdth. (r)	PM119/120 - *F35. *L. intertroch.* brdth. (m)	PM121 - *Femur* - Cortical thickness (ant.)	PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)	PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)	PM124 - *Femur* - Cortical thickness (med.)	PM125 - *Femur* - Cortical thickness (lat.)	PM126 - *Femur* - Cortical thickness (max.)	PM127 - *Femur* - Cortical thickness (min.)
Abu Tabari 95/2-3				9.0 (r; ca mid)					9.0	9.0
Abu Tabari 02/1-2	8.5	7.5	8.00	8.0 (l; 40.0-50.0 dist mid)	10.0 (l; 40.0-50.0 dist mid)	7.0 (l; 40.0-50.0 dist mid)	7.0 (l; 40.0-50.0 dist mid)	7.0 (l; 40.0-50.0 dist mid)	10.0	6.5 (l; 40.0-50.0 dist mid)
Abu Tabari 02/1-3				5.0 (l; ca mid)	9.0 (l; ca mid)	5.5 (l; ca mid)	6.0 (l; ca mid)	7.5 (l; ca mid)	9.0	4.0 (l; ca mid)
Abu Tabari 02/1-5				6.0 (r; ca mid)	9.0 (r; ca mid)	5.0 (r; ca mid)	5.0 (r; ca mid)	7.5 (r; ca mid)	9.0	5.0
Abu Tabari 02/1-6										
Abu Tabari 02/1-7				[(5.0)] (l; ca mid)	[(10.5)] (l; ca mid)	[(5.5)] (l; ca mid)	[(5.5)] (l; ca mid)	[(6.5)] (l; ca mid)	[(10.5)]	[(4.0)] (l; ca mid)
Abu Tabari 02/1-8				3.5 (l; ca mid)	5.0 (l; ca mid)	4.0 (l; ca mid)	(3.0) (l; ca mid)	4.0 (l; ca mid)	5.0	(3.0)
Abu Tabari 02/28-2	(4.0)	(3.5)	3.75							
Abu Tabari 02/28-3				(4.0) (r; ca 25.0 dist mid)	(10.5) (r; ca 25.0 dist mid)	(6.0) (r; ca 25.0 dist mid)	(6.5) (r; ca 25.0 dist mid)	(5.5) (r; ca 25.0 dist mid)	(10.5)	(4.0)
Abu Tabari 02/28-4				(8.0) (l; prob dist mid)	(10.5) (l; prob dist mid)	(8.5) (l; prob dist mid)	(7.5) (l; prob dist mid)	(8.0) (l; prob dist mid)	(10.5)	(6.0) (l; prob dist mid)
Abu Tabari 02/28-5				5.0 (l; ca mid)	9.0 (l; ca mid)	5.0 (l; ca mid)	5.0 (l; ca mid)	5.0 (l; ca mid)	9.0	5.0
Abu Tabari 02/28-7										
Abu Tabari 02/28-8				(4.5) (l; ca 30.0 dist mid)		(5.0) (l; ca 30.0 dist mid)	(4.0) (l; ca 30.0 dist mid)	(4.0) (l; ca 30.0 dist mid)	(5.0)	(4.0)
Abu Tabari 02/28-11				(6.0) (r, ca 20.0 prox mid)	(9.0) (r, ca 20.0 prox mid)	(6.0) (r, ca 20.0 prox mid)	8.0 (r, ca 20.0 prox mid)	(7.5) (r, ca 20.0 prox mid)	(9.0)	(6.0)
Abu Tabari 02/28-13										
Abu Tabari 02/28-14				(4.0) (r; ca mid)	(4.5) (r; ca mid)	(4.5) (r; ca mid)	(4.0) (r; ca mid)	(4.0) (r; ca mid)	(5.0) (r; ca mid)	(3.5) (r; ca mid)
Abu Tabari 02/28-15				(6.0) (r; ca 20.0 dist mid)	10.0 (r; ca 20.0 dist mid)	5.5 (r; ca 20.0 dist mid)	7.0 (r; ca 20.0 dist mid)	7.0 (r; ca 20.0 dist mid)	10.0	4.0 (r; ca 20.0 dist mid)
Abu Tabari 02/28-20										
Abu Tabari 02/28-21				(5.0) (r; ca mid)	(7.0) (r; ca mid)		(4.5) (r; ca mid)	(5.0) (r; ca mid)	(7.0)	(4.5)
Abu Tabari 02/28-22				5.0 (r; ca mid)	11.5 (r; ca mid)	5.0 (r; ca mid)	(5.5) (r; ca mid)	9.0 (r; ca mid)	11.5	(4.0) (r; ca mid)
Abu Tabari 02/28-23										
Abu Tabari 03/31				[(6.5)] (l; prox mid)	10.0 (l; ca mid)	7.5 (l; ca mid)	7.0 (l; prox mid)	8.0 (l; prox mid)	10.0	[(6.5)] (l; prox mid)
Abu Tabari 03/34-1				6.0 (r; ca 35.0 prox mid)	7.5 (r; ca 35.0 prox mid)	7.0 (r; ca 35.0 prox mid)	5.5 (r; ca 35.0 prox mid)	6.5 (r; ca 35.0 prox mid)	7.5	5.0 (r; ca 35.0 prox mid)
Conical Hill 95/4										
Conical Hill 95/4-1										
Conical Hill 02/3-4				(6.0) (r; mid)	[(10.5)] (r; mid)		(7.0) (r; mid)	(6.5) (r; mid)	[(10.5)]	(6.5)
Djabarona 96/1-1							(6.0) (r; mid)	(6.5) (r; mid)		
Djabarona 96/1-2				(4.0) (r; prox mid)	[(8.5)] (r; prox mid)		(5.0) (r; prox mid)	(3.0) (r; prox mid)	[(8.5)]	(3.0)
Djabarona 96-4				(5.5) (r; mid)	[(13.0)] (r; mid)		(5.5) (r; mid)	(6.0) (r; mid)	(13.0)	(5.5)
Djabarona 96/120-3										
Djabarona 96/120-4							(5.0) (l; dist mid)	(5.0) (l; dist mid)	(5.0)	(5.0)
Djabarona 96/120-5									[(7.0)] (?)	[(5.0)] (?)

	PM119	PM120	PM119/120	PM121	PM122	PM123	PM124	PM125	PM126	PM127
♂ No.	0	0	0	8	7	5	8	8	8	8
♂ Min.				5.0	9.0	5.0	5.0	5.0	9.0	4.0
♂ Max.				9.0	13.0	8.5	8.0	8.0	13.0	9.0
♂ Mode				6.0	10.5		5.0	7.5	9.0	6.0
♂ Median				6.00	10.50	6.00	6.25	7.00	10.25	6.00
♂ Mean				6.50	10.36	6.50	6.31	6.88	10.19	6.06
♂ S.D.				1.34	1.35	1.46	1.19	1.06	1.33	1.45
♀ No.	1	1	1	10	9	8	11	11	11	11
♀ Min.	8.5	7.5	8.00	4.0	7.0	5.0	4.0	3.0	5.0	3.0
♀ Max.	8.5	7.5	8.00	8.0	11.5	7.0	7.0	9.0	11.5	6.5
♀ Mode				5.0	10.0	5.0	7.0	7.0	10.0	4.0
♀ Median	8.50	7.50	8.00	5.00	9.00	5.50	5.50	6.50	9.00	4.00
♀ Mean	8.50	7.50	8.00	5.25	9.22	5.75	5.64	6.00	8.64	4.45
♀ S.D.				1.18	1.44	0.85	0.98	1.70	1.89	0.91
No.	1	1	1	18	16	13	19	19	19	19
Min.	8.5	7.5	8.00	4.0	7.0	5.0	4.0	3.0	5.0	3.0
Max.	8.5	7.5	8.00	9.0	13.0	8.5	8.0	9.0	13.0	9.0
Mode				5.0	9.0	5.0	7.0	6.5	9.0	4.0
Median	8.50	7.50	8.00	5.75	10.00	5.50	5.50	6.50	9.00	5.00
Mean	8.50	7.50	8.00	5.81	9.72	6.04	5.92	6.37	9.29	5.13
S.D.				1.37	1.47	1.13	1.10	1.50	1.81	1.39

	PM128 - T1. *Tibia* length (l)	PM129 - T1. *Tibia* length (r)	PM128/129 - T1. *Tibia* length (m)	PM130 - T1a. *Tibia* - Maximum length (l)	PM131 - T1a. *Tibia* - Maximum length (r)	PM130/131 - T1a. *Tibia* - Maximum length (m)	PM132 - T2. Physiological length (l)	PM133 - T2. Physiological length (r)	PM132/133 - T2. Physiological length (m)	PM134 - T4. Maximum sagittal tuberosity diameter (l)	PM135 - T4. Maximum sagittal tuberosity diameter (r)	PM134/135 - T4. Maximum sagittal tuberosity diameter (m)
Abu Tabari 95/2-3				[(400.0)]		400.00						
Abu Tabari 02/1-2				[(420.0)]	[(420.0)]	420.00						
Abu Tabari 02/1-3				[(385.0)]		385.00						
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					[(330.0)]	330.00						
Abu Tabari 02/1-8					[(240.0)]	240.00						
Abu Tabari 02/28-2					222.0	222.00				20.5	21.0	20.75
Abu Tabari 02/28-3					[(390.0)]	390.00						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				[(335.0)]		335.00				42.0		42.00
Abu Tabari 02/28-7												
Abu Tabari 02/28-8				[(310.0)]	[(310.0)]	310.00						
Abu Tabari 02/28-11					[(360.0)]	360.00					[(44.0)]	44.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				[(225.0)]	[(225.0)]	225.00						
Abu Tabari 02/28-15				[(430.0)]	[(430.0)]	430.00						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21				[(375.0)]		375.00						
Abu Tabari 02/28-22				[(390.0)]		390.00				(40.0)		40.00
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				[(370.0)]	[(370.0)]	370.00						
Djabarona 96/1-2												
Djabarona 96-4				[(400.0)]		400.00						
Djabarona 96/120-3												
Djabarona 96/120-4				[(380.0)]		380.00						
Djabarona 96/120-5												

	PM128	PM129	PM128/129	PM130	PM131	PM130/131	PM132	PM133	PM132/133	PM134	PM135	PM134/135
♂ No.	0	0	0	3	2	5	0	0	0	0	1	1
♂ Min.				380.0	330.0	330.00					44.0	44.00
♂ Max.				400.0	360.0	400.00					44.0	44.00
♂ Mode				400.0		400.00						
♂ Median				400.00	345.00	380.00					44.00	44.00
♂ Mean				393.33	345.00	374.00					44.00	44.00
♂ S.D.				11.55	21.21	29.66						
♀ No.	0	0	0	8	5	9	0	0	0	2	0	2
♀ Min.				310.0	310.0	310.00				40.0		40.00
♀ Max.				430.0	430.0	430.00				42.0		42.00
♀ Mode						390.00						
♀ Median				380.00	390.00	385.00				41.00		41.00
♀ Mean				376.88	384.00	378.33				41.00		41.00
♀ S.D.				39.99	47.75	37.67				1.41		1.41
No.	0	0	0	11	7	14	0	0	0	2	1	3
Min.				310.0	310.0	310.00				40.0	44.0	40.00
Max.				430.0	430.0	430.00				42.0	44.0	44.00
Mode				400.0		400.00						
Median				385.00	370.00	382.50				41.00	44.00	42.00
Mean				381.36	372.86	376.79				41.00	44.00	42.00
S.D.				34.72	44.24	33.89				1.41		2.00

	PM136 - T5. Minimum transverse tuberosity diameter (l)	PM137 - T5. Minimum transverse tuberosity diameter (r)	PM136/137 - T5. Minimum transverse tuberosity diameter (m)	PM138 - T8. Sagittal mid-shaft diameter (l)	PM139 - T8. Sagittal mid-shaft diameter (r)	PM138/139 - T8. Sagittal mid-shaft diameter (m)	PM140 - T8a. Sagittal nutrient foramen diameter (l)	PM141 - T8a. Sagittal nutrient foramen diameter (r)	PM140/141 - T8a. Sagittal nutrient foramen diameter (m)	PM142 - T9. Transverse mid-shaft diameter (l)	PM143 - T9. Transverse mid-shaft diameter (r)	PM142/143 - T9. Transverse mid-shaft diameter (m)
Abu Tabari 95/2-3				33.5		33.50				21.0		21.00
Abu Tabari 02/1-2				27.0	27.5	27.25	32.5		32.50	20.0	20.0	20.00
Abu Tabari 02/1-3				(29.0)		29.00				(19.0)		19.00
Abu Tabari 02/1-5					(27.0)	27.00					(18.0)	18.00
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					[(25.5)]	25.50					[(18.0)]	18.00
Abu Tabari 02/1-8					18.0	18.00		18.5	18.50		14.5	14.50
Abu Tabari 02/28-2	21.0	20.5	20.75	16.5	16.5	16.50	18.0	18.5	18.25	13.0	12.5	12.75
Abu Tabari 02/28-3					(24.0)	24.00		(29.0)	29.00		19.0	19.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	45.0		45.00	21.0	22.0	21.50				20.0	20.0	20.00
Abu Tabari 02/28-7												
Abu Tabari 02/28-8				(23.0)		23.00				(17.0)		17.00
Abu Tabari 02/28-11		[(32.0)]	32.00		(27.0)	27.00					[(23.0)]	23.00
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				(16.5)		16.50				(14.5)		14.50
Abu Tabari 02/28-15				24.5	25.0	24.75		31.5	31.50	18.0	[(20.0)]	19.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21				[(31.0)]	[(30.5)]	30.75	[(33.0)]	[(32.0)]	32.50	[(23.0)]	[(24.5)]	23.75
Abu Tabari 02/28-22	(35.0)		35.00	(26.0)	(25.0)	25.50	(27.0)	(27.5)	27.25	(20.0)	(20.0)	20.00
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				(25.0)	(25.0)	25.00	(28.0)	(28.0)	28.00	(23.0)	(23.0)	23.00
Djabarona 96/1-2												
Djabarona 96-4				(33.0)		33.00				(22.0)		22.00
Djabarona 96/120-3												
Djabarona 96/120-4				(27.0)		27.00	(29.0)		29.00	(20.0)		20.00
Djabarona 96/120-5												

	PM136	PM137	PM136/137	PM138	PM139	PM138/139	PM140	PM141	PM140/141	PM142	PM143	PM142/143
♂ No.	0	1	1	3	3	6	1	0	1	3	3	6
♂ Min.		32.0	32.00	27.0	25.5	25.50	29.0		29.00	20.0	18.0	18.00
♂ Max.		32.0	32.00	33.5	27.0	33.50	29.0		29.00	22.0	23.0	23.00
♂ Mode					27.0	27.00					18.0	18.00
♂ Median		32.00	32.00	33.00	27.00	27.00	29.00		29.00	21.00	18.00	20.50
♂ Mean		32.00	32.00	31.17	26.50	28.83	29.00		29.00	21.00	19.67	20.33
♂ S.D.				3.62	0.87	3.47				1.00	2.89	2.07
♀ No.	2	0	2	8	7	9	4	5	6	8	7	9
♀ Min.	35.0		35.00	21.0	22.0	21.50	27.0	27.5	27.25	17.0	19.0	17.00
♀ Max.	45.0		45.00	31.0	30.5	30.75	33.0	32.0	32.50	23.0	24.5	23.75
♀ Mode					25.0				32.50	20.0	20.0	20.00
♀ Median	40.00		40.00	25.50	25.00	25.00	30.25	29.00	30.25	20.00	20.00	20.00
♀ Mean	40.00		40.00	25.81	25.57	25.64	30.13	29.60	30.13	20.00	20.93	20.08
♀ S.D.	7.07		7.07	3.21	2.71	2.92	3.07	2.04	2.33	2.14	2.01	2.09
No.	2	1	3	11	10	15	5	5	7	11	10	15
Min.	35.0	32.0	32.00	21.0	22.0	21.50	27.0	27.5	27.25	17.0	18.0	17.00
Max.	45.0	32.0	45.00	33.5	30.5	33.50	33.0	32.0	32.50	23.0	24.5	23.75
Mode				27.0	25.0	27.00			32.50	20.0	20.0	20.00
Median	40.00	32.00	35.00	27.00	25.25	27.00	29.00	29.00	29.00	20.00	20.00	20.00
Mean	40.00	32.00	37.33	27.27	25.85	26.92	29.90	29.60	29.96	20.27	20.55	20.18
S.D.	7.07		6.81	4.01	2.30	3.43	2.70	2.04	2.17	1.90	2.22	2.01

	PM144 - T9a. Transverse nutrient foramen diameter (l)	PM145 - T9a. Transverse nutrient foramen diameter (r)	PM144/145 - T9a. Transverse nutrient foramen diameter (m)	PM146 - T10. Mid-shaft circumference (l)	PM147 - T10. Mid-shaft circumference (r)	PM146/147 - T10. Mid-shaft circumference (m)	PM148 - T10a. Nutient foramen circumference (l)	PM149 - T10a. Nutient foramen circumference (r)	PM148/149 - T10a. Nutient foramen circumference (m)	PM150 - T10b. Minimum shaft circumference (l)	PM151 - T10b. Minimum shaft circumference (r)	PM150/151 - T10b. Minimum shaft circumference (m)
Abu Tabari 95/2-3				(90.0)		90.00						
Abu Tabari 02/1-2	22.0		22.00	74.0	75.0	74.50	90.0		90.00	67.0	68.0	67.50
Abu Tabari 02/1-3				(77.0)		77.00					(63.0)	63.00
Abu Tabari 02/1-5					(70.0)	70.00					(63.0)	63.00
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					[(70.0)]	70.00						
Abu Tabari 02/1-8		15.5	15.50		51.5	51.50		55.0	55.00		45.0	45.00
Abu Tabari 02/28-2	15.5	16.0	15.75	47.0	46.0	46.50	55.0	56.0	55.50	43.5	43.0	43.25
Abu Tabari 02/28-3		20.5	20.50		(68.0)	68.00		[(80.0)]	80.00	(63.0)		63.00
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				66.0	66.0	66.00				62.0	62.0	62.00
Abu Tabari 02/28-7										[(55.0)]		55.00
Abu Tabari 02/28-8				(65.0)		65.00						
Abu Tabari 02/28-11					[(77.0)]	77.00						
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				(50.0)		50.00						
Abu Tabari 02/28-15		23.0	23.00	67.0	(69.0)	68.00		89.0	89.00	63.0		63.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		[(25.5)]	25.50	[(84.0)]	[(86.0)]	85.00		[(92.0)]	92.00			
Abu Tabari 02/28-22	(22.0)	(22.5)	22.25	(72.0)	(72.0)	72.00	(77.0)	(81.0)	79.00	(66.0)	(67.0)	66.50
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(22.0)	(22.5)	22.25	(75.0)	(76.0)	75.50	(79.0)	(79.0)	79.00		(61.0)	61.00
Djabarona 96/1-2												
Djabarona 96-4				(86.0)		86.00					(73.0)	73.00
Djabarona 96/120-3												
Djabarona 96/120-4	(20.0)		20.00	(74.0)		74.00	(76.0)		76.00	(60.0)		60.00
Djabarona 96/120-5												

	PM144	PM145	PM144/145	PM146	PM147	PM146/147	PM148	PM149	PM148/149	PM150	PM151	PM150/151
♂ No.	1	0	1	3	3	6	1	0	1	1	2	3
♂ Min.	20.0		20.00	74.0	70.0	70.00	76.0		76.00	60.0	63.0	60.00
♂ Max.	20.0		20.00	90.0	77.0	90.00	76.0		76.00	60.0	73.0	73.00
♂ Mode					70.0	70.00						
♂ Median	20.00		20.00	86.00	70.00	75.50	76.00		76.00	60.00	68.00	63.00
♂ Mean	20.00		20.00	83.33	72.33	77.83	76.00		76.00	60.00	68.00	65.33
♂ S.D.				8.33	4.04	8.40					7.07	6.81
♀ No.	3	5	6	8	7	9	3	5	6	6	5	8
♀ Min.	22.0	20.5	20.50	65.0	66.0	65.00	77.0	79.0	79.00	55.0	61.0	55.00
♀ Max.	22.0	25.5	25.50	84.0	86.0	85.00	90.0	92.0	92.00	67.0	68.0	67.50
♀ Mode	22.0	22.5	22.25			68.00			79.00	63.0		63.00
♀ Median	22.00	22.50	22.25	73.00	72.00	72.00	79.00	81.00	84.50	63.00	63.00	63.00
♀ Mean	22.00	22.80	22.58	72.50	73.14	72.33	82.00	84.20	84.83	62.67	64.20	62.63
♀ S.D.	0.00	1.79	1.65	6.44	6.74	6.41	7.00	5.89	6.11	4.23	3.11	3.79
No.	4	5	7	11	10	15	4	5	7	7	7	11
Min.	20.0	20.5	20.00	65.0	66.0	65.00	76.0	79.0	76.00	55.0	61.0	55.00
Max.	22.0	25.5	25.50	90.0	86.0	90.00	90.0	92.0	92.00	67.0	73.0	73.00
Mode	22.0	22.5	22.25	74.0	70.0	77.00			79.00	63.0	63.0	63.00
Median	22.00	22.50	22.25	74.00	71.00	74.00	78.00	81.00	80.00	63.00	63.00	63.00
Mean	21.50	22.80	22.21	75.45	72.90	74.53	80.50	84.20	83.57	62.29	65.29	63.36
S.D.	1.00	1.79	1.79	8.27	5.84	7.51	6.45	5.89	6.50	3.99	4.27	4.57

	PM152 - *T15. Longitudinal *Tuberosita tibiae* diameter (l)	PM153 - *T15. Longitudinal *Tuberosita tibiae* diameter (r)	PM152/153 - *T15. Longitudinal *Tuberosita tibiae* diameter (m)	PM154 - *T16. Transverse *Tuberosita tibiae* diameter (l)	PM155 - *T16. Transverse *Tuberosita tibiae* diameter (r)	PM154/155 - *T16. Transverse *Tuberosita tibiae* diameter (m)	PM156 - *T17. *Linea musculi solei* breadth (l)	PM157 - *T17. *Linea musculi solei* breadth (r)	PM156/157 - *T17. *Linea musculi solei* breadth (m)
Abu Tabari 95/2-3									
Abu Tabari 02/1-2									
Abu Tabari 02/1-3							4.0		4.00
Abu Tabari 02/1-5									
Abu Tabari 02/1-6									
Abu Tabari 02/1-7									
Abu Tabari 02/1-8									
Abu Tabari 02/28-2									
Abu Tabari 02/28-3									
Abu Tabari 02/28-4									
Abu Tabari 02/28-5				[(17.0)]		17.00	[(6.0)]		6.00
Abu Tabari 02/28-7									
Abu Tabari 02/28-8									
Abu Tabari 02/28-11									
Abu Tabari 02/28-13									
Abu Tabari 02/28-14									
Abu Tabari 02/28-15								9.0	9.00
Abu Tabari 02/28-20									
Abu Tabari 02/28-21									
Abu Tabari 02/28-22							(6.0)	(5.0)	5.50
Abu Tabari 02/28-23									
Abu Tabari 03/31									
Abu Tabari 03/34-1									
Conical Hill 95/4									
Conical Hill 95/4-1									
Conical Hill 02/3-4									
Djabarona 96/1-1									
Djabarona 96/1-2									
Djabarona 96-4									
Djabarona 96/120-3									
Djabarona 96/120-4									
Djabarona 96/120-5									

	PM152	PM153	PM152/153	PM154	PM155	PM154/155	PM156	PM157	PM156/157
♂ No.	0	0	0	0	0	0	0	0	0
♂ Min.									
♂ Max.									
♂ Mode									
♂ Median									
♂ Mean									
♂ S.D.									
♀ No.	0	0	0	1	0	1	3	2	4
♀ Min.				17.0		17.00	4.0	5.0	4.00
♀ Max.				17.0		17.00	6.0	9.0	9.00
♀ Mode							6.0		
♀ Median				17.00		17.00	6.00	7.00	5.75
♀ Mean				17.00		17.00	5.33	7.00	6.13
♀ S.D.							1.15	2.83	2.10
No.	0	0	0	1	0	1	3	2	4
Min.				17.0		17.00	4.0	5.0	4.00
Max.				17.0		17.00	6.0	9.0	9.00
Mode							6.0		
Median				17.00		17.00	6.00	7.00	5.75
Mean				17.00		17.00	5.33	7.00	6.13
S.D.							1.15	2.83	2.10

	PM158 - *Tibia* - Cortical thickness (ant.)	PM159 - *Tibia* - Cortical thickness (post.)	PM160 - *Tibia* - Cortical thickness (med.)	PM161 - *Tibia* - Cortical thickness (lat.)	PM162 - *Tibia* - Cortical thickness (max.)	PM163 - *Tibia* - Cortical thickness (min.)
Abu Tabari 95/2-3		[(8.0)] (l; prox mid)		[(8.0)] (l; prox mid)	[(8.0)]	[(8.0)]
Abu Tabari 02/1-2	11.5 (l; ca mid)	6.0 (l; ca mid)	7.0 (l; ca mid)	5.0 (l; ca mid)	11.5	4.5 (l; ca mid)
Abu Tabari 02/1-3			3.5 (l; mid)	3.0 (l; mid)	3.5	3.0
Abu Tabari 02/1-5	(9.5) (r; ca mid)	(7.0) (r; ca mid)	(4.5) (r; ca mid)	(3.5) (r; ca mid)	(9.5)	(3.5)
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8	6.5 (r; ca 20.0 prox mid)	3.5 (r; ca 20.0 prox mid)	3.0 (r; ca 20.0 prox mid)	2.5 (r; ca 20.0 prox mid)	6.5	2.0 (r; ca 20.0 prox mid)
Abu Tabari 02/28-2						
Abu Tabari 02/28-3	[(7.0)] (l; ca mid)	(6.0) (l; ca 30.0 prox mid)		(4.5) (l; ca 25.0 dist mid)	7.0	4.5
Abu Tabari 02/28-4						
Abu Tabari 02/28-5	8.0 (r; 65.0-70.0 prox mid)	4.0 (r; 65.0-70.0 prox mid)	4.5 (r; 65.0-70.0 prox mid)	3.0 (r; 65.0-70.0 prox mid)	8.0	3.0
Abu Tabari 02/28-7		[(4.0)] (l; prox frag; dist 3rd)		[(3.5)] (l; prox frag; dist 3rd)	[(4.0)]	[(3.5)]
Abu Tabari 02/28-8	(4.0) (r; ca mid)	(4.0) (r; ca mid)	(4.0) (r; ca mid)	(3.0) (r; ca mid)	(4.0)	(3.0)
Abu Tabari 02/28-11		(5.0) (r; ca mid)	(5.0) (r; ca mid)	(5.0) (r; ca mid)	(5.0)	(5.0)
Abu Tabari 02/28-13						
Abu Tabari 02/28-14	(6.0) (l; ca mid)	(4.0) (l; ca mid)	(3.5) (l; ca mid)	(3.0) (l; ca mid)	(6.0)	(2.5) (l; ca mid)
Abu Tabari 02/28-15						
Abu Tabari 02/28-20						
Abu Tabari 02/28-21	(9.0) (l; ca mid)	(5.0) (l; ca mid)	(4.0) (r; ca mid)		(9.0)	(4.0)
Abu Tabari 02/28-22	(9.5) (r; ca mid)	(7.0) (r; ca mid)	5.0 (r; ca mid)	(4.0) (r; ca mid)	(9.5)	(4.0)
Abu Tabari 02/28-23						
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4					[(4.0)] (?; prox third)	[(4.0)]
Djabarona 96/1-1	(8.0) (l; dist *For nut*)	(4.5) (l; dist *For nut*)		(4.0) (l; dist *For nut*)	(8.0)	(4.0)
Djabarona 96/1-2						
Djabarona 96-4	[(19.0)] (l; prox mid)	(9.5) (l; prox mid)	(5.0) (l; prox mid)	(5.0) (l; prox mid)	[(19.0)]	(5.0)
Djabarona 96/120-3						
Djabarona 96/120-4	[(9.5)] (r; mid)	(5.0) (r; mid)	(5.0) (r; mid)	(5.0) (r; mid)	[(9.5)]	(5.0)
Djabarona 96/120-5						

	PM158	PM159	PM160	PM161	PM162	PM163
♂ No.	3	5	4	5	6	6
♂ Min.	9.5	5.0	4.5	3.5	4.0	3.5
♂ Max.	19.0	9.5	5.0	8.0	19.0	8.0
♂ Mode	9.5	5.0	5.0	5.0	9.5	5.0
♂ Median	9.50	7.00	5.00	5.00	8.75	5.00
♂ Mean	12.67	6.90	4.88	5.30	9.17	5.08
♂ S.D.	5.48	1.95	0.25	1.64	5.34	1.56
♀ No.	7	8	6	8	9	9
♀ Min.	4.0	4.0	3.5	3.0	3.5	3.0
♀ Max.	11.5	7.0	7.0	5.0	11.5	4.5
♀ Mode	8.0	4.0	4.0	3.0	8.0	3.0
♀ Median	8.00	4.75	4.25	3.75	8.00	4.00
♀ Mean	8.14	5.06	4.67	3.75	7.17	3.72
♀ S.D.	2.32	1.15	1.25	0.76	2.80	0.62
No.	10	13	10	13	15	15
Min.	4.0	4.0	3.5	3.0	3.5	3.0
Max.	19.0	9.5	7.0	8.0	19.0	8.0
Mode	9.5	4.0	5.0	5.0	8.0	4.0
Median	9.25	5.00	4.75	4.00	8.00	4.00
Mean	9.50	5.77	4.75	4.35	7.97	4.27
S.D.	3.88	1.70	0.95	1.36	3.96	1.25

	PM164 - Fi1. *Fibula* - Maximum length (l)	PM165 - Fi1. *Fibula* - Maximum length (r)	PM164/165 - Fi1. *Fibula* - Maximum length (m)	PM166 - Fi2. Maximum mid-shaft diameter (l)	PM167 - Fi2. Maximum mid-shaft diameter (r)	PM166/167 - Fi2. Maximum mid-shaft diameter (m)	PM168 - Fi3. Minimum mid-shaft diameter (l)	PM169 - Fi3. Minimum mid-shaft diameter (r)	PM168/169 - Fi3. Minimum mid-shaft diameter (m)	PM170 - Fi4. Mid-shaft circumference (l)	PM171 - Fi4. Mid-shaft circumference (r)	PM170/171 - Fi4. Mid-shaft circumference (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(405.0)]	[(405.0)]	405.00	14.5	14.5	14.50	11.0	11.0	11.00	42.0	41.0	41.50
Abu Tabari 02/1-3												
Abu Tabari 02/1-5					(13.0)	13.00		(8.0)	8.00		(35.0)	35.00
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8					(8.5)	8.50		(6.5)	6.50		(24.5)	24.50
Abu Tabari 02/28-2		[(210.0)]	210.00	(9.5)	(9.5)	9.50	(7.0)	7.0	7.00	(26.0)	26.0	26.00
Abu Tabari 02/28-3	[(375.0)]		375.00									
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		[(330.0)]	330.00	(13.5)	(13.5)	13.50	(9.0)	(10.0)	9.50	(38.0)	(38.5)	38.25
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11					(14.0)	14.00		(10.5)	10.50		(39.5)	39.50
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				(8.5)		8.50	(7.5)		7.50	(25.0)		25.00
Abu Tabari 02/28-15				(15.5)		15.50	(10.5)		10.50	42.0		42.00
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	[(380.0)]		380.00	12.0	(12.0)	12.00	9.0	(10.0)	9.50	34.0		34.00
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(350.0)]	[(350.0)]	350.00	(13.0)	(15.0)	14.00	(9.0)	(9.5)	9.25		(38.5)	38.50
Djabarona 96/1-2												
Djabarona 96-4	[(380.0)]		380.00	(19.0)		19.00	(9.5)		9.50	(39.0)		39.00
Djabarona 96/120-3												
Djabarona 96/120-4	[(365.0)]	[(365.0)]	365.00	(12.0)		12.00	(8.5)		8.50	(35.0)		35.00
Djabarona 96/120-5												

	PM164	PM165	PM164/165	PM166	PM167	PM166/167	PM168	PM169	PM168/169	PM170	PM171	PM170/171
♂ No.	2	1	2	2	2	4	2	2	4	2	2	4
♂ Min.	365.0	365.0	365.00	12.0	13.0	12.00	8.5	8.0	8.00	35.0	35.0	35.00
♂ Max.	380.0	365.0	380.00	19.0	14.0	19.00	9.5	10.5	10.50	39.0	39.5	39.50
♂ Mode												35.00
♂ Median	372.50	365.00	372.50	15.50	13.50	13.50	9.00	9.25	9.00	37.00	37.25	37.00
♂ Mean	372.50	365.00	372.50	15.50	13.50	14.50	9.00	9.25	9.13	37.00	37.25	37.13
♂ S.D.	10.61		10.61	4.95	0.71	3.11	0.71	1.77	1.11	2.83	3.18	2.46
♀ No.	4	3	5	5	4	5	5	4	5	4	3	5
♀ Min.	350.0	330.0	330.00	12.0	12.0	12.00	9.0	9.5	9.25	34.0	38.5	34.00
♀ Max.	405.0	405.0	405.00	15.5	15.0	15.50	11.0	11.0	11.00	42.0	41.0	42.00
♀ Mode							9.0	10.0	9.50	42.0	38.5	
♀ Median	377.50	350.00	375.00	13.50	14.00	14.00	9.00	10.00	9.50	40.00	38.50	38.50
♀ Mean	377.50	361.67	368.00	13.70	13.75	13.90	9.70	10.13	9.95	39.00	39.33	38.85
♀ S.D.	22.55	38.84	28.85	1.35	1.32	1.29	0.97	0.63	0.76	3.83	1.44	3.20
No.	6	4	7	7	6	9	7	6	9	6	5	9
Min.	350.0	330.0	330.00	12.0	12.0	12.00	8.5	8.0	8.00	34.0	35.0	34.00
Max.	405.0	405.0	405.00	19.0	15.0	19.00	11.0	11.0	11.00	42.0	41.0	42.00
Mode	380.0		380.00	12.0		14.00	9.0	10.0	9.50	42.0	38.5	35.00
Median	377.50	357.50	375.00	13.50	13.75	14.00	9.00	10.00	9.50	38.50	38.50	38.50
Mean	375.83	362.50	369.29	14.21	13.67	14.17	9.50	9.83	9.58	38.33	38.50	38.08
S.D.	18.28	31.75	24.05	2.46	1.08	2.14	0.91	1.03	0.97	3.39	2.21	2.87

	PM172 - Fi4a. Minimum circumference (l)	PM173 - Fi4a. Minimum circumference (r)	PM172/173 - Fi4a. Minimum circumference (m)	PM174 - *Fibula* - Cortical thickness (ant.)	PM175 - *Fibula* - Cortical thickness (post.)	PM176 - *Fibula* - Cortical thickness (med.)	PM177 - *Fibula* - Cortical thickness (lat.)	PM178 - *Fibula* - Cortical thickness (max.)	PM179 - *Fibula* - Cortical thickness (min.)
Abu Tabari 95/2-3									
Abu Tabari 02/1-2	32.0		32.00	6.5 (r; 10.0-20.0 dist mid)	2.5 (r; 10.0-20.0 dist mid)	3.5 (r; 10.0-20.0 dist mid)	3.5 (r; 10.0-20.0 dist mid)	6.5	2.5
Abu Tabari 02/1-3									
Abu Tabari 02/1-5				(5.0) (l; dist mid)	(3.0) (l; dist mid)	(3.0) (l; dist mid)	(3.0) (l; dist mid)	(5.0)	(3.0)
Abu Tabari 02/1-6									
Abu Tabari 02/1-7									
Abu Tabari 02/1-8									
Abu Tabari 02/28-2		20.5	20.50						
Abu Tabari 02/28-3							(3.0) (l; dist mid)	(3.0)	(3.0)
Abu Tabari 02/28-4									
Abu Tabari 02/28-5	(30.0)	(31.0)	30.50	6.0 (l; ca 70.0 dist mid)	3.0 (l; ca 70.0 dist mid)	2.0 (l; ca 70.0 dist mid)	5.0 (l; ca 70.0 dist mid)	6.0	2.0
Abu Tabari 02/28-7									
Abu Tabari 02/28-8									
Abu Tabari 02/28-11				(3.0) (r; ca mid)	(4.5) (r; ca mid)	(3.5) (r; ca mid)	(3.5) (r; ca mid)	(5.5) (r; ca mid)	(2.5) (r; ca mid)
Abu Tabari 02/28-13									
Abu Tabari 02/28-14								(3.0) (l; prox mid)	(2.0) (l; prox mid)
Abu Tabari 02/28-15									
Abu Tabari 02/28-20									
Abu Tabari 02/28-21								3.0 (l; ?)	3.0
Abu Tabari 02/28-22	25.0		25.00	4.0 (l; ca 25.0 prox mid)	4.0 (l; ca 25.0 prox mid)	2.5 (l; ca 25.0 prox mid)	4.5 (l; ca 25.0 prox mid)	4.5	2.5
Abu Tabari 02/28-23									
Abu Tabari 03/31									
Abu Tabari 03/34-1									
Conical Hill 95/4									
Conical Hill 95/4-1									
Conical Hill 02/3-4									
Djabarona 96/1-1								(3.0) (l; mid)	(3.0)
Djabarona 96/1-2									
Djabarona 96-4						(3.5) (l; mid)	(3.0) (l; mid)	(3.5)	(3.0)
Djabarona 96/120-3									
Djabarona 96/120-4		(27.0)	27.00	(5.0) (r; mid)	(2.0) (r; mid)	(2.0) (r; mid)	(3.0) (r; mid)	(5.0)	(2.0)
Djabarona 96/120-5									

	PM172	PM173	PM172/173	PM174	PM175	PM176	PM177	PM178	PM179
♂ No.	0	1	1	3	3	4	4	4	4
♂ Min.		27.0	27.00	3.0	2.0	2.0	3.0	3.5	2.0
♂ Max.		27.0	27.00	5.0	4.5	3.5	3.5	5.5	3.0
♂ Mode				5.0		3.5	3.0	5.0	3.0
♂ Median		27.00	27.00	5.00	3.00	3.25	3.00	5.00	2.75
♂ Mean		27.00	27.00	4.33	3.17	3.00	3.13	4.75	2.63
♂ S.D.				1.15	1.26	0.71	0.25	0.87	0.48
♀ No.	3	1	3	3	3	3	4	6	6
♀ Min.	25.0	31.0	25.00	4.0	2.5	2.0	3.0	3.0	2.0
♀ Max.	32.0	31.0	32.00	6.5	4.0	3.5	5.0	6.5	3.0
♀ Mode								3.0	3.0
♀ Median	30.00	31.00	30.50	6.00	3.00	2.50	4.00	3.75	2.75
♀ Mean	29.00	31.00	29.17	5.50	3.17	2.67	4.00	4.33	2.67
♀ S.D.	3.61		3.69	1.32	0.76	0.76	0.91	1.60	0.41
No.	3	2	4	6	6	7	8	10	10
Min.	25.0	27.0	25.00	3.0	2.0	2.0	3.0	3.0	2.0
Max.	32.0	31.0	32.00	6.5	4.5	3.5	5.0	6.5	3.0
Mode				5.0	3.0	3.5	3.0	3.0	3.0
Median	30.00	29.00	28.75	5.00	3.00	3.00	3.25	4.75	2.75
Mean	29.00	29.00	28.63	4.92	3.17	2.86	3.56	4.50	2.65
S.D.	3.61	2.83	3.20	1.28	0.93	0.69	0.78	1.31	0.41

Appendix XIII. Indices

Appendix XIII.A. Cranial indices

	ICM001 - I1. Cranial index	ICM002 - *I46c. Interorbital palatal index	ICM003 - *I51(1)b. Naso-palatal index	ICM004 - *I54b. Palato-alveolar index	ICM005 - *I58b. Palatal length-breadth index	ICM006 - *I62b. Mandibular length-breadth index	ICM007 - *I62c. Anterior mandibular length-breadth index	ICM008 - I62(1). Mandibular height index	ICM009 - *I63b. Alternative ramus breadth index	ICM010 - *I66b. Height-breadth index of the *Corpus mandibulae* at M2	ICM011 - *I66c. Symphyseal index	ICM012 - *I66d. Symphyseal height index	ICM013 - Cranial thickness index
Abu Tabari 95/2-3													
Abu Tabari 02/1-2			110.34	75.86	56.90	76.11	48.89	74.31	144.44	63.55	34.72	160.00	63.83
Abu Tabari 02/1-3			86.21	79.31		93.33		81.58		43.55	32.89	149.02	57.14
Abu Tabari 02/1-5													67.23
Abu Tabari 02/1-6													
Abu Tabari 02/1-7							43.40				35.90	147.17	
Abu Tabari 02/1-8													52.04
Abu Tabari 02/28-2	72.78										41.94		26.00
Abu Tabari 02/28-3													
Abu Tabari 02/28-4													
Abu Tabari 02/28-5		81.82	78.79	63.64	48.48	70.21	42.31		146.15		38.24	130.77	50.85
Abu Tabari 02/28-7													50.46
Abu Tabari 02/28-8	72.83												72.09
Abu Tabari 02/28-11													
Abu Tabari 02/28-13													
Abu Tabari 02/28-14													
Abu Tabari 02/28-15		66.67	75.76	69.70	42.42			81.43	116.36	59.65	34.29	127.27	80.81
Abu Tabari 02/28-20													
Abu Tabari 02/28-21			73.02	73.02	38.10	76.29	30.19	87.14	135.85	52.46	40.00	132.08	39.17
Abu Tabari 02/28-22	67.23					93.08	30.77	76.97	142.31	58.12	39.47	146.15	44.87
Abu Tabari 02/28-23	72.78		62.86	45.71	45.71	76.47	32.14	69.70		73.91	39.39	117.86	29.41
Abu Tabari 03/31													
Abu Tabari 03/34-1													
Conical Hill 95/4	66.67		87.50	100.00				73.91		52.94			72.83
Conical Hill 95/4-1													
Conical Hill 02/3-4								80.00		53.33	46.67		64.22
Djabarona 96/1-1	75.14		104.35	82.61	41.30	72.53		62.50		73.33	37.50		42.86
Djabarona 96/1-2													31.25
Djabarona 96-4													42.04
Djabarona 96/120-3													
Djabarona 96/120-4													
Djabarona 96/120-5								83.87		44.23	32.26		

	ICM001	ICM002	ICM003	ICM004	ICM005	ICM006	ICM007	ICM008	ICM009	ICM010	ICM011	ICM012	ICM013
♂ No.	1	0	1	1	0	0	1	2	0	2	2	1	4
♂ Min.	66.667		87.500	100.000			43.396	73.913		52.941	35.897	147.170	42.035
♂ Max.	66.667		87.500	100.000			43.396	80.000		53.333	46.667	147.170	72.835
♂ Mode													
♂ Median	66.667		87.500	100.000			43.396	76.957		53.137	41.282	147.170	65.724
♂ Mean	66.667		87.500	100.000			43.396	76.957		53.137	41.282	147.170	61.579
♂ S.D.								4.304		0.277	7.615		13.509
♀ No.	4	2	7	7	6	7	5	8	5	8	9	7	11
♀ Min.	67.227	66.667	62.857	45.714	38.095	70.213	30.189	62.500	116.364	43.548	32.258	117.857	29.412
♀ Max.	75.145	81.818	110.345	82.609	56.897	93.333	48.889	87.143	146.154	73.913	40.000	160.000	80.808
♀ Mode													
♀ Median	72.805	74.242	78.788	73.016	44.069	76.289	32.143	79.201	142.308	58.884	37.500	132.075	50.459
♀ Mean	71.995	74.242	84.474	69.978	45.487	79.718	36.859	77.187	137.024	58.601	36.529	137.593	51.158
♀ S.D.	3.365	10.714	17.196	12.379	6.644	9.499	8.340	8.117	12.192	11.638	3.011	14.600	16.235
No.	5	2	8	8	6	7	6	10	5	10	11	8	15
Min.	66.667	66.667	62.857	45.714	38.095	70.213	30.189	62.500	116.364	43.548	32.258	117.857	29.412
Max.	75.145	81.818	110.345	100.000	56.897	93.333	48.889	87.143	146.154	73.913	46.667	160.000	80.808
Mode													
Median	72.778	74.242	82.497	74.439	44.069	76.289	37.225	78.487	142.308	55.726	37.500	139.115	50.847
Mean	70.930	74.242	84.852	73.731	45.487	79.718	37.949	77.141	137.024	57.508	37.393	138.790	53.937
S.D.	3.764	10.714	15.956	15.621	6.644	9.499	7.923	7.302	12.192	10.520	4.092	13.935	15.815

All descriptive statistics were calculated without sub-adult values.

Appendix XIII.B. Dental indices

	IDM001 - I74. Crown index UI1	IDM002 - I74. Crown index UI2	IDM003 - I74. Crown index UC	IDM004 - I74. Crown index UP1	IDM005 - I74. Crown index UP2	IDM006 - I74. Crown index UM1	IDM007 - I74. Crown index UM2	IDM008 - I74. Crown index UM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2	91.954	92.857	106.250				116.290	125.263
Abu Tabari 02/1-3								126.374
Abu Tabari 02/1-5								
Abu Tabari 02/1-6								
Abu Tabari 02/1-7					137.500			
Abu Tabari 02/1-8	67.580	77.011	102.747	127.922	126.115	107.143	114.762	113.706
Abu Tabari 02/28-2	82.949	89.773				98.513	108.077	
02/28-2 (*Dentes decidui*)	79.268	90.580	82.099	104.040	101.351			
Abu Tabari 02/28-3	79.048	90.533	110.920				127.619	
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	69.820	77.707	101.190	135.032	143.796	110.435	127.228	126.804
Abu Tabari 02/28-7	78.947		105.455	127.044	135.172	99.209	96.124	108.120
Abu Tabari 02/28-8	77.665		117.123	125.926	140.580	97.071	99.563	99.561
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	74.661	80.108	104.839	125.568	137.647	102.583	112.157	
02/28-14 (*Dentes decidui*)			88.485	124.848	113.333			
Abu Tabari 02/28-15	80.925	85.430	105.660	131.034	134.028	105.991	111.165	147.170
Abu Tabari 02/28-20	76.364							116.981
Abu Tabari 02/28-21	80.435	96.923	99.367	130.667	139.130			
Abu Tabari 02/28-22	81.319		96.970	135.036	137.063	114.019	116.509	118.932
Abu Tabari 02/28-23	81.319			136.364	149.275	108.850	115.196	118.090
Abu Tabari 03/31								
Abu Tabari 03/34-1	88.587	97.872	120.130	132.468	132.680	109.052	105.983	128.495
Conical Hill 95/4	78.641	96.552	103.825					108.120
Conical Hill 95/4-1				130.769				113.333
Conical Hill 02/3-4								
Djabarona 96/1-1	68.421		93.056			101.770	107.767	122.951
Djabarona 96/1-2							112.931	132.057
Djabarona 96-4								
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM001	IDM002	IDM003	IDM004	IDM005	IDM006	IDM007	IDM008
♂ No.	5	4	3	2	3	3	3	3
♂ Min.	67.580	77.011	102.747	125.568	126.115	98.513	108.077	108.120
♂ Max.	82.949	96.552	104.839	127.922	137.647	107.143	114.762	116.981
♂ Mode								
♂ Median	76.364	84.940	103.825	126.745	137.500	102.583	112.157	113.706
♂ Mean	76.039	85.861	103.804	126.745	133.754	102.746	111.665	112.935
♂ S.D.	5.659	8.963	1.046	1.664	6.616	4.317	3.369	4.481
♀ No.	11	6	10	9	8	8	11	12
♀ Min.	68.421	77.707	93.056	125.926	132.680	97.071	96.124	99.561
♀ Max.	91.954	97.872	120.130	136.364	149.275	114.019	127.619	147.170
♀ Mode	81.319							
♀ Median	80.435	91.695	105.557	131.034	138.097	107.420	112.931	124.107
♀ Mean	79.858	90.220	105.612	131.593	138.965	105.800	112.398	122.263
♀ S.D.	6.827	7.617	8.582	3.568	5.531	5.914	9.927	12.157
No.	16	10	13	11	11	11	14	15
Min.	67.580	77.011	93.056	125.568	126.115	97.071	96.124	99.561
Max.	91.954	97.872	120.130	136.364	149.275	114.019	127.619	147.170
Mode	81.319							108.120
Median	78.997	90.153	104.839	130.769	137.500	105.991	112.544	118.932
Mean	78.665	88.477	105.195	130.712	137.544	104.967	112.241	120.397
S.D.	6.554	8.005	7.486	3.783	6.008	5.499	8.812	11.572

All descriptive statistics were calculated without milk tooth (*Dens deciduus*) and peg-shaped molar values.

	IDM009 - I74. Crown index LI1	IDM010 - I74. Crown index LI2	IDM011 - I74. Crown index LC	IDM012 - I74. Crown index LP1	IDM013 - I74. Crown index LP2	IDM014 - I74. Crown index LM1	IDM015 - I74. Crown index LM2	IDM016 - I74. Crown index LM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2	131.373	106.870	106.164	118.000	122.876	103.478	101.293	100.461
Abu Tabari 02/1-3			116.912	115.753	132.824	99.541	91.703	98.165
Abu Tabari 02/1-5					125.641		100.000	
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	97.561	92.254	98.089	96.855	108.125	94.043	93.249	91.803
Abu Tabari 02/28-2	102.963	105.594	110.303			102.756	92.593	
02/28-2 (*Dentes decidui*)		91.150	90.511	93.443	93.043			
Abu Tabari 02/28-3	109.677	110.606	115.584		127.027		100.452	95.359
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	97.674	94.776	100.641	116.250	117.308	97.581	100.855	99.163
Abu Tabari 02/28-7		100.000	102.158	114.583	109.434	91.429	88.259	82.677
Abu Tabari 02/28-8		90.299	106.061	108.974	124.832		97.285	92.237
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	100.741	89.865	102.857	111.602	115.556	93.448	95.620	
02/28-14 (*Dentes decidui*)	91.379	95.798	94.406	94.444	93.443			
Abu Tabari 02/28-15	102.655	104.464	106.569	106.667	115.278	94.737	90.000	108.791
Abu Tabari 02/28-20		102.740						88.806
Abu Tabari 02/28-21	104.630	93.701	98.592	100.000	124.638		96.444	98.605
Abu Tabari 02/28-22			100.704		112.162	100.433	101.299	95.595
Abu Tabari 02/28-23	126.316	101.613	108.824	113.699	108.805	98.696	100.000	100.457
Abu Tabari 03/31								
Abu Tabari 03/34-1	106.034	102.439	102.041	109.877	107.229	96.234	92.017	96.098
Conical Hill 95/4			112.346	106.748			97.692	86.220
Conical Hill 95/4-1								
Conical Hill 02/3-4							89.344	
Djabarona 96/1-1	87.719		96.875	98.639	98.551	96.234	90.517	86.134
Djabarona 96/1-2								88.889
Djabarona 96-4						95.726		
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM009	IDM010	IDM011	IDM012	IDM013	IDM014	IDM015	IDM016
♂ No.	3	4	4	3	3	4	6	3
♂ Min.	97.561	89.865	98.089	96.855	108.125	93.448	89.344	86.220
♂ Max.	102.963	105.594	112.346	111.602	125.641	102.756	100.000	91.803
♂ Mode								
♂ Median	100.741	97.497	106.580	106.748	115.556	94.885	94.435	88.806
♂ Mean	100.422	97.613	105.899	105.069	116.441	96.493	94.750	88.943
♂ S.D.	2.715	7.719	6.613	7.516	8.791	4.285	3.824	2.794
♀ No.	8	9	12	10	12	9	12	13
♀ Min.	87.719	90.299	96.875	98.639	98.551	91.429	88.259	82.677
♀ Max.	131.373	110.606	116.912	118.000	132.824	103.478	101.299	108.791
♀ Mode						96.234		
♀ Median	105.332	101.613	104.109	111.788	116.293	97.581	96.865	96.098
♀ Mean	108.260	100.530	105.094	110.244	116.747	97.596	95.844	95.587
♀ S.D.	14.371	6.583	6.287	6.762	9.959	3.492	5.021	6.848
No.	11	13	16	13	15	13	18	16
Min.	87.719	89.865	96.875	96.855	98.551	91.429	88.259	82.677
Max.	131.373	110.606	116.912	118.000	132.824	103.478	101.299	108.791
Mode						96.234	100.000	
Median	102.963	101.613	104.459	109.877	115.556	96.234	96.032	95.477
Mean	106.122	99.632	105.295	109.050	116.686	97.257	95.479	94.341
S.D.	12.627	6.764	6.153	6.990	9.434	3.606	4.571	6.763

	IDM017 - I75. Crown area UI1	IDM018 - I75. Crown area UI2	IDM019 - I75. Crown area UC	IDM020 - I75. Crown area UP1	IDM021 - I75. Crown area UP2	IDM022 - I75. Crown area UM1	IDM023 - I75. Crown area UM2	IDM024 - I75. Crown area UM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2	69.600	65.520	68.000				141.993	113.050
Abu Tabari 02/1-3								104.650
Abu Tabari 02/1-5								
Abu Tabari 02/1-6								
Abu Tabari 02/1-7					71.280			
Abu Tabari 02/1-8	81.030	58.290	85.085	75.845	77.715	134.400	126.525	110.320
Abu Tabari 02/28-2	97.650	69.520				178.213	182.650	
02/28-2 (*Dentes decidui*)	53.300	43.125	53.865	101.970	124.875			
Abu Tabari 02/28-3	87.150	64.643	83.955				140.700	
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	86.025	47.885	71.400	83.210	67.473	146.050	129.785	119.310
Abu Tabari 02/28-7	71.250		71.775	80.295	71.050	158.758	159.960	148.005
Abu Tabari 02/28-8	75.353		62.415	82.620	66.930	138.620	130.530	129.390
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	91.163	69.285	90.675	97.240	99.450	188.345	182.325	
02/28-14 (*Dentes decidui*)			60.225	84.975	124.950			
Abu Tabari 02/28-15	60.550	48.698	66.780	68.875	69.480	124.775	117.935	93.015
Abu Tabari 02/28-20	92.400							131.440
Abu Tabari 02/28-21	68.080	40.950	62.015	73.500	66.240			
Abu Tabari 02/28-22	67.340		66.000	63.363	70.070	130.540	130.910	126.175
Abu Tabari 02/28-23	67.340			80.850	71.070	138.990	119.850	116.913
Abu Tabari 03/31								
Abu Tabari 03/34-1	74.980	48.645	71.225	78.540	77.648	146.740	145.080	111.135
Conical Hill 95/4	83.430	73.080	86.925					148.005
Conical Hill 95/4-1				79.560				124.950
Conical Hill 02/3-4								
Djabarona 96/1-1	61.750		48.240			129.950	114.330	102.938
Djabarona 96/1-2							151.960	144.210
Djabarona 96-4								
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM017	IDM018	IDM019	IDM020	IDM021	IDM022	IDM023	IDM024
♂ No.	5	4	3	2	3	3	3	3
♂ Min.	81.030	58.290	85.085	75.845	71.280	134.400	126.525	110.320
♂ Max.	97.650	73.080	90.675	97.240	99.450	188.345	182.650	148.005
♂ Mode								
♂ Median	91.163	69.403	86.925	86.543	77.715	178.213	182.325	131.440
♂ Mean	89.135	67.544	87.562	86.543	82.815	166.986	163.833	129.922
♂ S.D.	6.810	6.409	2.849	15.129	14.761	28.671	32.310	18.888
♀ No.	11	6	10	9	8	8	11	12
♀ Min.	60.550	40.950	48.240	63.363	66.240	124.775	114.330	93.015
♀ Max.	87.150	65.520	83.955	83.210	77.648	158.758	159.960	148.005
♀ Mode	67.340							
♀ Median	69.600	48.671	67.390	79.560	69.775	138.805	130.910	118.111
♀ Mean	71.765	52.723	67.181	76.757	69.995	139.303	134.821	119.478
♀ S.D.	8.643	10.007	9.111	6.787	3.605	11.053	14.509	16.264
No.	16	10	13	11	11	11	14	15
Min.	60.550	40.950	48.240	63.363	66.240	124.775	114.330	93.015
Max.	97.650	73.080	90.675	97.240	99.450	188.345	182.650	148.005
Mode	67.340							148.005
Median	75.166	61.466	71.225	79.560	71.050	138.990	135.805	119.310
Mean	77.193	58.652	71.884	78.536	73.491	146.853	141.038	121.567
S.D.	11.459	11.309	11.979	8.684	9.409	20.424	21.798	16.658

	IDM025 - I75. Crown area LI1	IDM026 - I75. Crown area LI2	IDM027 - I75. Crown area LC	IDM028 - I75. Crown area LP1	IDM029 - I75. Crown area LP2	IDM030 - I75. Crown area LM1	IDM031 - I75. Crown area LM2	IDM032 - I75. Crown area LM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2	34.170	45.850	56.575	66.375	71.910	136.850	136.300	118.265
Abu Tabari 02/1-3			54.060	61.685	56.985	118.265	120.225	116.630
Abu Tabari 02/1-5					76.440		141.610	
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	36.900	46.505	60.445	61.215	69.200	129.838	130.943	136.640
Abu Tabari 02/28-2	46.913	53.983	75.075			165.735	168.750	
02/28-2 (*Dentes decidui*)		29.098	42.470	78.233	123.050			
Abu Tabari 02/28-3	42.160	48.180	68.530		69.560		122.655	133.905
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	40.635	42.545	61.230	74.400	71.370	150.040	138.060	141.608
Abu Tabari 02/28-7		39.063	49.345	59.400	69.165	137.200	134.615	133.350
Abu Tabari 02/28-8		40.535	46.200	66.300	69.285		118.788	110.595
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	45.900	49.210	78.750	91.405	93.600	196.475	179.470	
02/28-14 (*Dentes decidui*)	30.740	33.915	48.263	92.565	139.080			
Abu Tabari 02/28-15	32.770	32.760	50.005	60.000	59.760	123.120	108.900	90.090
Abu Tabari 02/28-20		54.750						159.460
Abu Tabari 02/28-21	30.510	37.783	49.700	65.610	59.340		122.063	113.950
Abu Tabari 02/28-22			50.765		61.420	133.980	135.135	123.148
Abu Tabari 02/28-23	41.040	39.060	50.320	60.590	68.768	130.525	122.103	120.450
Abu Tabari 03/31								
Abu Tabari 03/34-1	35.670	38.745	55.125	72.090	73.870	137.425	130.305	100.963
Conical Hill 95/4			73.710	70.905			165.100	139.065
Conical Hill 95/4-1								
Conical Hill 02/3-4							132.980	
Djabarona 96/1-1	28.500		39.680	53.288	46.920	137.425	121.800	121.975
Djabarona 96/1-2								162.000
Djabarona 96-4						131.040		
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM025	IDM026	IDM027	IDM028	IDM029	IDM030	IDM031	IDM032
♂ No.	3	4	4	3	3	4	6	3
♂ Min.	36.900	46.505	60.445	61.215	69.200	129.838	130.943	136.640
♂ Max.	46.913	54.750	78.750	91.405	93.600	196.475	179.470	159.460
♂ Mode								
♂ Median	45.900	51.596	74.393	70.905	76.440	148.388	153.355	139.065
♂ Mean	43.238	51.112	71.995	74.508	79.747	155.772	153.142	145.055
♂ S.D.	5.512	3.929	7.989	15.414	12.532	31.834	20.553	12.534
♀ No.	8	9	12	10	12	9	12	13
♀ Min.	28.500	32.760	39.680	53.288	46.920	118.265	108.900	90.090
♀ Max.	42.160	48.180	68.530	74.400	73.870	150.040	138.060	162.000
♀ Mode						137.425		
♀ Median	34.920	39.063	50.543	63.648	68.966	136.850	122.379	120.450
♀ Mean	35.682	40.502	52.628	63.974	64.863	133.870	125.912	122.071
♀ S.D.	5.131	4.559	7.353	6.290	7.982	9.199	8.867	18.159
No.	11	13	16	13	15	13	18	16
Min.	28.500	32.760	39.680	53.288	46.920	118.265	108.900	90.090
Max.	46.913	54.750	78.750	91.405	93.600	196.475	179.470	162.000
Mode						137.425		
Median	36.900	42.545	54.593	65.610	69.200	136.850	131.961	122.561
Mean	37.743	43.767	57.470	66.405	67.840	140.609	134.989	126.381
S.D.	6.080	6.610	11.288	9.519	10.511	20.505	18.697	19.251

	IDM033 - Asymmetry index UI1	IDM034 - Asymmetry index UI2	IDM035 - Asymmetry index UC	IDM036 - Asymmetry index UP1	IDM037 - Asymmetry index UP2	IDM038 - Asymmetry index UM1	IDM039 - Asymmetry index UM2	IDM040 - Asymmetry index UM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2	0.0359281	0.0246914					0.0083682	
Abu Tabari 02/1-3								
Abu Tabari 02/1-5								
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	0.0163488	0.0000000	0.0162602	0.0512821	0.0169014	0.0086207	0.0133038	0.0142518
Abu Tabari 02/28-2	0.0050378					0.0074906	0.0184843	
02/28-2 (*Dentes decidui*)								
Abu Tabari 02/28-3		0.0124224	0.0054496					
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	0.0265252	0.0215054	0.0236686		0.0119760		0.0305011	0.0545455
Abu Tabari 02/28-7			0.0176991	0.0277008	0.0293255	0.0238095		0.1273101
Abu Tabari 02/28-8	0.0228571		0.0441640		0.0240964	0.0127389	0.0831510	0.0131868
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	0.0103627	0.0417910	0.0052493	0.0151134	0.0396040	0.0255009	0.0258780	
02/28-14 (*Dentes decidui*)								
Abu Tabari 02/28-15	0.0063898	0.0285714	0.0061162	0.0179104	0.0296736	0.0402685	0.0321839	0.0254453
Abu Tabari 02/28-20								
Abu Tabari 02/28-21			0.0317460					
Abu Tabari 02/28-22			0.0184615	0.0372671			0.0392157	0.0133038
Abu Tabari 02/28-23				0.0109890	0.0465116	0.0169492	0.0592255	0.0184332
Abu Tabari 03/31								
Abu Tabari 03/34-1	0.0403458	0.0071685	0.0058997	0.0111732	0.0449438	0.0041237	0.0082988	0.0423529
Conical Hill 95/4		0.0350877	0.0053619					0.0123203
Conical Hill 95/4-1								
Conical Hill 02/3-4								
Djabarona 96/1-1			0.0000000					0.0196078
Djabarona 96/1-2								0.0288660
Djabarona 96-4								
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM033	IDM034	IDM035	IDM036	IDM037	IDM038	IDM039	IDM040
♂ No.	3	3	3	2	2	3	3	2
♂ Min.	0.0050378	0.0000000	0.0052493	0.0151134	0.0169014	0.0074906	0.0133038	0.0123203
♂ Max.	0.0163488	0.0417910	0.0162602	0.0512821	0.0396040	0.0255009	0.0258780	0.0142518
♂ Mode								
♂ Median	0.0103627	0.0350877	0.0053619	0.0331977	0.0282527	0.0086207	0.0184843	0.0132861
♂ Mean	0.0105831	0.0256263	0.0089571	0.0331977	0.0282527	0.0138707	0.0192220	0.0132861
♂ S.D.	0.0056587	0.0224447	0.0063248	0.0255751	0.0160531	0.0100879	0.0063195	0.0013657
♀ No.	5	5	9	5	6	5	7	9
♀ Min.	0.0063898	0.0071685	0.0000000	0.0109890	0.0119760	0.0041237	0.0082988	0.0131868
♀ Max.	0.0403458	0.0285714	0.0441640	0.0372671	0.0465116	0.0402685	0.0831510	0.1273101
♀ Mode								
♀ Median	0.0265252	0.0215054	0.0176991	0.0179104	0.0294996	0.0169492	0.0321839	0.0254453
♀ Mean	0.0264092	0.0188718	0.0170228	0.0210081	0.0310878	0.0195779	0.0372777	0.0381168
♀ S.D.	0.0132122	0.0088522	0.0144331	0.0113562	0.0130317	0.0135879	0.0268863	0.0361536
No.	8	8	12	7	8	8	10	11
Min.	0.0050378	0.0000000	0.0000000	0.0109890	0.0119760	0.0041237	0.0082988	0.0123203
Max.	0.0403458	0.0417910	0.0441640	0.0512821	0.0465116	0.0402685	0.0831510	0.1273101
Mode								
Median	0.0196030	0.0230984	0.0111882	0.0179104	0.0294996	0.0148440	0.0281895	0.0196078
Mean	0.0204744	0.0214047	0.0150064	0.0244909	0.0303790	0.0174377	0.0318610	0.0336021
S.D.	0.0132660	0.0141750	0.0131179	0.0151779	0.0126428	0.0119709	0.0238088	0.0338636

	IDM041 - Asymmetry index LI1	IDM042 - Asymmetry index LI2	IDM043 - Asymmetry index LC	IDM044 - Asymmetry index LP1	IDM045 - Asymmetry index LP2	IDM046 - Asymmetry index LM1	IDM047 - Asymmetry index LM2	IDM048 - Asymmetry index LM3
Abu Tabari 95/2-3								
Abu Tabari 02/1-2		0.0221402	0.0332226	0.0428135	0.0175953	0.0170940	0.0128480	0.0229885
Abu Tabari 02/1-3					0.0327869		0.0318907	
Abu Tabari 02/1-5								
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	0.0082305	0.0366300		0.0063898	0.0420420	0.0175439	0.0262009	
Abu Tabari 02/28-2	0.0145985	0.0272109	0.0172911			0.0271845	0.0153846	
02/28-2 (*Dentes decidui*)								
Abu Tabari 02/28-3	0.0000000	0.0575540	0.0120482					0.0215983
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	0.0078431	0.0229885	0.0063898	0.0115607	0.0766962	0.0163265	0.0340426	0.0084034
Abu Tabari 02/28-7		0.0160000	0.0071174	0.0064725	0.0120120		0.0129032	
Abu Tabari 02/28-8		0.0078431		0.0122699	0.0776119		0.0183486	0.0237530
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	0.0369004	0.0355872	0.0281690	0.0156658	0.0206186	0.0392157		
02/28-14 (*Dentes decidui*)								
Abu Tabari 02/28-15	0.0087336	0.0786026	0.0070671					
Abu Tabari 02/28-20								
Abu Tabari 02/28-21	0.0090498	0.0162602	0.0283688				0.0090498	0.0234192
Abu Tabari 02/28-22			0.0070175					0.0360360
Abu Tabari 02/28-23	0.0000000				0.0120482	0.0043764	0.0090498	0.0136674
Abu Tabari 03/31								
Abu Tabari 03/34-1	0.0418410		0.0336700	0.0000000	0.0232558	0.0042644	0.0131291	0.0796020
Conical Hill 95/4								0.0126850
Conical Hill 95/4-1								
Conical Hill 02/3-4								
Djabarona 96/1-1			0.0317460	0.0410959			0.0180995	0.0316027
Djabarona 96/1-2								0.0470588
Djabarona 96-4								
Djabarona 96/120-3								
Djabarona 96/120-4								
Djabarona 96/120-5								

	IDM041	IDM042	IDM043	IDM044	IDM045	IDM046	IDM047	IDM048
♂ No.	3	3	2	2	2	3	2	1
♂ Min.	0.0082305	0.0272109	0.0172911	0.0063898	0.0206186	0.0175439	0.0153846	0.0126850
♂ Max.	0.0369004	0.0366300	0.0281690	0.0156658	0.0420420	0.0392157	0.0262009	0.0126850
♂ Mode								
♂ Median	0.0145985	0.0355872	0.0227300	0.0110278	0.0313303	0.0271845	0.0207927	0.0126850
♂ Mean	0.0199098	0.0331427	0.0227300	0.0110278	0.0313303	0.0279813	0.0207927	0.0126850
♂ S.D.	0.0150548	0.0051635	0.0076919	0.0065591	0.0151487	0.0108579	0.0076482	
♀ No.	6	7	9	6	7	4	9	10
♀ Min.	0.0000000	0.0078431	0.0063898	0.0000000	0.0120120	0.0042644	0.0090498	0.0084034
♀ Max.	0.0418410	0.0786026	0.0336700	0.0428135	0.0776119	0.0170940	0.0340426	0.0796020
♀ Mode	0.0000000						0.0090498	
♀ Median	0.0082884	0.0221402	0.0120482	0.0119153	0.0232558	0.0103514	0.0131291	0.0235861
♀ Mean	0.0112446	0.0316269	0.0185164	0.0190354	0.0360009	0.0105153	0.0177068	0.0308129
♀ S.D.	0.0155674	0.0261073	0.0127482	0.0182969	0.0290067	0.0071603	0.0092610	0.0203279
No.	9	10	11	8	9	7	11	11
Min.	0.0000000	0.0078431	0.0063898	0.0000000	0.0120120	0.0042644	0.0090498	0.0084034
Max.	0.0418410	0.0786026	0.0336700	0.0428135	0.0776119	0.0392157	0.0340426	0.0796020
Mode	0.0000000						0.0090498	
Median	0.0087336	0.0250997	0.0172911	0.0119153	0.0232558	0.0170940	0.0153846	0.0234192
Mean	0.0141330	0.0320817	0.0192825	0.0170335	0.0349630	0.0180008	0.0182679	0.0291649
S.D.	0.0150631	0.0214676	0.0117828	0.0160938	0.0257675	0.0123326	0.0087190	0.0200443

Appendix XIII.C. Postcranial indices

	IPM001 - HI1. Robusticity index	IPM002 - *HI1b. Modified robusticity index	IPM003 - *HI1c. Pearson's robusticity index	IPM004 - HI2. Diaphyseal index	IPM005 - Humeral cortical thickness index	IPM006 - *RI1b. Modified robusticity index	IPM007 - RI2. Diaphyseal index	IPM008 - *RI1c. Pearson's robusticity index	IPM009 - Radial cortical thickness index	IPM010 - *UI1b. Modified robusticity index	IPM011 - *UI1c. Pearson's robusticity index	IPM012 - UI6. Diaphyseal index
Abu Tabari 95/2-3	17.88	19.70	11.97	68.09	16.92		66.67		17.39	15.93	10.37	64.71
Abu Tabari 02/1-2	16.18	16.91	10.15	74.68	18.26	14.95	79.31	10.51	24.36	12.68	11.27	76.47
Abu Tabari 02/1-3	16.24	17.29	10.30	75.64	13.91		85.71		17.50	12.45	11.13	73.53
Abu Tabari 02/1-5	16.52	17.39	10.72	72.09	16.67	14.23				12.55	10.55	75.76
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		18.06	11.29	79.49	16.96							
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	20.32	20.86	13.10	81.48			72.09			15.77	14.09	82.61
Abu Tabari 02/28-3	16.97	18.03	11.21	85.00	14.29					12.83	11.04	69.57
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	20.36	22.18	13.91	68.13	11.48	16.22	66.13	11.44	15.09	15.32	11.70	86.44
Abu Tabari 02/28-7		17.59	10.34	76.47	12.75							
Abu Tabari 02/28-8							71.43	10.91	18.42		11.41	87.50
Abu Tabari 02/28-11						15.74	70.00	10.85	19.51	14.00	11.10	76.19
Abu Tabari 02/28-13												
Abu Tabari 02/28-14		27.10	17.10	96.30	17.86							
Abu Tabari 02/28-15						14.34	75.00	10.57	20.24	12.86	10.89	79.41
Abu Tabari 02/28-20				84.21	17.24							
Abu Tabari 02/28-21	20.17	20.50	12.58	81.93	11.38						11.67	133.33
Abu Tabari 02/28-22	18.55	20.16	12.34	73.86	11.20	15.20	68.25	10.82	15.66	13.46	11.54	90.48
Abu Tabari 02/28-23				75.00	14.55							
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4				90.63	16.00							
Djabarona 96/1-1	18.06	18.55	11.45	91.89	15.65	15.00			19.44	11.73	9.42	81.48
Djabarona 96/1-2	18.25	19.65	12.28	84.21	16.07							
Djabarona 96-4				88.89	13.64							
Djabarona 96/120-3												
Djabarona 96/120-4	15.65	16.52	9.42	66.67	14.04					10.71	9.29	73.33
Djabarona 96/120-5												

	IPM001	IPM002	IPM003	IPM004	IPM005	IPM006	IPM007	IPM008	IPM009	IPM010	IPM011	IPM012
♂ No.	3	4	4	7	7	2	2	1	2	4	4	4
♂ Min.	15.652	16.522	9.420	66.667	13.636	14.231	66.667	10.851	17.391	10.714	9.286	64.706
♂ Max.	17.879	19.697	11.970	90.625	17.241	15.745	70.000	10.851	19.512	15.926	11.100	76.190
♂ Mode												
♂ Median	16.522	17.728	11.007	79.487	16.667	14.988	68.333	10.851	18.452	13.273	10.458	74.545
♂ Mean	16.684	17.919	10.851	78.579	15.924	14.988	68.333	10.851	18.452	13.296	10.325	72.497
♂ S.D.	1.122	1.343	1.081	9.815	1.482	1.070	2.357		1.500	2.209	0.760	5.344
♀ No.	8	9	9	10	10	5	6	5	7	7	9	9
♀ Min.	16.176	16.912	10.147	68.132	11.200	14.340	66.129	10.505	15.094	11.731	9.423	69.565
♀ Max.	20.364	22.182	13.909	91.892	18.261	16.222	85.714	11.444	24.359	15.319	11.702	133.333
♀ Mode												
♀ Median	18.155	18.548	11.452	76.056	14.099	15.000	73.214	10.816	18.421	12.830	11.268	81.481
♀ Mean	18.097	18.985	11.619	78.682	13.953	15.143	74.306	10.848	18.674	13.047	11.119	86.468
♀ S.D.	1.606	1.752	1.267	6.942	2.314	0.684	7.314	0.373	3.127	1.128	0.694	18.845
No.	11	13	13	17	17	7	8	6	9	11	13	13
Min.	15.652	16.522	9.420	66.667	11.200	14.231	66.129	10.505	15.094	10.714	9.286	64.706
Max.	20.364	22.182	13.909	91.892	18.261	16.222	85.714	11.444	24.359	15.926	11.702	133.333
Mode				84.211								
Median	17.879	18.065	11.290	76.471	14.545	15.000	70.714	10.834	18.421	12.830	11.100	76.471
Mean	17.712	18.657	11.383	78.640	14.765	15.099	72.813	10.849	18.625	13.138	10.875	82.169
S.D.	1.579	1.661	1.224	7.952	2.199	0.713	6.830	0.334	2.762	1.498	0.782	16.999

All descriptive statistics were calculated without sub-adult values.

	IPM013 - *UI10. Crest circumference length index	IPM014 - Ulnar cortical thickness index	IPM015 - *FI1b. Modified length index	IPM016 - *FI2b. Pearson's robusticity index	IPM017 - FI3. *Index pilastericus*	IPM018 - FI4. *Index platymericus*	IPM019 - *FI16. Subtrochanteric index	IPM020 - *FI17. Subtrochanteric robusticity index	IPM021 - *FI18. *Linea aspera* index	IPM022 - Femoral cortical thickness index	IPM023 - 2nd femoral cortical thickness index	IPM024 - TI1. Mid-shaft diameter index
Abu Tabari 95/2-3	17.78	20.93	20.87	11.58	131.52					18.75		62.69
Abu Tabari 02/1-2	18.22	28.15	17.81	11.41	116.83	91.35	16.88	10.36	25.74	19.30	37.43	73.39
Abu Tabari 02/1-3	17.92	15.15	18.84	12.33	130.43	79.25	18.02	11.05	23.91	16.05	33.95	65.52
Abu Tabari 02/1-5	16.36	26.09	17.14	11.26	122.83	89.09	17.36	11.43	20.65	17.95	35.26	66.67
Abu Tabari 02/1-6												
Abu Tabari 02/1-7			20.00	13.03	115.22	69.39	17.89	10.92		19.08	36.18	70.59
Abu Tabari 02/1-8			17.50	11.92	101.41	86.49	17.67	11.50	22.54	15.24	29.52	80.56
Abu Tabari 02/28-2	22.32		19.07	12.26	117.24	83.33	23.93	16.05				77.27
Abu Tabari 02/28-3	16.79	19.12	17.83	11.68	128.72	76.86	17.93	11.63	23.40	17.68	32.32	79.17
Abu Tabari 02/28-4					117.86					17.55	36.17	
Abu Tabari 02/28-5	18.09		20.76	13.23	111.11	71.70	18.99	11.52	25.25	17.07	29.27	93.02
Abu Tabari 02/28-7												
Abu Tabari 02/28-8			19.44	12.64	133.33	76.00		12.22		12.86		73.91
Abu Tabari 02/28-11	17.00	24.29	18.33	12.62	112.00	71.43	18.57	11.43		19.48	39.61	85.19
Abu Tabari 02/28-13												
Abu Tabari 02/28-14										16.35	31.73	87.88
Abu Tabari 02/28-15	16.79	29.17	16.73	11.53	105.45	90.91	17.35	10.71	21.82	17.07	36.59	76.77
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	18.75		18.82	13.41	119.23	86.54	18.82	11.41		14.38	26.88	77.24
Abu Tabari 02/28-22	17.50	25.71	18.99	12.53	110.38	82.46	18.31	11.69	18.87	18.34	36.69	78.43
Abu Tabari 02/28-23												
Abu Tabari 03/31			19.02	12.35	110.00	75.00	19.02	12.35	21.67	17.01	32.47	
Abu Tabari 03/34-1			15.11	9.67	123.08	76.53	14.89	9.61	35.90	18.38	37.50	
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4			17.58	11.21	131.82	88.89	17.58	11.21	20.45	21.25	37.50	
Djabarona 96/1-1			17.21	11.34	126.74	84.62	17.91	11.16				92.00
Djabarona 96/1-2		20.00			121.05	80.77				17.42	31.06	
Djabarona 96-4			18.48	11.52	130.43	88.89	17.39	11.09		21.76	35.29	66.67
Djabarona 96/120-3												
Djabarona 96/120-4	13.93	25.00			117.39							74.07
Djabarona 96/120-5												

	IPM013	IPM014	IPM015	IPM016	IPM017	IPM018	IPM019	IPM020	IPM021	IPM022	IPM023	IPM024
♂ No.	4	4	7	7	9	6	6	6	3	8	7	6
♂ Min.	13.929	20.930	17.143	11.209	110.000	69.388	17.363	10.921	20.455	17.010	32.474	62.687
♂ Max.	17.778	26.087	20.870	13.026	131.818	89.091	19.020	12.353	21.667	21.765	39.610	85.185
♂ Mode						88.889		11.429				66.667
♂ Median	16.682	24.643	18.478	11.576	117.857	81.944	17.739	11.319	20.652	18.914	36.170	68.627
♂ Mean	16.267	24.076	18.775	11.938	121.007	80.448	17.970	11.404	20.924	19.105	36.070	70.978
♂ S.D.	1.663	2.224	1.311	0.720	8.503	9.493	0.682	0.505	0.650	1.694	2.191	7.969
♀ No.	7	6	10	10	11	11	9	10	7	10	9	9
♀ Min.	16.786	15.152	15.111	9.667	105.455	71.698	14.889	9.611	18.868	12.857	26.875	65.517
♀ Max.	18.750	29.167	20.759	13.412	133.333	91.346	18.987	12.222	35.897	19.298	37.500	93.023
♀ Mode										17.073		
♀ Median	17.925	22.857	18.325	12.005	121.053	80.769	17.935	11.287	23.913	17.249	33.951	77.236
♀ Mean	17.722	22.883	18.155	11.976	120.579	81.543	17.678	11.137	24.985	16.856	33.519	78.828
♀ S.D.	0.738	5.612	1.580	1.098	8.994	6.322	1.235	0.750	5.336	1.955	3.880	8.753
No.	11	10	17	17	20	17	15	16	10	18	16	15
Min.	13.929	15.152	15.111	9.667	105.455	69.388	14.889	9.611	18.868	12.857	26.875	62.687
Max.	18.750	29.167	20.870	13.412	133.333	91.346	19.020	12.353	35.897	21.765	39.610	93.023
Mode					130.435	88.889		11.429		17.073	37.500	66.667
Median	17.500	24.643	18.478	11.685	120.142	80.769	17.907	11.310	22.611	17.816	35.732	74.074
Mean	17.193	23.360	18.410	11.960	120.772	81.156	17.795	11.237	23.767	17.855	34.635	75.688
S.D.	1.302	4.419	1.465	0.934	8.548	7.309	1.029	0.663	4.788	2.128	3.414	9.072

	IPM025 - TI2. *Index cnemicus*	IPM026 - *TI3b. Modified length index	IPM027 - *TI5. Modified robusticity index	IPM028 - Tibial cortical thickness index	IPM029 - *Modified radio-humeral index (brachial index)	IPM030 - *Modified tibio-femoral index (crural Index)	IPM031 - *Modified intermembral index
Abu Tabari 95/2-3			13.63	17.78		86.96	
Abu Tabari 02/1-2	67.69	16.07	11.25	21.48	72.79	87.50	65.28
Abu Tabari 02/1-3		16.36	12.47	8.44		89.53	
Abu Tabari 02/1-5				18.57	75.36		
Abu Tabari 02/1-6							
Abu Tabari 02/1-7			13.18			86.84	
Abu Tabari 02/1-8	83.78	18.75	13.54	16.50		80.00	
Abu Tabari 02/28-2	86.30	19.48	13.18			86.38	
Abu Tabari 02/28-3	70.69	16.15	11.03	16.91	75.76	84.78	68.24
Abu Tabari 02/28-4							
Abu Tabari 02/28-5		18.51	12.39	16.67	81.82	84.81	68.49
Abu Tabari 02/28-7							
Abu Tabari 02/28-8			12.90	10.77	81.48	86.11	73.13
Abu Tabari 02/28-11			13.89	12.99		85.71	
Abu Tabari 02/28-13							
Abu Tabari 02/28-14			13.78	17.00			68.89
Abu Tabari 02/28-15	73.02	14.65	10.17			87.76	
Abu Tabari 02/28-20							
Abu Tabari 02/28-21	78.46		14.53	15.29		88.24	
Abu Tabari 02/28-22	81.65	17.05	11.67	18.75	79.03	87.64	66.47
Abu Tabari 02/28-23							
Abu Tabari 03/31							
Abu Tabari 03/34-1							
Conical Hill 95/4							
Conical Hill 95/4-1							
Conical Hill 02/3-4							
Djabarona 96/1-1	79.46	16.49	12.97	15.89	77.42	86.05	68.75
Djabarona 96/1-2							
Djabarona 96-4		18.25	13.75	27.91		86.96	
Djabarona 96/120-3							
Djabarona 96/120-4	68.97	15.79	12.37	19.59	79.71		
Djabarona 96/120-5							

	IPM025	IPM026	IPM027	IPM028	IPM029	IPM030	IPM031
♂ No.	1	2	5	5	2	4	0
♂ Min.	68.966	15.789	12.368	12.987	75.362	85.714	
♂ Max.	68.966	18.250	13.889	27.907	79.710	86.957	
♂ Mode						86.957	
♂ Median	68.966	17.020	13.625	18.571	77.536	86.899	
♂ Mean	68.966	17.020	13.363	19.368	77.536	86.617	
♂ S.D.		1.740	0.616	5.405	3.074	0.604	
♀ No.	6	7	9	8	6	9	6
♀ Min.	67.692	14.651	10.174	8.442	72.794	84.783	65.278
♀ Max.	81.651	18.507	14.533	21.477	81.818	89.535	73.134
♀ Mode							
♀ Median	75.739	16.364	12.388	16.280	78.226	87.500	68.364
♀ Mean	75.163	16.469	12.154	15.525	78.050	86.935	68.393
♀ S.D.	5.512	1.160	1.289	4.175	3.470	1.603	2.685
No.	7	9	14	13	8	13	6
Min.	67.692	14.651	10.174	8.442	72.794	84.783	65.278
Max.	81.651	18.507	14.533	27.907	81.818	89.535	73.134
Mode						86.957	
Median	73.016	16.364	12.685	16.912	78.226	86.957	68.364
Mean	74.277	16.592	12.585	17.003	77.922	86.837	68.393
S.D.	5.550	1.202	1.225	4.867	3.164	1.352	2.685

Appendix XIV. Scaled measurements

Appendix XIV.A. Measurements which formed the basis of the scaling process

	Abu Tabari 95/2-3	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-6	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-4	Abu Tabari 02/28-5	Abu Tabari 02/28-7	Abu Tabari 02/28-8	Abu Tabari 02/28-11	Abu Tabari 02/28-13	Abu Tabari 02/28-14
DM061/62 - 81(1). Crown width LM2 (m)	11.92 (♂ mean)	11.75	10.50	11.90	11.36 (sample mean)	11.92 (♂ mean)	11.05	12.50	11.10	11.92 (♂ mean)	11.80	10.90	10.75	11.92 (♂ mean)	11.36 (sample mean)	13.10
DM057/58 - 81(1). Crown width LP2 (m)								10.70 (*Dens molaris deciduus*)								11.40 (*Dens molaris deciduus*)

	Abu Tabari 02/28-15	Abu Tabari 02/28-20	Abu Tabari 02/28-21	Abu Tabari 02/28-22	Abu Tabari 02/28-23	Abu Tabari 03/31	Abu Tabari 03/34-1	Conical Hill 95/4	Conical Hill 95/4-1	Conical Hill 02/3-4	Djabarona 96/1-1	Djabarona 96/1-2	Djabarona 96-4	Djabarona 96/120-3	Djabarona 96/120-4	Djabarona 96/120-5
DM061/62 - 81(1). Crown width LM2 (m)	9.90	11.92 (♂ mean)	10.85	11.70	11.05	11.92 (♂ mean)	10.95	12.70	11.06 (♀ mean)	10.90	10.50	12.00	11.30	11.06 (♀ mean)	11.92 (♂ mean)	11.06 (♀ mean)
DM057/58 - 81(1). Crown width LP2 (m)																

Milk molar (*Dens molaris deciduus*) measurements were used to scale the cranial and postcranial measurements of Abu Tabari 02/28-2 and -14. These scaled values, like all other cranial and postcranial sub-adult scaled values, were, however, not in included in the descriptive statistics.

Appendix XIV.B. Scaled cranial measurements

	SCM001 - 1. Maximum cranial length	SCM002 - 3. *Glabello-Lambda* length	SCM003 - 8. Maximum cranial breadth	SCM004 - 9. Least frontal breadth	SCM005 - 10. Maximum frontal breadth	SCM006 - 12. Biasterionic breadth	SCM007 - 13a. Mastoid width (l)	SCM008 - 13a. Mastoid width (r)	SCM007/8 - 13a. Mastoid width (m)	SCM009 - 17. *Basion-Bregma* height	SCM010 - 19a. Mastoid height (l)	SCM011 - 19a. Mastoid height (r)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2								1.1915	1.1915			2.7234
Abu Tabari 02/1-3							1.2381	1.1905	1.2143		2.5714	2.8571
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	15.7944	15.0467	11.4953	7.3832		9.8131	0.7944		0.7944	11.9626	2.3364	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			10.9322	8.7712			1.2712		1.2712		2.7966	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	16.0930	15.2558	11.7209	6.9767		9.4884	1.0233		1.0233	11.9070	2.6977	
Abu Tabari 02/28-11				8.4732								
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15						10.2525						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	15.2564	14.5299	10.2564	7.6923	8.9744	8.0342	0.7692	0.6838	0.7265	12.8205		1.7949
Abu Tabari 02/28-23	16.2896	15.3846	11.8552									
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	16.5354		11.0236			9.8425				11.4173		
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	16.4762	16.0000	12.3810			10.0000				12.4762		
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5							0.8137		0.8137		2.2604	

	SCM001	SCM002	SCM003	SCM004	SCM005	SCM006	SCM007	SCM008	SCM007/8	SCM009	SCM010	SCM011
♂ No.	1	0	1	1	0	1	0	0	0	1	0	0
♂ Min.	16.5354		11.0236	8.4732		9.8425				11.4173		
♂ Max.	16.5354		11.0236	8.4732		9.8425				11.4173		
♂ Mode												
♂ Median	16.5354		11.0236	8.4732		9.8425				11.4173		
♂ Mean	16.5354		11.0236	8.4732		9.8425				11.4173		
♂ S.D.												
♀ No.	4	4	5	3	1	4	5	3	6	3	4	3
♀ Min.	15.2564	14.5299	10.2564	6.9767	8.9744	8.0342	0.7692	0.6838	0.7265	11.9070	2.2604	1.7949
♀ Max.	16.4762	16.0000	12.3810	8.7712	8.9744	10.2525	1.2712	1.1915	1.2712	12.8205	2.7966	2.8571
♀ Mode												
♀ Median	16.1913	15.3202	11.7209	7.6923	8.9744	9.7442	1.0233	1.1905	1.1074	12.4762	2.6346	2.7234
♀ Mean	16.0288	15.2926	11.4291	7.8134	8.9744	9.4438	1.0231	1.0219	1.0401	12.4012	2.5815	2.4585
♀ S.D.	0.5382	0.6033	0.8359	0.9033		0.9920	0.2324	0.2928	0.2265	0.4614	0.2331	0.5786
No.	5	4	6	4	1	5	5	3	6	4	4	3
Min.	15.2564	14.5299	10.2564	6.9767	8.9744	8.0342	0.7692	0.6838	0.7265	11.4173	2.2604	1.7949
Max.	16.5354	16.0000	12.3810	8.7712	8.9744	10.2525	1.2712	1.1915	1.2712	12.8205	2.7966	2.8571
Mode												
Median	16.2896	15.3202	11.3723	8.0827	8.9744	9.8425	1.0233	1.1905	1.1074	12.1916	2.6346	2.7234
Mean	16.1301	15.2926	11.3616	7.9783	8.9744	9.5235	1.0231	1.0219	1.0401	12.1553	2.5815	2.4585
S.D.	0.5182	0.6033	0.7658	0.8080		0.8774	0.2324	0.2928	0.2265	0.6196	0.2331	0.5786

	SCM010/11 - 19a. Mastoid height (m)	SCM012 - 23. Horizontal circumference	SCM013 - 24. Transverse arc	SCM014 - 25b. *Glabella-Inion* arc	SCM015 - 26a. *Glabella-Bregma* arc	SCM016 - 27. Parietal sagittal arc	SCM017 - 28. Occipital sagittal arc	SCM018 - 28(2). *Inion-Opisthion* arc	SCM019 - 29d. *Glabella-Bregma* chord	SCM020 - 30. *Bregma-Lambda* chord	SCM021 - 31. *Lambda-Opisthion* chord	SCM022 - 31(2). *Inion-Opisthion* chord
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2.7234											
Abu Tabari 02/1-3	2.7143											
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	2.3364					10.6542	5.6075		9.3458	9.8131	5.4206	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2.7966					9.3220				8.3051		
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	2.6977	44.6512		29.7674	10.6047	12.4651	6.9767	3.7209	9.5814	11.2558	4.1860	3.0698
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15							5.5556				5.3030	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	1.7949	41.8803	25.3846	28.9744	10.2564	10.6838		4.7009	9.0171	9.4017	3.1624	4.6154
Abu Tabari 02/28-23					10.8597	10.4072			9.5023	9.8643		
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			24.4094			11.0236				9.6850		
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				28.2857	10.0000	11.6190	4.7619	2.3810	9.0476	10.7619	4.0952	2.4762
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5	2.2604											

	SCM010/11	SCM012	SCM013	SCM014	SCM015	SCM016	SCM017	SCM018	SCM019	SCM020	SCM021	SCM022
♂ No.	0	0	1	0	0	1	0	0	0	1	0	0
♂ Min.			24.4094			11.0236				9.6850		
♂ Max.			24.4094			11.0236				9.6850		
♂ Mode												
♂ Median			24.4094			11.0236				9.6850		
♂ Mean			24.4094			11.0236				9.6850		
♂ S.D.												
♀ No.	6	2	1	3	4	5	3	3	4	5	4	3
♀ Min.	1.7949	41.8803	25.3846	28.2857	10.0000	9.3220	4.7619	2.3810	9.0171	8.3051	3.1624	2.4762
♀ Max.	2.7966	44.6512	25.3846	29.7674	10.8597	12.4651	6.9767	4.7009	9.5814	11.2558	5.3030	4.6154
♀ Mode												
♀ Median	2.7060	43.2658	25.3846	28.9744	10.4305	10.6838	5.5556	3.7209	9.2749	9.8643	4.1406	3.0698
♀ Mean	2.4979	43.2658	25.3846	29.0092	10.4302	10.8994	5.7647	3.6009	9.2871	9.9178	4.1867	3.3871
♀ S.D.	0.3943	1.9593		0.7415	0.3787	1.1986	1.1221	1.1646	0.2962	1.1590	0.8763	1.1043
No.	6	2	2	3	4	6	3	3	4	6	4	3
Min.	1.7949	41.8803	24.4094	28.2857	10.0000	9.3220	4.7619	2.3810	9.0171	8.3051	3.1624	2.4762
Max.	2.7966	44.6512	25.3846	29.7674	10.8597	12.4651	6.9767	4.7009	9.5814	11.2558	5.3030	4.6154
Mode												
Median	2.7060	43.2658	24.8970	28.9744	10.4305	10.8537	5.5556	3.7209	9.2749	9.7746	4.1406	3.0698
Mean	2.4979	43.2658	24.8970	29.0092	10.4302	10.9201	5.7647	3.6009	9.2871	9.8790	4.1867	3.3871
S.D.	0.3943	1.9593	0.6895	0.7415	0.3787	1.0732	1.1221	1.1646	0.2962	1.0410	0.8763	1.1043

	SCM023 - 44. Bimalar breadth	SCM024 - 45. Bizygomatic breadth	SCM025 - 45(3). Mid-orbital chord	SCM027 - 48 Upper facial height	SCM028 - 48(1). *Nasospinale-Prosthion* height	SCM029 - 48(3). Minimum orbito-alveolar height	SCM030 - *50(1). Interorbital breadth	SCM031 - 51. Orbital breadth (l)	SCM032 - 51. Orbital breadth (r)	SCM033 - 52. Orbital height (l)	SCM035 - 54. Nasal breadth	SCM037 - 55(1). Nasal aperture height
Abu Tabari 95/2-3												
Abu Tabari 02/1-2					1.8723						2.7234	
Abu Tabari 02/1-3					2.1905						2.3810	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2				5.1402	1.7757			3.6449	3.6449		1.6822	2.1495
Abu Tabari 02/28-3											2.2523	
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	9.4915		5.2542	5.6780	1.7797		2.2881				2.2034	2.2881
Abu Tabari 02/28-7												
Abu Tabari 02/28-8							1.8605					
Abu Tabari 02/28-11							1.9295					
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15			5.0505		2.3232		2.2222				2.5253	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21					2.1198						2.1198	
Abu Tabari 02/28-22	7.6923	9.4872					1.9658	3.2479	3.0769	2.9915		
Abu Tabari 02/28-23					1.4480						1.9910	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4					2.5197						2.2047	
Conical Hill 95/4-1												
Conical Hill 02/3-4						3.9450	2.5688				2.1101	
Djabarona 96/1-1					1.8095						2.2857	2.0952
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4							1.8037					
Djabarona 96/120-5											1.6275	

	SCM023	SCM024	SCM025	SCM027	SCM028	SCM029	SCM030	SCM031	SCM032	SCM033	SCM035	SCM037
♂ No.	0	0	0	0	1	1	3	0	0	0	2	0
♂ Min.					2.5197	3.9450	1.8037				2.1101	
♂ Max.					2.5197	3.9450	2.5688				2.2047	
♂ Mode												
♂ Median					2.5197	3.9450	1.9295				2.1574	
♂ Mean					2.5197	3.9450	2.1007				2.1574	
♂ S.D.							0.4103				0.0669	
♀ No.	2	1	2	1	7	0	4	1	1	1	9	2
♀ Min.	7.6923	9.4872	5.0505	5.6780	1.4480		1.8605	3.2479	3.0769	2.9915	1.6275	2.0952
♀ Max.	9.4915	9.4872	5.2542	5.6780	2.3232		2.2881	3.2479	3.0769	2.9915	2.7234	2.2881
♀ Mode												
♀ Median	8.5919	9.4872	5.1524	5.6780	1.8723		2.0940	3.2479	3.0769	2.9915	2.2523	2.1917
♀ Mean	8.5919	9.4872	5.1524	5.6780	1.9347		2.0842	3.2479	3.0769	2.9915	2.2344	2.1917
♀ S.D.	1.2722		0.1441		0.2975		0.2039				0.3142	0.1364
No.	2	1	2	1	8	1	7	1	1	1	11	2
Min.	7.6923	9.4872	5.0505	5.6780	1.4480	3.9450	1.8037	3.2479	3.0769	2.9915	1.6275	2.0952
Max.	9.4915	9.4872	5.2542	5.6780	2.5197	3.9450	2.5688	3.2479	3.0769	2.9915	2.7234	2.2881
Mode												
Median	8.5919	9.4872	5.1524	5.6780	1.9961	3.9450	1.9658	3.2479	3.0769	2.9915	2.2047	2.1917
Mean	8.5919	9.4872	5.1524	5.6780	2.0078	3.9450	2.0912	3.2479	3.0769	2.9915	2.2204	2.1917
S.D.	1.2722		0.1441		0.3445		0.2774				0.2836	0.1364

	SCM040 - 60. Maxillo-alveolar length	SCM041 - 61. External palate breadth	SCM042 - *61a(1). Canine alveolar breadth (mx)	SCM043 - *61a(1). Canine alveolar breadth (md)	SCM044 - *61a(2). 1st premolar alveolar breadth (mx)	SCM045 - *61a(2). 1st premolar alveolar breadth (md)	SCM046 - *61a(3). 2nd premolar alveolar breadth (mx)	SCM047 - *61a(3). 2nd premolar alveolar breadth (md)	SCM048 - *61a(4). 1st moalr alveolar breadth (mx)	SCM049 - *61a(4). 1st moalr alveolar breadth (md)	SCM050 - *61a(5). 2nd molar alveolar breadth (mx)	SCM051 - *61a(5). 2nd molar alveolar breadth (md)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	5.0213		3.8298	2.5532		3.3191		3.8298		4.6383	5.1064	5.2766
Abu Tabari 02/1-3			3.7143	3.1429		3.7143		4.1905		5.0476		5.5238
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			3.6441	2.8390	4.1949	3.5593	4.5339	3.8983				
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		6.8687	4.2929	3.3333	5.2525		5.7576		6.3131		6.7677	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21			3.7788	2.8111	4.3318	3.5945	4.7926	4.3318		5.1613		5.6221
Abu Tabari 02/28-22				2.5641		3.2479		3.6325		4.3590		4.8291
Abu Tabari 02/28-23				2.9412		3.8462	5.4751	4.4796		5.3394		5.6109
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1										4.8571		5.7143
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SCM040	SCM041	SCM042	SCM043	SCM044	SCM045	SCM046	SCM047	SCM048	SCM049	SCM050	SCM051
♂ No.	0	0	0	0	0	0	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ S.D.												
♀ No.	1	1	5	7	3	6	4	6	1	6	2	6
♀ Min.	5.0213	6.8687	3.6441	2.5532	4.1949	3.2479	4.5339	3.6325	6.3131	4.3590	5.1064	4.8291
♀ Max.	5.0213	6.8687	4.2929	3.3333	5.2525	3.8462	5.7576	4.4796	6.3131	5.3394	6.7677	5.7143
♀ Mode												
♀ Median	5.0213	6.8687	3.7788	2.8390	4.3318	3.5769	5.1339	4.0444	6.3131	4.9524	5.9370	5.5673
♀ Mean	5.0213	6.8687	3.8520	2.8835	4.5931	3.5469	5.1398	4.0604	6.3131	4.9004	5.9370	5.4295
♀ S.D.			0.2562	0.2861	0.5752	0.2286	0.5721	0.3252		0.3595	1.1747	0.3298
No.	1	1	5	7	3	6	4	6	1	6	2	6
Min.	5.0213	6.8687	3.6441	2.5532	4.1949	3.2479	4.5339	3.6325	6.3131	4.3590	5.1064	4.8291
Max.	5.0213	6.8687	4.2929	3.3333	5.2525	3.8462	5.7576	4.4796	6.3131	5.3394	6.7677	5.7143
Mode												
Median	5.0213	6.8687	3.7788	2.8390	4.3318	3.5769	5.1339	4.0444	6.3131	4.9524	5.9370	5.5673
Mean	5.0213	6.8687	3.8520	2.8835	4.5931	3.5469	5.1398	4.0604	6.3131	4.9004	5.9370	5.4295
S.D.			0.2562	0.2861	0.5752	0.2286	0.5721	0.3252		0.3595	1.1747	0.3298

	SCM052 - 62. Internal palate length	SCM053 - 62(1). Anterior palate length	SCM054 - *62a(1). 1st internal dental arch length (mx)	SCM056 - *62a(2). 2nd internal dental arch length (mx)	SCM057 - *62a(2). 2nd internal dental arch length (md)	SCM058 - *62a(3). 3rd internal dental arch length (mx)	SCM059 - *62a(3). 3rd internal dental arch length (md)	SCM060 - *62a(4). 4th internal dental arch length (mx)	SCM061 - *62a(4). 4th internal dental arch length (md)	SCM062 - *62a(5). 5th internal dental arch length (mx)	SCM063 - *62a(5). 5th internal dental arch length (md)	SCM064 - *62a(6). 6th internal dental arch length (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2			0.3404	0.6383		1.4043	0.9362		1.3617		2.2979	3.6596
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					0.5872		0.9648					
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				0.6780		1.3559	0.9322	1.9492	1.6102			
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	4.9495			0.7576	0.3030	1.4141		2.1212		3.1818		4.1414
Abu Tabari 02/28-20												
Abu Tabari 02/28-21						1.1060	0.7373	1.3825	1.1982		2.1198	
Abu Tabari 02/28-22							0.6838		1.3675		2.2222	
Abu Tabari 02/28-23						1.4480	0.8145	1.9910	1.6290		2.6244	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	4.4882	3.3858		0.6299						2.5984		3.3858
Conical Hill 95/4-1												
Conical Hill 02/3-4										2.5688		
Djabarona 96/1-1				0.3810		0.9048		1.3333			2.3810	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SCM052	SCM053	SCM054	SCM056	SCM057	SCM058	SCM059	SCM060	SCM061	SCM062	SCM063	SCM064
♂ No.	1	1	0	1	1	0	1	0	0	2	0	1
♂ Min.	4.4882	3.3858		0.6299	0.5872		0.9648			2.5688		3.3858
♂ Max.	4.4882	3.3858		0.6299	0.5872		0.9648			2.5984		3.3858
♂ Mode												
♂ Median	4.4882	3.3858		0.6299	0.5872		0.9648			2.5836		3.3858
♂ Mean	4.4882	3.3858		0.6299	0.5872		0.9648			2.5836		3.3858
♂ S.D.										0.0209		
♀ No.	1	0	1	4	1	6	5	5	5	1	5	2
♀ Min.	4.9495		0.3404	0.3810	0.3030	0.9048	0.6838	1.3333	1.1982	3.1818	2.1198	3.6596
♀ Max.	4.9495		0.3404	0.7576	0.3030	1.4480	0.9362	2.1212	1.6290	3.1818	2.6244	4.1414
♀ Mode												
♀ Median	4.9495		0.3404	0.6581	0.3030	1.3801	0.8145	1.9492	1.3675	3.1818	2.2979	3.9005
♀ Mean	4.9495		0.3404	0.6137	0.3030	1.2722	0.8208	1.7554	1.4333	3.1818	2.3291	3.9005
♀ S.D.				0.1629		0.2182	0.1135	0.3688	0.1832		0.1911	0.3407
No.	2	1	1	5	2	6	6	5	5	3	5	3
Min.	4.4882	3.3858	0.3404	0.3810	0.3030	0.9048	0.6838	1.3333	1.1982	2.5688	2.1198	3.3858
Max.	4.9495	3.3858	0.3404	0.7576	0.5872	1.4480	0.9648	2.1212	1.6290	3.1818	2.6244	4.1414
Mode												
Median	4.7188	3.3858	0.3404	0.6383	0.4451	1.3801	0.8733	1.9492	1.3675	2.5984	2.2979	3.6596
Mean	4.7188	3.3858	0.3404	0.6169	0.4451	1.2722	0.8448	1.7554	1.4333	2.7830	2.3291	3.7289
S.D.	0.3262			0.1413	0.2010	0.2182	0.1173	0.3688	0.1832	0.3457	0.1911	0.3825

	SCM065 - *62a(6). 6th internal dental arch length (md)	SCM066 - 63. Internal palate breadth (mx)	SCM067 - *63. Internal palate breadth (md)	SCM068 - 63(2). Anterior palate breadth (mx)	SCM069 - *63(2). Anterior palate breadth (md)	SCM070 - *63(2)a. 1st internal dental arch breadth (mx)	SCM071 - *63(2)a. 1st internal dental arch breadth (md)	SCM072 - *63(2)b. 2nd internal dental arch breadth (mx)	SCM073 - *63(2)b. 2nd internal dental arch breadth (md)	SCM074 - *63(2)c. 3rd internal dental arch breadth (mx)	SCM075 - *63(2)c. 3rd internal dental arch breadth (md)	SCM076 - *63(2)d. 4th internal dental arch breadth (mx)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	3.2340	3.3617	3.4468	2.4681	1.9149	2.1277	1.3617	2.7660	2.5106	3.2766	2.8936	3.4894
Abu Tabari 02/1-3			3.8095	2.7619	2.4286	2.3333	1.7143		2.7619		3.0000	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					2.2232				2.6007			
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				2.7966	2.2034	2.3305	1.6525	3.0508	2.6271		2.9237	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		3.8384		3.3333	2.7778	2.6263	1.9697	3.8384		4.1414		4.5455
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	3.3180		3.9631	2.9032	2.4424	2.6267	1.6590	3.5023	2.9954	3.6866	3.4101	
Abu Tabari 02/28-22	3.0769		2.9915		2.2222				2.5641		2.7350	
Abu Tabari 02/28-23	3.6199		3.8009	3.1674	2.5339	2.6244	1.6742	3.5294	3.0769		3.4389	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		3.2283	3.1496	2.5197		2.0472				3.7008		3.7795
Conical Hill 95/4-1												
Conical Hill 02/3-4		2.1101										
Djabarona 96/1-1				2.1905		1.7143		2.6667				
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SCM065	SCM066	SCM067	SCM068	SCM069	SCM070	SCM071	SCM072	SCM073	SCM074	SCM075	SCM076
♂ No.	0	2	1	1	1	1	0	0	1	1	0	1
♂ Min.		2.1101	3.1496	2.5197	2.2232	2.0472			2.6007	3.7008		3.7795
♂ Max.		3.2283	3.1496	2.5197	2.2232	2.0472			2.6007	3.7008		3.7795
♂ Mode												
♂ Median		2.6692	3.1496	2.5197	2.2232	2.0472			2.6007	3.7008		3.7795
♂ Mean		2.6692	3.1496	2.5197	2.2232	2.0472			2.6007	3.7008		3.7795
♂ S.D.		0.7907										
♀ No.	4	2	5	7	7	7	6	6	6	3	6	2
♀ Min.	3.0769	3.3617	2.9915	2.1905	1.9149	1.7143	1.3617	2.6667	2.5106	3.2766	2.7350	3.4894
♀ Max.	3.6199	3.8384	3.9631	3.3333	2.7778	2.6267	1.9697	3.8384	3.0769	4.1414	3.4389	4.5455
♀ Mode												
♀ Median	3.2760	3.6000	3.8009	2.7966	2.4286	2.3333	1.6666	3.2766	2.6945	3.6866	2.9619	4.0174
♀ Mean	3.3122	3.6000	3.6024	2.8030	2.3605	2.3405	1.6719	3.2256	2.7560	3.7015	3.0669	4.0174
♀ S.D.	0.2282	0.3371	0.3905	0.3901	0.2763	0.3371	0.1935	0.4687	0.2341	0.4326	0.2903	0.7468
No.	4	4	6	8	8	8	6	6	7	4	6	3
Min.	3.0769	2.1101	2.9915	2.1905	1.9149	1.7143	1.3617	2.6667	2.5106	3.2766	2.7350	3.4894
Max.	3.6199	3.8384	3.9631	3.3333	2.7778	2.6267	1.9697	3.8384	3.0769	4.1414	3.4389	4.5455
Mode												
Median	3.2760	3.2950	3.6239	2.7793	2.3259	2.3319	1.6666	3.2766	2.6271	3.6937	2.9619	3.7795
Mean	3.3122	3.1346	3.5269	2.7676	2.3433	2.3038	1.6719	3.2256	2.7338	3.7014	3.0669	3.9381
S.D.	0.2282	0.7315	0.3952	0.3748	0.2603	0.3289	0.1935	0.4687	0.2216	0.3532	0.2903	0.5456

	SCM077 - *63(2)d. 4th internal dental arch breadth (md)	SCM078 - *63(2)e. 5th internal dental arch breadth (mx)	SCM079 - *63(2)e. 5th internal dental arch breadth (md)	SCM080 - 66. Bigonial breadth	SCM081 - 67. Minimum chord between the mental foramina	SCM082 - 68. Projective length of the body of the mandible	SCM083 - 69. Height of the mandibular symphysis	SCM084 - 69a. Symphyseal height	SCM085 - *69c. Thickness of the mandibular symphysis	SCM086 - 69(1). Mental foramen height (l)	SCM087 - 69(1). Mental foramen height (r)	SCM086/87 - 69(1). Mental foramen height (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	3.3191	3.7021	3.9149	7.6596	3.7447	5.8298	3.0638	3.0638	1.0638		2.7234	2.7234
Abu Tabari 02/1-3	3.5714			7.8571	3.9048	7.3333	3.6190	3.5238	1.1905	3.3333	3.2381	3.2857
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7							3.2718	3.2718	1.1745			
Abu Tabari 02/1-8												
Abu Tabari 02/28-2							2.8972		1.2150	2.5701	2.6168	2.5935
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				7.9661		5.5932	2.8814	2.8814	1.1017		2.8814	2.8814
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		4.7475				7.5253	3.5354	3.6364	1.2121	3.3333		3.3333
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	3.9631		4.3318	8.9401		6.8203	3.2258	3.2258	1.2903		3.1336	3.1336
Abu Tabari 02/28-22	3.2479		3.5897	6.7949	3.7607	6.3248	3.2479	3.2479	1.2821	2.9915		2.9915
Abu Tabari 02/28-23	3.8914		4.4344	7.6923	3.9819	5.8824	2.9864	2.9864	1.1765	2.5339	2.5339	2.5339
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		3.7008				7.4803	3.6220	3.6220			3.2283	3.2283
Conical Hill 95/4-1												
Conical Hill 02/3-4							3.4404		1.6055	3.5780		3.5780
Djabarona 96/1-1	3.9048		4.4762	8.6667		6.2857	3.4286	3.4286	1.2857		3.0476	3.0476
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5							2.8029		0.9042			

	SCM077	SCM078	SCM079	SCM080	SCM081	SCM082	SCM083	SCM084	SCM085	SCM086	SCM087	SCM086/87
♂ No.	0	1	0	0	0	1	3	2	2	1	1	2
♂ Min.		3.7008				7.4803	3.2718	3.2718	1.1745	3.5780	3.2283	3.2283
♂ Max.		3.7008				7.4803	3.6220	3.6220	1.6055	3.5780	3.2283	3.5780
♂ Mode												
♂ Median		3.7008				7.4803	3.4404	3.4469	1.3900	3.5780	3.2283	3.4032
♂ Mean		3.7008				7.4803	3.4447	3.4469	1.3900	3.5780	3.2283	3.4032
♂ S.D.							0.1752	0.2477	0.3048			0.2473
♀ No.	6	2	5	7	4	8	9	8	9	4	6	8
♀ Min.	3.2479	3.7021	3.5897	6.7949	3.7447	5.5932	2.8029	2.8814	0.9042	2.5339	2.5339	2.5339
♀ Max.	3.9631	4.7475	4.4762	8.9401	3.9819	7.5253	3.6190	3.6364	1.2903	3.3333	3.2381	3.3333
♀ Mode												
♀ Median	3.7314	4.2248	4.3318	7.8571	3.8327	6.3053	3.2258	3.2368	1.1905	3.1624	2.9645	3.0196
♀ Mean	3.6496	4.2248	4.1494	7.9395	3.8480	6.4493	3.1990	3.2493	1.1674	3.0480	2.9263	2.9913
♀ S.D.	0.3158	0.7392	0.3839	0.7056	0.1147	0.7129	0.2887	0.2664	0.1271	0.3787	0.2654	0.2726
No.	6	3	5	7	4	9	12	10	11	5	7	10
Min.	3.2479	3.7008	3.5897	6.7949	3.7447	5.5932	2.8029	2.8814	0.9042	2.5339	2.5339	2.5339
Max.	3.9631	4.7475	4.4762	8.9401	3.9819	7.5253	3.6220	3.6364	1.6055	3.5780	3.2381	3.5780
Mode												
Median	3.7314	3.7021	4.3318	7.8571	3.8327	6.3248	3.2598	3.2598	1.1905	3.3333	3.0476	3.0906
Mean	3.6496	4.0501	4.1494	7.9395	3.8480	6.5639	3.2604	3.2888	1.2079	3.1540	2.9695	3.0737
S.D.	0.3158	0.6039	0.3839	0.7056	0.1147	0.7502	0.2802	0.2626	0.1741	0.4047	0.2678	0.3078

	SCM088 - 69(2). 2nd molar mandibular body height (l)	SCM089 - 69(2). 2nd molar mandibular body height (r)	SCM088/89 - 69(2). 2nd molar mandibular body height (m)	SCM090 - *69(2)a. Canine mandibular body height (l)	SCM091 - *69(2)a. Canine mandibular body height (r)	SCM092 - *69(2)b. 1st premolar mandibular body height (l)	SCM093 - *69(2)b. 1st premolar mandibular body height (r)	SCM094 - *69(2)c. 2nd premolar mandibular body height (l)	SCM095 - *69(2)c. 2nd premolar mandibular body height (r)	SCM096 - *69(2)d. 1st molar mandibular body height (l)	SCM097 - *69(2)d. 1st molar mandibular body height (r)	SCM098 - *69(2)e. 3rd molar mandibular body height (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2.2553	2.2979	2.2766	2.7234	2.7234	2.8936	2.8936	2.8085	2.7660	2.5957	2.6383	2.1277
Abu Tabari 02/1-3	2.9524	2.9524	2.9524	3.4286	3.4762	3.4286	3.4286	3.4286	3.3333	3.3333	3.3333	2.8095
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7						3.1040						
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5					2.7966	2.9237	2.9661				2.7119	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	2.8788		2.8788	3.3838		3.4343		3.3333		3.1313		2.8283
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2.8571	2.7650	2.8111	3.2258	2.9954	3.3641	3.1797		3.1336		2.8571	2.7189
Abu Tabari 02/28-22	2.5641	2.4359	2.5000	2.9915	2.9060	3.1624	3.0769	2.9915	2.9060	2.8632	2.7350	2.1795
Abu Tabari 02/28-23	2.0814	2.0814	2.0814	2.6244		2.6244		2.4887	2.5339	2.3529	2.3529	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	2.6772		2.6772		3.3071					3.0709		2.3622
Conical Hill 95/4-1												
Conical Hill 02/3-4		2.7523	2.7523									
Djabarona 96/1-1	2.1905	2.0952	2.1429				3.2381		3.0476		2.8095	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5		2.3508	2.3508								2.4412	

	SCM088	SCM089	SCM088/89	SCM090	SCM091	SCM092	SCM093	SCM094	SCM095	SCM096	SCM097	SCM098
♂ No.	1	1	2	0	1	1	0	0	0	1	0	1
♂ Min.	2.6772	2.7523	2.6772		3.3071	3.1040				3.0709		2.3622
♂ Max.	2.6772	2.7523	2.7523		3.3071	3.1040				3.0709		2.3622
♂ Mode												
♂ Median	2.6772	2.7523	2.7148		3.3071	3.1040				3.0709		2.3622
♂ Mean	2.6772	2.7523	2.7148		3.3071	3.1040				3.0709		2.3622
♂ S.D.			0.0531									
♀ No.	7	7	8	6	5	7	6	5	6	5	8	5
♀ Min.	2.0814	2.0814	2.0814	2.6244	2.7234	2.6244	2.8936	2.4887	2.5339	2.3529	2.3529	2.1277
♀ Max.	2.9524	2.9524	2.9524	3.4286	3.4762	3.4343	3.4286	3.4286	3.3333	3.3333	3.3333	2.8283
♀ Mode												
♀ Median	2.5641	2.3508	2.4254	3.1086	2.9060	3.1624	3.1283	2.9915	2.9768	2.8632	2.7235	2.7189
♀ Mean	2.5400	2.4255	2.4992	3.0629	2.9795	3.1187	3.1305	3.0101	2.9534	2.8553	2.7349	2.5328
♀ S.D.	0.3650	0.3272	0.3422	0.3394	0.2964	0.3138	0.1943	0.3849	0.2825	0.3951	0.2978	0.3491
No.	8	8	10	6	6	8	6	5	6	6	8	6
Min.	2.0814	2.0814	2.0814	2.6244	2.7234	2.6244	2.8936	2.4887	2.5339	2.3529	2.3529	2.1277
Max.	2.9524	2.9524	2.9524	3.4286	3.4762	3.4343	3.4286	3.4286	3.3333	3.3333	3.3333	2.8283
Mode												
Median	2.6206	2.3934	2.5886	3.1086	2.9507	3.1332	3.1283	2.9915	2.9768	2.9671	2.7235	2.5405
Mean	2.5571	2.4664	2.5423	3.0629	3.0341	3.1169	3.1305	3.0101	2.9534	2.8912	2.7349	2.5043
S.D.	0.3414	0.3242	0.3157	0.3394	0.2969	0.2905	0.1943	0.3849	0.2825	0.3642	0.2978	0.3199

	SCM099 - *69(2)e. 3rd molar mandibular body height (r)	SCM100 - 69(3). Mental foramen body thickness (l)	SCM101 - 69(3). Mental foramen body thickness (r)	SCM100/101 - 69(3). Mental foramen body thickness (m)	SCM102 - 69b. 2nd molar mandibular body thickness (l)	SCM103 - 69b. 2nd molar mandibular body thickness (r)	SCM102/103 - 69b. 2nd molar mandibular body thickness (m)	SCM104 - *69b(1). Canine mandibular body thickness (l)	SCM105 - *69b(1). Canine mandibular body thickness (r)	SCM106 - *69b(2). 1st premolar mandibular body thickness (l)	SCM107 - *69b(2). 1st premolar mandibular body thickness (r)	SCM108 - *69b(3). 2nd premolar mandibular body thickness (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2.1277	1.1064	1.1064	1.1064	1.4468	1.4468	1.4468	1.0213	1.0213	1.0213	1.0213	1.1064
Abu Tabari 02/1-3		1.1429	1.0952	1.1191	1.2857	1.2857	1.2857	1.0476	1.0476	1.0000	1.0476	1.0476
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		1.2617	1.2150	1.2384								
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			1.0593	1.0593							1.1017	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		1.2121		1.2121	1.7172		1.7172	1.0606		1.1111		1.2121
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2.5806		1.1521	1.1521		1.4747	1.4747		1.0599		1.1060	
Abu Tabari 02/28-22	2.0513	1.1111		1.1111	1.4530		1.4530	1.1111		1.1966		1.2821
Abu Tabari 02/28-23		1.0860	1.0860	1.0860	1.5385	1.5385	1.5385	1.1765	1.0860	1.0860	1.0860	1.0860
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			1.2598	1.2598	1.4173		1.4173					
Conical Hill 95/4-1												
Conical Hill 02/3-4						1.4679	1.4679	1.3761				
Djabarona 96/1-1			1.2381	1.2381	1.6190	1.5238	1.5714		1.1429		1.2381	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5						1.0398	1.0398					

	SCM099	SCM100	SCM101	SCM100/101	SCM102	SCM103	SCM102/103	SCM104	SCM105	SCM106	SCM107	SCM108
♂ No.	0	0	1	1	1	1	2	1	0	0	0	0
♂ Min.			1.2598	1.2598	1.4173	1.4679	1.4173	1.3761				
♂ Max.			1.2598	1.2598	1.4173	1.4679	1.4679	1.3761				
♂ Mode												
♂ Median			1.2598	1.2598	1.4173	1.4679	1.4426	1.3761				
♂ Mean			1.2598	1.2598	1.4173	1.4679	1.4426	1.3761				
♂ S.D.							0.0358					
♀ No.	4	5	6	8	6	6	8	5	5	5	6	5
♀ Min.	0.0000	1.0860	1.0593	1.0593	1.2857	1.0398	1.0398	1.0213	1.0213	1.0000	1.0213	1.0476
♀ Max.	2.5806	1.2121	1.2381	1.2381	1.7172	1.5385	1.7172	1.1765	1.1429	1.1966	1.2381	1.2821
♀ Mode												
♀ Median	2.0895	1.1111	1.1008	1.1151	1.4957	1.4607	1.4639	1.0606	1.0599	1.0860	1.0938	1.1064
♀ Mean	1.6899	1.1317	1.1228	1.1355	1.5100	1.3849	1.4409	1.0834	1.0715	1.0830	1.1001	1.1468
♀ S.D.	1.1506	0.0494	0.0641	0.0617	0.1504	0.1917	0.2033	0.0614	0.0462	0.0781	0.0752	0.0971
No.	4	5	7	9	7	7	10	6	5	5	6	5
Min.	0.0000	1.0860	1.0593	1.0593	1.2857	1.0398	1.0398	1.0213	1.0213	1.0000	1.0213	1.0476
Max.	2.5806	1.2121	1.2598	1.2598	1.7172	1.5385	1.7172	1.3761	1.1429	1.1966	1.2381	1.2821
Mode												
Median	2.0895	1.1111	1.1064	1.1191	1.4530	1.4679	1.4605	1.0859	1.0599	1.0860	1.0938	1.1064
Mean	1.6899	1.1317	1.1424	1.1493	1.4968	1.3967	1.4412	1.1322	1.0715	1.0830	1.1001	1.1468
S.D.	1.1506	0.0494	0.0782	0.0710	0.1417	0.1778	0.1797	0.1315	0.0462	0.0781	0.0752	0.0971

	SCM109 - *69b(3). 2nd premolar mandibular body thickness (r)	SCM110 - *69b(4). 1st molar mandibular body thickness (l)	SCM111 - *69b(4). 1st molar mandibular body thickness (r)	SCM112 - *69b(5). 3rd molar mandibular body thickness (l)	SCM113 - *69b(5). 3rd molar mandibular body thickness (r)	SCM114 - 70. Ramus height (l)	SCM115 - 70. Ramus height (r)	SCM116 - 70(1). Coronoid height (l)	SCM117 - 70(1). Coronoid height (r)	SCM118 - 70(2). Minimum ramus height (l)	SCM119 - 70(2). Minimum ramus height (r)	SCM120 - 71. Minimum ramus breadth (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1.1064	1.1915	1.1915	1.3617	1.3617		5.2766		4.4255		3.8298	
Abu Tabari 02/1-3	1.0952	1.1905	1.1429									
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			1.2288					5.2119				
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		1.4141		1.6162				5.7576		5.1515		3.2323
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	1.1060		1.3364		1.5668	5.8986		5.5300		4.4240		3.3180
Abu Tabari 02/28-22		1.3675		1.4530		4.9573	4.6581		4.2735	3.9316	3.7607	2.9915
Abu Tabari 02/28-23	1.0860	1.2217	1.2217						4.6606		3.7557	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		1.2598		1.4961								
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	1.1429		1.4286			5.9048		5.2381		4.4762		3.2381
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5			0.9042									

	SCM109	SCM110	SCM111	SCM112	SCM113	SCM114	SCM115	SCM116	SCM117	SCM118	SCM119	SCM120
♂ No.	0	1	0	1	0	0	0	0	0	0	0	0
♂ Min.		1.2598		1.4961								
♂ Max.		1.2598		1.4961								
♂ Mode												
♂ Median		1.2598		1.4961								
♂ Mean		1.2598		1.4961								
♂ S.D.												
♀ No.	5	5	7	3	2	3	2	4	3	4	3	4
♀ Min.	1.0860	1.1905	0.9042	1.3617	1.3617	4.9573	4.6581	5.2119	4.2735	3.9316	3.7557	2.9915
♀ Max.	1.1429	1.4141	1.4286	1.6162	1.5668	5.9048	5.2766	5.7576	4.6606	5.1515	3.8298	3.3180
♀ Mode												
♀ Median	1.1060	1.2217	1.2217	1.4530	1.4643	5.8986	4.9674	5.3840	4.4255	4.4501	3.7607	3.2352
♀ Mean	1.1073	1.2771	1.2077	1.4770	1.4643	5.5869	4.9674	5.4344	4.4532	4.4958	3.7820	3.1950
♀ S.D.	0.0216	0.1059	0.1646	0.1289	0.1450	0.5453	0.4373	0.2592	0.1950	0.5013	0.0414	0.1412
No.	5	6	7	4	2	3	2	4	3	4	3	4
Min.	1.0860	1.1905	0.9042	1.3617	1.3617	4.9573	4.6581	5.2119	4.2735	3.9316	3.7557	2.9915
Max.	1.1429	1.4141	1.4286	1.6162	1.5668	5.9048	5.2766	5.7576	4.6606	5.1515	3.8298	3.3180
Mode												
Median	1.1060	1.2408	1.2217	1.4745	1.4643	5.8986	4.9674	5.3840	4.4255	4.4501	3.7607	3.2352
Mean	1.1073	1.2742	1.2077	1.4817	1.4643	5.5869	4.9674	5.4344	4.4532	4.4958	3.7820	3.1950
S.D.	0.0216	0.0950	0.1646	0.1057	0.1450	0.5453	0.4373	0.2592	0.1950	0.5013	0.0414	0.1412

	SCM121 - 71. Minimum ramus breadth (r)	SCM122 - 71a. Minimum ramus width (l)	SCM123 - 71a. Minimum ramus width (r)	SCM122/123 - 71a. Minimum ramus width (m)	SCM132 - 80. Dental arch length of the *Maxilla*	SCM133 - 80a. Dental arch length of the mandible	SCM134 - 80(1). External dental arch width (mx)	SCM135 - 80(1). External dental arch width (md)	SCM136 - *80(1)a. Canine dental arch breadth (mx)	SCM137 - *80(1)a. Canine dental arch breadth (md)	SCM138 - *80(1)b. 1st premolar dental arch breadth (mx)	SCM139 - *80(1)b. 1st premolar dental arch breadth (md)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2.8085		2.7660	2.7660	4.9362	4.7660		5.5745	3.4894	2.6383	3.9149	3.4043
Abu Tabari 02/1-3						4.9048		5.7619	3.7143	3.0952		3.7143
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3			3.2432	3.2432								
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		3.2203		3.2203					3.7712	2.9237	4.2373	3.6441
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		3.2323		3.2323	5.5556		6.5152		4.2424	3.2828	4.9495	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		3.3180		3.3180		4.8848		5.9908	4.2396	2.8111	4.9770	
Abu Tabari 02/28-22	3.1624		3.1624	3.1624		4.6154		5.1282		2.6496		
Abu Tabari 02/28-23	3.0769					5.0679		6.1991			4.8416	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4					4.3307		5.7480		3.5433			
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		3.2381		3.2381		3.9048						
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SCM121	SCM122	SCM123	SCM122/123	SCM132	SCM133	SCM134	SCM135	SCM136	SCM137	SCM138	SCM139
♂ No.	0	0	0	0	1	0	1	0	1	0	0	0
♂ Min.					4.3307		5.7480		3.5433			
♂ Max.					4.3307		5.7480		3.5433			
♂ Mode												
♂ Median					4.3307		5.7480		3.5433			
♂ Mean					4.3307		5.7480		3.5433			
♂ S.D.												
♀ No.	3	4	3	7	2	6	1	5	5	6	5	3
♀ Min.	2.8085	3.2203	2.7660	2.7660	4.9362	3.9048	6.5152	5.1282	3.4894	2.6383	3.9149	3.4043
♀ Max.	3.1624	3.3180	3.2432	3.3180	5.5556	5.0679	6.5152	6.1991	4.2424	3.2828	4.9770	3.7143
♀ Mode												
♀ Median	3.0769	3.2352	3.1624	3.2323	5.2459	4.8254	6.5152	5.7619	3.7712	2.8674	4.8416	3.6441
♀ Mean	3.0159	3.2522	3.0572	3.1686	5.2459	4.6906	6.5152	5.7309	3.8914	2.9001	4.5841	3.5875
♀ S.D.	0.1847	0.0445	0.2554	0.1833	0.4380	0.4135		0.4109	0.3361	0.2547	0.4802	0.1626
No.	3	4	3	7	3	6	2	5	6	6	5	3
Min.	2.8085	3.2203	2.7660	2.7660	4.3307	3.9048	5.7480	5.1282	3.4894	2.6383	3.9149	3.4043
Max.	3.1624	3.3180	3.2432	3.3180	5.5556	5.0679	6.5152	6.1991	4.2424	3.2828	4.9770	3.7143
Mode												
Median	3.0769	3.2352	3.1624	3.2323	4.9362	4.8254	6.1316	5.7619	3.7427	2.8674	4.8416	3.6441
Mean	3.0159	3.2522	3.0572	3.1686	4.9408	4.6906	6.1316	5.7309	3.8334	2.9001	4.5841	3.5875
S.D.	0.1847	0.0445	0.2554	0.1833	0.6124	0.4135	0.5424	0.4109	0.3325	0.2547	0.4802	0.1626

	SCM140 - *80(1)c. 2nd premolar dental arch breadth (mx)	SCM141 - *80(1)c. 2nd premolar dental arch breadth (md)	SCM142 - *80(1)d. 1st molar dental arch breadth (mx)	SCM143 - *80(1)d. 1st molar dental arch breadth (md)	SCM144 - *80(1)e. 2nd molar dental arch breadth (mx)	SCM145 - *80(1)e. 2nd molar dental arch breadth (md)	SCM146 - *80(1)f. 3rd molar dental arch breadth (mx)	SCM147 - *80(1)f. 3rd molar dental arch breadth (md)	SCM148 - *80(4)a. Canine dental arch length (mx)	SCM149 - *80(4)a. Canine dental arch length (md)	SCM150 - *80(4)b. 1st premolar dental arch length (mx)	SCM151 - *80(4)b. 1st premolar dental arch length (md)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		4.0000		4.5957	5.1915	5.2340		5.5745	1.2766	0.8936	2.0000	1.3617
Abu Tabari 02/1-3		4.1429		5.0476		5.6190			1.3333	1.0000	1.8571	1.4286
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	4.5763	3.9407							1.3983	1.1017	2.0763	1.5254
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	5.4545		6.0606		6.4141		6.5152		1.4141	1.0101	2.2222	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	5.4378			5.2535		5.9908		5.9908	1.1521		1.7512	
Abu Tabari 02/28-22		3.7607		4.5299		4.9573		5.1282				1.2821
Abu Tabari 02/28-23	5.3394	4.4796		5.2489		5.6561		6.1991			2.2624	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			5.5906		5.5906		5.7480		0.6299			
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SCM140	SCM141	SCM142	SCM143	SCM144	SCM145	SCM146	SCM147	SCM148	SCM149	SCM150	SCM151
♂ No.	0	0	1	0	1	0	1	0	1	0	0	0
♂ Min.			5.5906		5.5906		5.7480		0.6299			
♂ Max.			5.5906		5.5906		5.7480		0.6299			
♂ Mode												
♂ Median			5.5906		5.5906		5.7480		0.6299			
♂ Mean			5.5906		5.5906		5.7480		0.6299			
♂ S.D.												
♀ No.	4	5	1	5	2	5	1	4	5	4	6	4
♀ Min.	4.5763	3.7607	6.0606	4.5299	5.1915	4.9573	6.5152	5.1282	1.1521	0.8936	1.7512	1.2821
♀ Max.	5.4545	4.4796	6.0606	5.2535	6.4141	5.9908	6.5152	6.1991	1.4141	1.1017	2.2624	1.5254
♀ Mode												
♀ Median	5.3886	4.0000	6.0606	5.0476	5.8028	5.6190	6.5152	5.7826	1.3333	1.0051	2.0381	1.3951
♀ Mean	5.2020	4.0648	6.0606	4.9351	5.8028	5.4914	6.5152	5.7231	1.3149	1.0014	2.0282	1.3994
♀ S.D.	0.4202	0.2694		0.3506	0.8645	0.4014		0.4741	0.1062	0.0852	0.2008	0.1032
No.	4	5	2	5	3	5	2	4	6	4	6	4
Min.	4.5763	3.7607	5.5906	4.5299	5.1915	4.9573	5.7480	5.1282	0.6299	0.8936	1.7512	1.2821
Max.	5.4545	4.4796	6.0606	5.2535	6.4141	5.9908	6.5152	6.1991	1.4141	1.1017	2.2624	1.5254
Mode												
Median	5.3886	4.0000	5.8256	5.0476	5.5906	5.6190	6.1316	5.7826	1.3050	1.0051	2.0381	1.3951
Mean	5.2020	4.0648	5.8256	4.9351	5.7321	5.4914	6.1316	5.7231	1.2007	1.0014	2.0282	1.3994
S.D.	0.4202	0.2694	0.3324	0.3506	0.6235	0.4014	0.5424	0.4741	0.2953	0.0852	0.2008	0.1032

	SCM152 - *80(4)c. 2nd premolar dental arch length (mx)	SCM153 - *80(4)c. 2nd premolar dental arch length (md)	SCM154 - *80(4)d. 1st molar dental arch length (mx)	SCM155 - *80(4)d. 1st molar dental arch length (md)	SCM156 - *80(4)e. 2nd molar dental arch length (mx)	SCM157 - *80(4)e. 2nd molar dental arch length (md)	SCM162 - Cranial thickness (*Os frontale*; medio-occipital to *Frontotemporale*)	SCM163 - Cranial thickness (*Os parietale* lateral to *Bregma*)	SCM164 - Cranial thickness (*Os parietale* lateral to supero-lateral to *Lambda*)	SCM165 - Cranial thickness (*Os occipitale*; centre *Fossa cerebralis*)	SCM166 - Cranial thickness (*Os occipitale*; centre *Fossa cerebellaris*)	SCM167 - Cranial thickness (*Os occipitale*; centre of *Lambda*)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		1.9574	3.2340	2.8936	4.3404	3.8298						
Abu Tabari 02/1-3		2.2381		3.0476		4.0000				0.4762	0.1905	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2.6271	2.1186						0.4237				
Abu Tabari 02/28-7							0.5505				0.3211	
Abu Tabari 02/28-8							0.4651	0.5116	0.6047	0.3721		
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	2.7273		3.9394		4.7475			0.6061		0.4545	0.4040	0.8081
Abu Tabari 02/28-20											0.1678	
Abu Tabari 02/28-21	2.3963											
Abu Tabari 02/28-22		1.8803		2.6496		3.7607	0.4701	0.4701	0.5983	0.4274	0.2564	0.6410
Abu Tabari 02/28-23	2.8959	2.2624		3.2127		4.1629	0.2715	0.4072	0.3620	0.3620	0.1357	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4			2.4409		3.3858		0.6693		0.7480			
Conical Hill 95/4-1												
Conical Hill 02/3-4										0.5505		
Djabarona 96/1-1				2.3810			0.2857	0.5714	0.3810			
Djabarona 96/1-2										0.2500		
Djabarona 96-4										0.3540		
Djabarona 96/120-3												
Djabarona 96/120-4								0.6711				
Djabarona 96/120-5												

	SCM152	SCM153	SCM154	SCM155	SCM156	SCM157	SCM162	SCM163	SCM164	SCM165	SCM166	SCM167
♂ No.	0	0	1	0	1	0	1	1	1	2	1	0
♂ Min.			2.4409		3.3858		0.6693	0.6711	0.7480	0.3540	0.1678	
♂ Max.			2.4409		3.3858		0.6693	0.6711	0.7480	0.5505	0.1678	
♂ Mode												
♂ Median			2.4409		3.3858		0.6693	0.6711	0.7480	0.4522	0.1678	
♂ Mean			2.4409		3.3858		0.6693	0.6711	0.7480	0.4522	0.1678	
♂ S.D.										0.1389		
♀ No.	4	5	2	5	2	4	5	6	4	6	5	2
♀ Min.	2.3963	1.8803	3.2340	2.3810	4.3404	3.7607	0.2715	0.4072	0.3620	0.2500	0.1357	0.6410
♀ Max.	2.8959	2.2624	3.9394	3.2127	4.7475	4.1629	0.5505	0.6061	0.6047	0.4762	0.4040	0.8081
♀ Mode												
♀ Median	2.6772	2.1186	3.5867	2.8936	4.5440	3.9149	0.4651	0.4909	0.4896	0.3997	0.2564	0.7246
♀ Mean	2.6617	2.0914	3.5867	2.8369	4.5440	3.9383	0.4086	0.4984	0.4865	0.3904	0.2616	0.7246
♀ S.D.	0.2088	0.1688	0.4988	0.3286	0.2878	0.1803	0.1235	0.0797	0.1330	0.0821	0.1058	0.1181
No.	4	5	3	5	3	4	6	7	5	8	6	2
Min.	2.3963	1.8803	2.4409	2.3810	3.3858	3.7607	0.2715	0.4072	0.3620	0.2500	0.1357	0.6410
Max.	2.8959	2.2624	3.9394	3.2127	4.7475	4.1629	0.6693	0.6711	0.7480	0.5505	0.4040	0.8081
Mode												
Median	2.6772	2.1186	3.2340	2.8936	4.3404	3.9149	0.4676	0.5116	0.5983	0.3997	0.2234	0.7246
Mean	2.6617	2.0914	3.2048	2.8369	4.1579	3.9383	0.4520	0.5230	0.5388	0.4058	0.2459	0.7246
S.D.	0.2088	0.1688	0.7497	0.3286	0.6989	0.1803	0.1534	0.0978	0.1642	0.0916	0.1021	0.1181

	SCM168 - Cranial thickness (maximum cranial thickness; location)	SCM169 - Cranial thickness (minimum cranial thickness; location)	SCM170 - Cranial thickness (location)	SCM171 - Cranial thickness (location)
Abu Tabari 95/2-3				
Abu Tabari 02/1-2	0.6383	0.6383	0.6383	
Abu Tabari 02/1-3	0.9524	0.1905	0.4762	0.5714
Abu Tabari 02/1-5	0.6723	0.6723	0.6723	
Abu Tabari 02/1-6				
Abu Tabari 02/1-7				
Abu Tabari 02/1-8				
Abu Tabari 02/28-2	0.4673	0.1402	0.3271	0.4673
Abu Tabari 02/28-3				
Abu Tabari 02/28-4				
Abu Tabari 02/28-5	0.6780	0.3390	0.5932	0.3814
Abu Tabari 02/28-7	0.7339	0.2752	0.5963	0.4587
Abu Tabari 02/28-8	1.2093	0.2326		
Abu Tabari 02/28-11				
Abu Tabari 02/28-13				
Abu Tabari 02/28-14				
Abu Tabari 02/28-15	1.2121	0.4040	0.5556	
Abu Tabari 02/28-20	0.5034	0.1678	0.5034	
Abu Tabari 02/28-21	0.4147	0.3687	0.3687	0.4147
Abu Tabari 02/28-22	0.6410	0.2564		
Abu Tabari 02/28-23	0.4525	0.1357	0.4072	
Abu Tabari 03/31				
Abu Tabari 03/34-1				
Conical Hill 95/4	0.7874	0.6693		
Conical Hill 95/4-1				
Conical Hill 02/3-4	0.7339	0.5505		
Djabarona 96/1-1	0.5714	0.2857		
Djabarona 96/1-2	0.3750	0.2500	0.3333	0.3750
Djabarona 96-4	0.4867	0.3540		
Djabarona 96/120-3				
Djabarona 96/120-4	0.7550	0.5872	0.7550	0.5872
Djabarona 96/120-5	0.5877	0.4521	0.5877	0.4521

	SCM168	SCM169	SCM170	SCM171
♂ No.	6	6	3	1
♂ Min.	0.4867	0.1678	0.5034	0.5872
♂ Max.	0.7874	0.6723	0.7550	0.5872
♂ Mode				
♂ Median	0.7031	0.5689	0.6723	0.5872
♂ Mean	0.6565	0.5002	0.6436	0.5872
♂ S.D.	0.1307	0.2001	0.1283	
♀ No.	12	12	9	6
♀ Min.	0.3750	0.1357	0.3333	0.3750
♀ Max.	1.2121	0.6383	0.6383	0.5714
♀ Mode				
♀ Median	0.6397	0.2805	0.5556	0.4334
♀ Mean	0.7055	0.3190	0.5063	0.4422
♀ S.D.	0.2814	0.1345	0.1128	0.0722
No.	18	18	12	7
Min.	0.3750	0.1357	0.3333	0.3750
Max.	1.2121	0.6723	0.7550	0.5872
Mode	0.7339			
Median	0.6566	0.3465	0.5716	0.4521
Mean	0.6892	0.3794	0.5406	0.4629
S.D.	0.2384	0.1766	0.1269	0.0857

Appendix XIV.C. Scaled dental measurements

	SDM001 - 81. Crown length UI1 (l)	SDM002 - 81. Crown length UI1 (r)	SDM001/2 - 81. Crown length UI1 (m)	SDM003 - 81. Crown length UI2 (l)	SDM004 - 81. Crown length UI2 (r)	SDM003/4 - 81. Crown length UI2 (m)	SDM005 - 81. Crown length UC (l)	SDM006 - 81. Crown length UC (r)	SDM005/6 - 81. Crown length UC (m)	SDM007 - 81. Crown length UP1 (l)	SDM008 - 81. Crown length UP1 (r)	SDM007/8 - 81. Crown length UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.7234	0.7574	0.7404	0.7149	0.7149	0.7149		0.6809	0.6809	0.6638		0.6638
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	0.9955	0.9864	0.9910	0.7873	0.7873	0.7873	0.8145	0.8326	0.8236	0.6787	0.7149	0.6968
Abu Tabari 02/28-2	0.8640	0.8720	0.8680		0.7040	0.7040						
Abu Tabari 02/28-3		0.9459	0.9459	0.7658	0.7568	0.7613	0.7838	0.7838	0.7838	0.6486	0.7117	0.6802
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.9407	0.9407	0.9407	0.6610	0.6695	0.6653	0.7288	0.6949	0.7119	0.6695	0.6610	0.6653
Abu Tabari 02/28-7		0.8716	0.8716				0.7523	0.7615	0.7569	0.7156	0.7431	0.7293
Abu Tabari 02/28-8	0.9116	0.9209	0.9163				0.6977	0.6605	0.6791	0.7442	0.7628	0.7535
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.8473	0.8397	0.8435	0.7023	0.7176	0.7100	0.7099	0.7099	0.7099	0.6641	0.6794	0.6718
Abu Tabari 02/28-15	0.8788	0.8687	0.8738	0.7778	0.7475	0.7627	0.8081	0.7980	0.8031	0.7172	0.7475	0.7324
Abu Tabari 02/28-20		0.9228	0.9228									
Abu Tabari 02/28-21	0.8479		0.8479	0.5991		0.5991	0.7189	0.7373	0.7281	0.7005	0.6820	0.6913
Abu Tabari 02/28-22	0.7778	0.7778	0.7778				0.7094	0.7009	0.7051	0.5812	0.5897	0.5855
Abu Tabari 02/28-23	0.8235		0.8235							0.6968	0.6968	0.6968
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.8311	0.8493	0.8402	0.6393	0.6484	0.6439	0.7032	0.7032	0.7032	0.7032	0.7032	0.7032
Conical Hill 95/4	0.8110		0.8110	0.6850	0.6850	0.6850	0.7165	0.7244	0.7205	0.6693	0.6299	0.6496
Conical Hill 95/4-1										0.7052		0.7052
Conical Hill 02/3-4												
Djabarona 96/1-1	0.9048		0.9048				0.6857	0.6857	0.6857	0.6667		0.6667
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM001	SDM002	SDM001/2	SDM003	SDM004	SDM003/4	SDM005	SDM006	SDM005/6	SDM007	SDM008	SDM007/8
♂ No.	4	4	5	3	4	4	3	3	3	3	3	3
♂ Min.	0.8110	0.8397	0.8110	0.6850	0.6850	0.6850	0.7099	0.7099	0.7099	0.6641	0.6299	0.6496
♂ Max.	0.9955	0.9864	0.9910	0.7873	0.7873	0.7873	0.8145	0.8326	0.8236	0.6787	0.7149	0.6968
♂ Mode												
♂ Median	0.8557	0.8974	0.8680	0.7023	0.7108	0.7070	0.7165	0.7244	0.7205	0.6693	0.6794	0.6718
♂ Mean	0.8795	0.9052	0.8873	0.7249	0.7235	0.7216	0.7470	0.7556	0.7513	0.6707	0.6747	0.6727
♂ S.D.	0.0804	0.0640	0.0709	0.0548	0.0446	0.0451	0.0586	0.0670	0.0628	0.0074	0.0427	0.0236
♀ No.	9	8	11	6	5	6	9	10	10	12	9	12
♀ Min.	0.7234	0.7574	0.7404	0.5991	0.6484	0.5991	0.6857	0.6605	0.6791	0.5812	0.5897	0.5855
♀ Max.	0.9407	0.9459	0.9459	0.7778	0.7568	0.7627	0.8081	0.7980	0.8031	0.7442	0.7628	0.7535
♀ Mode												
♀ Median	0.8479	0.8701	0.8716	0.6880	0.7149	0.6901	0.7189	0.7020	0.7085	0.6986	0.7032	0.6940
♀ Mean	0.8488	0.8665	0.8621	0.6930	0.7074	0.6912	0.7320	0.7207	0.7238	0.6844	0.6998	0.6894
♀ S.D.	0.0690	0.0706	0.0650	0.0717	0.0475	0.0663	0.0414	0.0468	0.0437	0.0423	0.0527	0.0434
No.	13	12	16	9	9	10	12	13	13	15	12	15
Min.	0.7234	0.7574	0.7404	0.5991	0.6484	0.5991	0.6857	0.6605	0.6791	0.5812	0.5897	0.5855
Max.	0.9955	0.9864	0.9910	0.7873	0.7873	0.7873	0.8145	0.8326	0.8236	0.7442	0.7628	0.7535
Mode												0.6968
Median	0.8479	0.8718	0.8698	0.7023	0.7149	0.7070	0.7177	0.7099	0.7119	0.6787	0.7000	0.6913
Mean	0.8583	0.8794	0.8699	0.7036	0.7145	0.7033	0.7357	0.7287	0.7301	0.6816	0.6935	0.6861
S.D.	0.0708	0.0682	0.0656	0.0649	0.0441	0.0580	0.0438	0.0512	0.0473	0.0380	0.0498	0.0401

	SDM009 - 81. Crown length UP2 (l)	SDM010 - 81. Crown length UP2 (r)	SDM009/10 - 81. Crown length UP2 (m)	SDM011 - 81. Crown length UM1 (l)	SDM012 - 81. Crown length UM1 (r)	SDM011/12 - 81. Crown length UM1 (m)	SDM013 - 81. Crown length UM2 (l)	SDM014 - 81. Crown length UM2 (r)	SDM013/14 - 81. Crown length UM2 (m)	SDM015 - 81. Crown length UM3 (l)	SDM016 - 81. Crown length UM3 (r)	SDM015/16 - 81. Crown length UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.6043		0.6043				0.9362	0.9447	0.9405		0.8085	0.8085
Abu Tabari 02/1-3										0.8667		0.8667
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	0.6040		0.6040									
Abu Tabari 02/1-8	0.7149	0.7059	0.7104	1.0136	1.0136	1.0136	0.9502	0.9502	0.9502	0.8959	0.8869	0.8914
Abu Tabari 02/28-2				1.0800	1.0720	1.0760	1.0240	1.0560	1.0400			
Abu Tabari 02/28-3	0.6577	0.7297	0.6937	0.9730	0.9820	0.9775	0.9459		0.9459			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.5763	0.5847	0.5805	0.9576	0.9915	0.9746	0.8475	0.8644	0.8560	0.8559	0.7881	0.8220
Abu Tabari 02/28-7	0.6514	0.6789	0.6651	1.1743	1.1468	1.1606		1.1835	1.1835	0.9358	1.2110	1.0734
Abu Tabari 02/28-8	0.6512	0.6326	0.6419	1.1256	1.0977	1.1117	1.0047	1.1256	1.0652	1.0512	1.0698	1.0605
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.6412	0.6565	0.6488	1.0305	1.0382	1.0343	0.9771	0.9695	0.9733			
Abu Tabari 02/28-15	0.7475	0.7071	0.7273	1.0707	1.1212	1.0960	1.0606	1.0202	1.0404	0.7879	0.8182	0.8031
Abu Tabari 02/28-20											0.8893	0.8893
Abu Tabari 02/28-21	0.6359		0.6359		0.9770	0.9770	0.9862	0.9862	0.9862			
Abu Tabari 02/28-22	0.6239	0.5983	0.6111		0.9145	0.9145	0.8718	0.9402	0.9060	0.8889	0.8718	0.8804
Abu Tabari 02/28-23	0.6516	0.5973	0.6245	1.0317	1.0136	1.0227	0.9050	0.9412	0.9231	0.9140	0.8869	0.9005
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.6849	0.7123	0.6986	1.0594	1.0594	1.0594	1.0685	1.0685	1.0685	0.8767	0.8219	0.8493
Conical Hill 95/4	0.6535		0.6535	1.0315	0.9843	1.0079	0.9528	0.8740	0.9134	0.9134	0.9291	0.9213
Conical Hill 95/4-1											0.9494	0.9494
Conical Hill 02/3-4												
Djabarona 96/1-1				1.0762		1.0762	0.9810		0.9810	0.8571	0.8857	0.8714
Djabarona 96/1-2							0.9667		0.9667	0.8833	0.8583	0.8708
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM009	SDM010	SDM009/10	SDM011	SDM012	SDM011/12	SDM013	SDM014	SDM013/14	SDM015	SDM016	SDM015/16
♂ No.	4	2	4	4	4	4	4	4	4	2	3	3
♂ Min.	0.6040	0.6565	0.6040	1.0136	0.9843	1.0079	0.9502	0.8740	0.9134	0.8959	0.8869	0.8893
♂ Max.	0.7149	0.7059	0.7104	1.0800	1.0720	1.0760	1.0240	1.0560	1.0400	0.9134	0.9291	0.9213
♂ Mode												
♂ Median	0.6474	0.6812	0.6512	1.0310	1.0259	1.0240	0.9649	0.9598	0.9618	0.9047	0.8893	0.8914
♂ Mean	0.6534	0.6812	0.6542	1.0389	1.0270	1.0330	0.9760	0.9624	0.9692	0.9047	0.9018	0.9007
♂ S.D.	0.0461	0.0349	0.0436	0.0286	0.0372	0.0309	0.0342	0.0748	0.0532	0.0123	0.0237	0.0179
♀ No.	10	8	10	8	9	10	11	9	12	10	11	12
♀ Min.	0.5763	0.5847	0.5805	0.9576	0.9145	0.9145	0.8475	0.8644	0.8560	0.7879	0.7881	0.8031
♀ Max.	0.7475	0.7297	0.7273	1.1743	1.1468	1.1606	1.0685	1.1835	1.1835	1.0512	1.2110	1.0734
♀ Mode												
♀ Median	0.6513	0.6557	0.6389	1.0650	1.0136	1.0410	0.9667	0.9862	0.9739	0.8800	0.8718	0.8711
♀ Mean	0.6485	0.6551	0.6483	1.0586	1.0337	1.0370	0.9613	1.0083	0.9886	0.8918	0.9063	0.8963
♀ S.D.	0.0461	0.0587	0.0469	0.0723	0.0770	0.0765	0.0702	0.1016	0.0886	0.0684	0.1281	0.0893
No.	14	10	14	12	13	14	15	13	16	12	14	15
Min.	0.5763	0.5847	0.5805	0.9576	0.9145	0.9145	0.8475	0.8644	0.8560	0.7879	0.7881	0.8031
Max.	0.7475	0.7297	0.7273	1.1743	1.1468	1.1606	1.0685	1.1835	1.1835	1.0512	1.2110	1.0734
Mode					1.0136						0.8869	
Median	0.6513	0.6677	0.6454	1.0455	1.0136	1.0285	0.9667	0.9695	0.9700	0.8861	0.8863	0.8804
Mean	0.6499	0.6603	0.6500	1.0520	1.0317	1.0358	0.9652	0.9942	0.9837	0.8939	0.9053	0.8972
S.D.	0.0444	0.0542	0.0444	0.0604	0.0657	0.0653	0.0618	0.0936	0.0800	0.0621	0.1128	0.0795

	SDM017 - 81. Crown length LI1 (l)	SDM018 - 81. Crown length LI1 (r)	SDM017/18 - 81. Crown length LI1 (m)	SDM019 - 81. Crown length LI2 (l)	SDM020 - 81. Crown length LI2 (r)	SDM019/20 - 81. Crown length LI2 (m)	SDM021 - 81. Crown length LC (l)	SDM022 - 81. Crown length LC (r)	SDM021/22 - 81. Crown length LC (m)	SDM023 - 81. Crown length LP1 (l)	SDM024 - 81. Crown length LP1 (r)	SDM023/24 - 81. Crown length LP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.4340		0.4340	0.5702	0.5447	0.5575	0.6383	0.6043	0.6213	0.6298	0.6468	0.6383
Abu Tabari 02/1-3							0.6476		0.6476		0.6952	0.6952
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	0.5520	0.5611	0.5566	0.6516	0.6335	0.6426	0.7149	0.7059	0.7104	0.7149	0.7240	0.7194
Abu Tabari 02/28-2	0.5440	0.5360	0.5400	0.5840	0.5600	0.5720	0.6640	0.6560	0.6600			
Abu Tabari 02/28-3	0.5586	0.5586	0.5586	0.6126	0.5766	0.5946	0.7027	0.6847	0.6937	0.6306		0.6306
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.5424	0.5508	0.5466	0.5678	0.5678	0.5678	0.6610	0.6610	0.6610	0.6780	0.6780	0.6780
Abu Tabari 02/28-7				0.5688	0.5780	0.5734	0.6422	0.6330	0.6376	0.6606	0.6606	0.6606
Abu Tabari 02/28-8				0.6233	0.6233	0.6233	0.6140		0.6140	0.7256	0.7256	0.7256
Abu Tabari 02/28-11												
Abu Tabari 02/28-13				0.5546		0.5546						
Abu Tabari 02/28-14	0.5267	0.5038	0.5153	0.5649	0.5649	0.5649	0.6718	0.6641	0.6680	0.6947	0.6870	0.6909
Abu Tabari 02/28-15	0.5758	0.5657	0.5708	0.5758	0.5556	0.5657	0.6869	0.6970	0.6920	0.7576		0.7576
Abu Tabari 02/28-20				0.6124		0.6124						
Abu Tabari 02/28-21	0.4977	0.4977	0.4977	0.5899	0.5806	0.5853	0.6452	0.6636	0.6544	0.7465		0.7465
Abu Tabari 02/28-22							0.6068	0.6068	0.6068			
Abu Tabari 02/28-23	0.5158	0.5158	0.5158	0.5611		0.5611	0.6154		0.6154	0.6606		0.6606
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.5297	0.5297	0.5297	0.5662	0.5571	0.5617	0.6758	0.6667	0.6712	0.7397	0.7397	0.7397
Conical Hill 95/4								0.6378	0.6378	0.6378	0.6457	0.6418
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		0.5429	0.5429				0.6095	0.6095	0.6095	0.7238	0.6762	0.7000
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM017	SDM018	SDM017/18	SDM019	SDM020	SDM019/20	SDM021	SDM022	SDM021/22	SDM023	SDM024	SDM023/24
♂ No.	3	3	3	4	3	4	3	4	4	3	3	3
♂ Min.	0.5267	0.5038	0.5153	0.5649	0.5600	0.5649	0.6640	0.6378	0.6378	0.6378	0.6457	0.6418
♂ Max.	0.5520	0.5611	0.5566	0.6516	0.6335	0.6426	0.7149	0.7059	0.7104	0.7149	0.7240	0.7194
♂ Mode												
♂ Median	0.5440	0.5360	0.5400	0.5982	0.5649	0.5922	0.6718	0.6601	0.6640	0.6947	0.6870	0.6909
♂ Mean	0.5409	0.5336	0.5373	0.6032	0.5861	0.5980	0.6836	0.6659	0.6690	0.6825	0.6856	0.6840
♂ S.D.	0.0129	0.0287	0.0208	0.0377	0.0411	0.0363	0.0274	0.0288	0.0304	0.0400	0.0392	0.0393
♀ No.	7	7	8	9	8	9	12	9	12	10	7	11
♀ Min.	0.4340	0.4977	0.4340	0.5611	0.5447	0.5575	0.6068	0.6043	0.6068	0.6298	0.6468	0.6306
♀ Max.	0.5758	0.5657	0.5708	0.6233	0.6233	0.6233	0.7027	0.6970	0.6937	0.7576	0.7397	0.7576
♀ Mode												0.6606
♀ Median	0.5297	0.5429	0.5363	0.5702	0.5722	0.5678	0.6437	0.6610	0.6426	0.7009	0.6780	0.6952
♀ Mean	0.5220	0.5373	0.5245	0.5817	0.5729	0.5767	0.6454	0.6474	0.6437	0.6953	0.6889	0.6939
♀ S.D.	0.0467	0.0244	0.0433	0.0222	0.0239	0.0213	0.0315	0.0350	0.0313	0.0488	0.0337	0.0442
No.	10	10	11	14	11	14	15	13	16	13	10	14
Min.	0.4340	0.4977	0.4340	0.5546	0.5447	0.5546	0.6068	0.6043	0.6068	0.6298	0.6457	0.6306
Max.	0.5758	0.5657	0.5708	0.6516	0.6335	0.6426	0.7149	0.7059	0.7104	0.7576	0.7397	0.7576
Mode												0.6606
Median	0.5360	0.5394	0.5400	0.5730	0.5678	0.5699	0.6476	0.6610	0.6510	0.6947	0.6825	0.6930
Mean	0.5277	0.5362	0.5280	0.5859	0.5765	0.5812	0.6531	0.6531	0.6500	0.6923	0.6879	0.6918
S.D.	0.0397	0.0241	0.0379	0.0285	0.0279	0.0272	0.0337	0.0332	0.0321	0.0456	0.0332	0.0419

	SDM025 - 81. Crown length LP2 (l)	SDM026 - 81. Crown length LP2 (r)	SDM025/26 - 81. Crown length LP2 (m)	SDM027 - 81. Crown length LM1 (l)	SDM028 - 81. Crown length LM1 (r)	SDM027/28 - 81. Crown length LM1 (m)	SDM029 - 81. Crown length LM2 (l)	SDM030 - 81. Crown length LM2 (r)	SDM029/30 - 81. Crown length LM2 (m)	SDM031 - 81. Crown length LM3 (l)	SDM032 - 81. Crown length LM3 (r)	SDM031/32 - 81. Crown length LM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.6468	0.6553	0.6511	0.9872	0.9702	0.9787	0.9957	0.9787	0.9872	0.9191	0.9277	0.9234
Abu Tabari 02/1-3	0.6095	0.6381	0.6238	1.0381		1.0381	1.0762	1.1048	1.0905	1.0381		1.0381
Abu Tabari 02/1-5	0.6555		0.6555				1.0000		1.0000			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	0.6968	0.7511	0.7240	1.0679	1.0588	1.0634	1.0769	1.0679	1.0724		1.1041	1.1041
Abu Tabari 02/28-2				0.9920	1.0400	1.0160	1.0960	1.0640	1.0800			
Abu Tabari 02/28-3	0.6667	0.6667	0.6667	0.9910		0.9910	0.9910	1.0000	0.9955	1.0721	1.0631	1.0676
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.6186	0.7034	0.6610	1.0424	1.0593	1.0509	1.0169	0.9661	0.9915	1.0085	1.0169	1.0127
Abu Tabari 02/28-7	0.7339	0.7248	0.7293	1.1193	1.1284	1.1239	1.1376	1.1284	1.1330		1.1651	1.1651
Abu Tabari 02/28-8	0.7256	0.6605	0.6930				1.0326	1.0233	1.0280	0.9767	1.0605	1.0186
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.6794	0.6947	0.6870	1.1145	1.0992	1.1069	1.0458		1.0458			
Abu Tabari 02/28-15	0.7273		0.7273	1.1515		1.1515	1.1111		1.1111	0.9192		0.9192
Abu Tabari 02/28-20		0.7383	0.7383							1.1242		1.1242
Abu Tabari 02/28-21		0.6359	0.6359		0.9217	0.9217	1.0415	1.0323	1.0369	1.0138	0.9677	0.9908
Abu Tabari 02/28-22	0.6496	0.6154	0.6325	0.9829	0.9915	0.9872	0.9915	0.9829	0.9872	1.0000	0.9402	0.9701
Abu Tabari 02/28-23	0.7240	0.7149	0.7194	1.0407	1.0407	1.0407	0.9955	1.0045	1.0000	0.9774	1.0045	0.9910
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.7489	0.7671	0.7580	1.0868	1.0959	1.0914	1.0868	1.0868	1.0868	0.9041	0.9680	0.9361
Conical Hill 95/4		0.7165	0.7165		1.0079	1.0079	1.0236		1.0236	1.0079	0.9921	1.0000
Conical Hill 95/4-1												
Conical Hill 02/3-4					1.0734	1.0734		1.1193	1.1193			
Djabarona 96/1-1	0.6571		0.6571	1.1143	1.1619	1.1381	1.0952	1.1143	1.1048	1.1524	1.1143	1.1334
Djabarona 96/1-2										1.0917	1.1583	1.1250
Djabarona 96-4					1.0354	1.0354						
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM025	SDM026	SDM025/26	SDM027	SDM028	SDM027/28	SDM029	SDM030	SDM029/30	SDM031	SDM032	SDM031/32
♂ No.	3	4	5	3	6	6	5	3	6	2	2	3
♂ Min.	0.6555	0.6947	0.6555	0.9920	1.0079	1.0079	1.0000	1.0640	1.0000	1.0079	0.9921	1.0000
♂ Max.	0.6968	0.7511	0.7383	1.1145	1.0992	1.1069	1.0960	1.1193	1.1193	1.1242	1.1041	1.1242
♂ Mode												
♂ Median	0.6794	0.7274	0.7165	1.0679	1.0494	1.0494	1.0458	1.0679	1.0591	1.0660	1.0481	1.1041
♂ Mean	0.6772	0.7251	0.7043	1.0581	1.0525	1.0505	1.0485	1.0837	1.0569	1.0660	1.0481	1.0761
♂ S.D.	0.0208	0.0248	0.0331	0.0618	0.0319	0.0377	0.0389	0.0309	0.0427	0.0822	0.0792	0.0667
♀ No.	11	10	12	10	8	11	12	11	12	12	11	13
♀ Min.	0.6095	0.6154	0.6238	0.9829	0.9217	0.9217	0.9910	0.9661	0.9872	0.9041	0.9277	0.9192
♀ Max.	0.7489	0.7671	0.7580	1.1515	1.1619	1.1515	1.1376	1.1284	1.1330	1.1524	1.1651	1.1651
♀ Mode									0.9872			
♀ Median	0.6667	0.6636	0.6639	1.0415	1.0500	1.0407	1.0370	1.0233	1.0324	1.0042	1.0169	1.0127
♀ Mean	0.6825	0.6782	0.6796	1.0554	1.0462	1.0466	1.0476	1.0384	1.0460	1.0061	1.0351	1.0224
♀ S.D.	0.0503	0.0476	0.0445	0.0601	0.0820	0.0737	0.0520	0.0595	0.0555	0.0747	0.0841	0.0807
No.	14	14	17	13	14	17	17	14	18	14	13	16
Min.	0.6095	0.6154	0.6238	0.9829	0.9217	0.9217	0.9910	0.9661	0.9872	0.9041	0.9277	0.9192
Max.	0.7489	0.7671	0.7580	1.1515	1.1619	1.1515	1.1376	1.1284	1.1330	1.1524	1.1651	1.1651
Mode									0.9872			
Median	0.6730	0.6990	0.6870	1.0424	1.0498	1.0407	1.0415	1.0481	1.0414	1.0082	1.0169	1.0157
Mean	0.6814	0.6916	0.6869	1.0560	1.0489	1.0480	1.0479	1.0481	1.0496	1.0147	1.0371	1.0325
S.D.	0.0449	0.0468	0.0420	0.0579	0.0635	0.0620	0.0473	0.0569	0.0506	0.0756	0.0802	0.0792

	SDM033 - 81(1). Crown width UI1 (l)	SDM034 - 81(1). Crown width UI1 (r)	SDM033/34 - 81(1). Crown width UI1 (m)	SDM035 - 81(1). Crown width UI2 (l)	SDM036 - 81(1). Crown width UI2 (r)	SDM035/36 - 81(1). Crown width UI2 (m)	SDM037 - 81(1). Crown width UC (l)	SDM038 - 81(1). Crown width UC (r)	SDM037/38 - 81(1). Crown width UC (m)	SDM039 - 81(1). Crown width UP1 (l)	SDM040 - 81(1). Crown width UP1 (r)	SDM039/40 - 81(1). Crown width UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.6723	0.6894	0.6809	0.6809	0.6468	0.6639		0.7234	0.7234			
Abu Tabari 02/1-3							0.8286		0.8286			
Abu Tabari 02/1-5		0.7479	0.7479									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7											0.9312	0.9312
Abu Tabari 02/1-8	0.6787	0.6606	0.6697	0.6063	0.6063	0.6063	0.8507	0.8416	0.8462	0.8688	0.9140	0.8914
Abu Tabari 02/28-2	0.7200	0.7200	0.7200		0.6320	0.6320						
Abu Tabari 02/28-3		0.7477	0.7477	0.6847	0.6937	0.6892	0.8739	0.8649	0.8694			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.6356	0.6780	0.6568	0.5085	0.5254	0.5170	0.7203	0.7203	0.7203		0.8983	0.8983
Abu Tabari 02/28-7		0.6881	0.6881				0.7890	0.8073	0.7982	0.9358	0.9174	0.9266
Abu Tabari 02/28-8	0.7256	0.6977	0.7117				0.7814	0.8093	0.7954	0.9488		0.9488
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.6260	0.6336	0.6298	0.5878	0.5496	0.5687	0.7481	0.7405	0.7443	0.8397	0.8473	0.8435
Abu Tabari 02/28-15	0.7071	0.7071	0.7071	0.6465	0.6566	0.6516	0.8485	0.8485	0.8485	0.9596	0.9596	0.9596
Abu Tabari 02/28-20		0.7047	0.7047									
Abu Tabari 02/28-21	0.6820		0.6820	0.5806		0.5806	0.7097	0.7373	0.7235	0.9032		0.9032
Abu Tabari 02/28-22	0.6325		0.6325				0.6752	0.6923	0.6838	0.7692	0.8120	0.7906
Abu Tabari 02/28-23	0.6697		0.6697							0.9593	0.9412	0.9503
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.7215	0.7671	0.7443	0.6301	0.6301	0.6301	0.8493	0.8402	0.8448	0.9406	0.9224	0.9315
Conical Hill 95/4	0.6378		0.6378	0.6850	0.6378	0.6614	0.7480	0.7480	0.7480			
Conical Hill 95/4-1										0.9222		0.9222
Conical Hill 02/3-4												
Djabarona 96/1-1	0.6190		0.6190				0.6381	0.6381	0.6381			
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM033	SDM034	SDM033/34	SDM035	SDM036	SDM035/36	SDM037	SDM038	SDM037/38	SDM039	SDM040	SDM039/40
♂ No.	4	5	6	3	4	4	3	3	3	2	3	3
♂ Min.	0.6260	0.6336	0.6298	0.5878	0.5496	0.5687	0.7480	0.7405	0.7443	0.8397	0.8473	0.8435
♂ Max.	0.7200	0.7479	0.7479	0.6850	0.6378	0.6614	0.8507	0.8416	0.8462	0.8688	0.9312	0.9312
♂ Mode												
♂ Median	0.6583	0.7047	0.6872	0.6063	0.6192	0.6192	0.7481	0.7480	0.7480	0.8542	0.9140	0.8914
♂ Mean	0.6656	0.6934	0.6850	0.6264	0.6064	0.6171	0.7823	0.7767	0.7795	0.8542	0.8975	0.8887
♂ S.D.	0.0427	0.0460	0.0471	0.0516	0.0403	0.0393	0.0592	0.0564	0.0578	0.0206	0.0443	0.0439
♀ No.	9	7	11	6	5	6	10	10	11	8	6	9
♀ Min.	0.6190	0.6780	0.6190	0.5085	0.5254	0.5170	0.6381	0.6381	0.6381	0.7692	0.8120	0.7906
♀ Max.	0.7256	0.7671	0.7477	0.6847	0.6937	0.6892	0.8739	0.8649	0.8694	0.9596	0.9596	0.9596
♀ Mode												
♀ Median	0.6723	0.6977	0.6820	0.6383	0.6468	0.6408	0.7852	0.7723	0.7954	0.9382	0.9199	0.9266
♀ Mean	0.6739	0.7107	0.6854	0.6219	0.6305	0.6220	0.7714	0.7682	0.7703	0.9174	0.9085	0.9146
♀ S.D.	0.0392	0.0336	0.0410	0.0673	0.0632	0.0632	0.0814	0.0761	0.0762	0.0628	0.0517	0.0509
No.	13	12	17	9	9	10	13	13	14	10	9	12
Min.	0.6190	0.6336	0.6190	0.5085	0.5254	0.5170	0.6381	0.6381	0.6381	0.7692	0.8120	0.7906
Max.	0.7256	0.7671	0.7479	0.6850	0.6937	0.6892	0.8739	0.8649	0.8694	0.9596	0.9596	0.9596
Mode												
Median	0.6723	0.7012	0.6820	0.6301	0.6320	0.6311	0.7814	0.7480	0.7717	0.9290	0.9174	0.9244
Mean	0.6714	0.7035	0.6853	0.6234	0.6198	0.6201	0.7739	0.7701	0.7723	0.9047	0.9048	0.9081
S.D.	0.0387	0.0383	0.0418	0.0592	0.0526	0.0523	0.0747	0.0699	0.0707	0.0618	0.0468	0.0487

	SDM041 - 81(1). Crown width UP2 (l)	SDM042 - 81(1). Crown width UP2 (r)	SDM041/42 - 81(1). Crown width UP2 (m)	SDM043 - 81(1). Crown width UM1 (l)	SDM044 - 81(1). Crown width UM1 (r)	SDM043/44 - 81(1). Crown width UM1 (m)	SDM045 - 81(1). Crown width UM2 (l)	SDM046 - 81(1). Crown width UM2 (r)	SDM045/46 - 81(1). Crown width UM2 (m)	SDM047 - 81(1). Crown width UM3 (l)	SDM048 - 81(1). Crown width UM3 (r)	SDM047/48 - 81(1). Crown width UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2							1.0979	1.0894	1.0937		1.0128	1.0128
Abu Tabari 02/1-3		0.8667	0.8667							1.0952		1.0952
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	0.8305		0.8305									
Abu Tabari 02/1-8	0.9050	0.8869	0.8960	1.0950	1.0769	1.0860	1.0769	1.1041	1.0905	1.0226	1.0045	1.0136
Abu Tabari 02/28-2				1.0560	1.0640	1.0600	1.1280	1.1200	1.1240			
Abu Tabari 02/28-3							1.2072		1.2072			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.8305	0.8390	0.8348		1.0763	1.0763	1.1102	1.0678	1.0890	1.1017	0.9831	1.0424
Abu Tabari 02/28-7	0.8899	0.9083	0.8991	1.1651	1.1376	1.1513		1.1376	1.1376	1.1651	1.1560	1.1606
Abu Tabari 02/28-8	0.9116	0.8930	0.9023	1.0791	1.0791	1.0791	1.0326	1.0884	1.0605	1.0605	1.0512	1.0559
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.8702	0.9160	0.8931	1.0840	1.0382	1.0611	1.1145	1.0687	1.0916			
Abu Tabari 02/28-15	0.9798	0.9697	0.9748	1.1818	1.1414	1.1616	1.1717	1.1414	1.1566	1.1919	1.1717	1.1818
Abu Tabari 02/28-20											1.0403	1.0403
Abu Tabari 02/28-21	0.8848		0.8848									
Abu Tabari 02/28-22	0.8376		0.8376	1.0427		1.0427	1.0513	1.0598	1.0556	1.0513	1.0427	1.0470
Abu Tabari 02/28-23	0.9412	0.9231	0.9322	1.1041	1.1222	1.1132	1.0226	1.1041	1.0634	1.0679	1.0588	1.0634
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.9041	0.9498	0.9269	1.1507	1.1598	1.1553	1.1416	1.1233	1.1325	1.0776	1.1050	1.0913
Conical Hill 95/4										0.9921	1.0000	0.9961
Conical Hill 95/4-1											1.0759	1.0759
Conical Hill 02/3-4												
Djabarona 96/1-1				1.0952		1.0952	1.0571		1.0571	1.0762	1.0667	1.0715
Djabarona 96/1-2								1.0917	1.0917	1.1667	1.1333	1.1500
Djabarona 96-4							1.1416	1.0885	1.1151			
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM041	SDM042	SDM041/42	SDM043	SDM044	SDM043/44	SDM045	SDM046	SDM045/46	SDM047	SDM048	SDM047/48
♂ No.	3	2	3	3	3	3	4	4	4	2	3	3
♂ Min.	0.8305	0.8869	0.8305	1.0560	1.0382	1.0600	1.0769	1.0687	1.0905	0.9921	1.0000	0.9961
♂ Max.	0.9050	0.9160	0.8960	1.0950	1.0769	1.0860	1.1416	1.1200	1.1240	1.0226	1.0403	1.0403
♂ Mode												
♂ Median	0.8702	0.9015	0.8931	1.0840	1.0640	1.0611	1.1213	1.0963	1.1033	1.0074	1.0045	1.0136
♂ Mean	0.8686	0.9015	0.8732	1.0783	1.0597	1.0690	1.1153	1.0953	1.1053	1.0074	1.0149	1.0166
♂ S.D.	0.0372	0.0206	0.0370	0.0201	0.0197	0.0147	0.0278	0.0219	0.0168	0.0216	0.0221	0.0223
♀ No.	8	7	9	7	6	8	9	9	11	10	11	12
♀ Min.	0.8305	0.8390	0.8348	1.0427	1.0763	1.0427	1.0226	1.0598	1.0556	1.0513	0.9831	1.0128
♀ Max.	0.9798	0.9697	0.9748	1.1818	1.1598	1.1616	1.2072	1.1414	1.2072	1.1919	1.1717	1.1818
♀ Mode												
♀ Median	0.8970	0.9083	0.8991	1.1041	1.1299	1.1042	1.0979	1.0917	1.0917	1.0864	1.0667	1.0737
♀ Mean	0.8974	0.9071	0.8955	1.1170	1.1194	1.1093	1.0991	1.1004	1.1041	1.1054	1.0779	1.0873
♀ S.D.	0.0496	0.0456	0.0456	0.0504	0.0345	0.0435	0.0644	0.0288	0.0489	0.0504	0.0586	0.0517
No.	11	9	12	10	9	11	13	13	15	12	14	15
Min.	0.8305	0.8390	0.8305	1.0427	1.0382	1.0427	1.0226	1.0598	1.0556	0.9921	0.9831	0.9961
Max.	0.9798	0.9697	0.9748	1.1818	1.1598	1.1616	1.2072	1.1414	1.2072	1.1919	1.1717	1.1818
Mode								1.1041				
Median	0.8899	0.9083	0.8945	1.0951	1.0791	1.0860	1.1102	1.0917	1.0917	1.0769	1.0550	1.0634
Mean	0.8896	0.9058	0.8899	1.1054	1.0995	1.0983	1.1041	1.0988	1.1044	1.0891	1.0644	1.0732
S.D.	0.0467	0.0402	0.0432	0.0462	0.0416	0.0415	0.0550	0.0261	0.0421	0.0598	0.0586	0.0550

	SDM049 - 81(1). Crown width LI1 (l)	SDM050 - 81(1). Crown width LI1 (r)	SDM049/50 - 81(1). Crown width LI1 (m)	SDM051 - 81(1). Crown width LI2 (l)	SDM052 - 81(1). Crown width LI2 (r)	SDM051/52 - 81(1). Crown width LI2 (m)	SDM053 - 81(1). Crown width LC (l)	SDM054 - 81(1). Crown width LC (r)	SDM053/54 - 81(1). Crown width LC (m)	SDM055 - 81(1). Crown width LP1 (l)	SDM056 - 81(1). Crown width LP1 (r)	SDM055/56 - 81(1). Crown width LP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0.5702	0.5702	0.5702	0.5957	0.5957	0.5957	0.6638	0.6553	0.6596	0.7745	0.7319	0.7532
Abu Tabari 02/1-3	0.5714	0.5810	0.5762	0.6286	0.6286	0.6286	0.7524	0.7619	0.7572	0.8000	0.8095	0.8048
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	0.5430	0.5430	0.5430	0.6063	0.5792	0.5928		0.6968	0.6968	0.6968	0.6968	0.6968
Abu Tabari 02/28-2	0.5520	0.5600	0.5560	0.6000	0.6080	0.6040	0.7200	0.7360	0.7280			
Abu Tabari 02/28-3	0.6126	0.6126	0.6126	0.6757	0.6396	0.6577	0.8018	0.8018	0.8018			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0.5339	0.5339	0.5339	0.5508	0.5254	0.5381	0.6695	0.6610	0.6653	0.7797	0.7966	0.7881
Abu Tabari 02/28-7				0.5780	0.5688	0.5734	0.6514	0.6514	0.6514	0.7523	0.7615	0.7569
Abu Tabari 02/28-8				0.5581	0.5674	0.5628	0.6512	0.6512	0.6512	0.8000	0.7814	0.7907
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0.5115	0.5267	0.5191	0.5267	0.4885	0.5076	0.7023	0.6718	0.6870	0.7786	0.7634	0.7710
Abu Tabari 02/28-15	0.5859	0.5859	0.5859	0.6263	0.5556	0.5910	0.7374	0.7374	0.7374	0.8081		0.8081
Abu Tabari 02/28-20				0.6292		0.6292						
Abu Tabari 02/28-21	0.5253	0.5161	0.5207	0.5530	0.5438	0.5484	0.6544	0.6359	0.6452	0.7465		0.7465
Abu Tabari 02/28-22							0.6068	0.6154	0.6111			
Abu Tabari 02/28-23	0.6516	0.6516	0.6516	0.5701		0.5701	0.6697		0.6697	0.7511		0.7511
Abu Tabari 03/31												
Abu Tabari 03/34-1	0.5845	0.5388	0.5617		0.5753	0.5753	0.6667	0.7032	0.6850	0.8128	0.8128	0.8128
Conical Hill 95/4								0.7165	0.7165		0.6850	0.6850
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		0.4762	0.4762				0.5714	0.6095	0.5905	0.6857	0.6952	0.6905
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SDM049	SDM050	SDM049/50	SDM051	SDM052	SDM051/52	SDM053	SDM054	SDM053/54	SDM055	SDM056	SDM055/56
♂ No.	3	3	3	4	3	4	2	4	4	2	3	3
♂ Min.	0.5115	0.5267	0.5191	0.5267	0.4885	0.5076	0.7023	0.6718	0.6870	0.6968	0.6850	0.6850
♂ Max.	0.5520	0.5600	0.5560	0.6292	0.6080	0.6292	0.7200	0.7360	0.7280	0.7786	0.7634	0.7710
♂ Mode												
♂ Median	0.5430	0.5430	0.5430	0.6032	0.5792	0.5984	0.7111	0.7067	0.7067	0.7377	0.6968	0.6968
♂ Mean	0.5355	0.5432	0.5394	0.5906	0.5586	0.5834	0.7111	0.7053	0.7071	0.7377	0.7151	0.7176
♂ S.D.	0.0213	0.0166	0.0187	0.0444	0.0623	0.0528	0.0125	0.0275	0.0186	0.0578	0.0422	0.0466
♀ No.	8	9	9	9	9	10	12	11	12	10	7	10
♀ Min.	0.5253	0.4762	0.4762	0.5508	0.5254	0.5381	0.5714	0.6095	0.5905	0.6857	0.6952	0.6905
♀ Max.	0.6516	0.6516	0.6516	0.6757	0.6396	0.6577	0.8018	0.8018	0.8018	0.8128	0.8128	0.8128
♀ Mode										0.8000		
♀ Median	0.5780	0.5702	0.5702	0.5780	0.5688	0.5743	0.6652	0.6553	0.6624	0.7771	0.7814	0.7725
♀ Mean	0.5794	0.5629	0.5654	0.5929	0.5778	0.5841	0.6747	0.6804	0.6771	0.7711	0.7698	0.7703
♀ S.D.	0.0406	0.0529	0.0515	0.0427	0.0376	0.0362	0.0626	0.0625	0.0606	0.0387	0.0435	0.0379
No.	11	12	12	13	12	14	14	15	16	12	10	13
Min.	0.5115	0.4762	0.4762	0.5267	0.4885	0.5076	0.5714	0.6095	0.5905	0.6857	0.6850	0.6850
Max.	0.6516	0.6516	0.6516	0.6757	0.6396	0.6577	0.8018	0.8018	0.8018	0.8128	0.8128	0.8128
Mode										0.8000		
Median	0.5702	0.5515	0.5588	0.5957	0.5721	0.5831	0.6681	0.6718	0.6773	0.7765	0.7624	0.7569
Mean	0.5674	0.5580	0.5589	0.5922	0.5730	0.5839	0.6799	0.6870	0.6846	0.7655	0.7534	0.7581
S.D.	0.0408	0.0465	0.0461	0.0413	0.0426	0.0394	0.0592	0.0555	0.0542	0.0412	0.0485	0.0444

	SDM057 - 81(1). Crown width LP2 (l)	SDM058 - 81(1). Crown width LP2 (r)	SDM057/58 - 81(1). Crown width LP2 (m)	SDM059 - 81(1). Crown width LM1 (l)	SDM060 - 81(1). Crown width LM1 (r)	SDM059/60 - 81(1). Crown width LM1 (m)	SDM063 - 81(1). Crown width LM3 (l)	SDM064 - 81(1). Crown width LM3 (r)	SDM063/64 - 81(1). Crown width LM3 (m)
Abu Tabari 95/2-3									
Abu Tabari 02/1-2	0.7915	0.8085	0.8000	1.0213	1.0043	1.0128	0.9106	0.9447	0.9277
Abu Tabari 02/1-3	0.8190	0.8381	0.8285	1.0286	1.0381	1.0334	1.0190		1.0190
Abu Tabari 02/1-5	0.8235		0.8235						
Abu Tabari 02/1-6									
Abu Tabari 02/1-7									
Abu Tabari 02/1-8	0.7873	0.7783	0.7828	1.0136	0.9864	1.0000		1.0136	1.0136
Abu Tabari 02/28-2				1.0480	1.0400	1.0440			
Abu Tabari 02/28-3	0.8468		0.8468				1.0000	1.0360	1.0180
Abu Tabari 02/28-4									
Abu Tabari 02/28-5	0.7627	0.7881	0.7754	1.0169	1.0339	1.0254	1.0000	1.0085	1.0042
Abu Tabari 02/28-7	0.7982	0.7982	0.7982	1.0275		1.0275		0.9633	0.9633
Abu Tabari 02/28-8	0.8930	0.8372	0.8651	1.0326		1.0326	0.9209	0.9581	0.9395
Abu Tabari 02/28-11									
Abu Tabari 02/28-13									
Abu Tabari 02/28-14	0.8015	0.7863	0.7939	1.0000	1.0687	1.0343			
Abu Tabari 02/28-15	0.8384		0.8384	1.0909		1.0909	1.0000		1.0000
Abu Tabari 02/28-20							0.9983		0.9983
Abu Tabari 02/28-21		0.7926	0.7926				0.9770	0.9770	0.9770
Abu Tabari 02/28-22		0.7094	0.7094	0.9915		0.9915	0.9316	0.9231	0.9274
Abu Tabari 02/28-23	0.7873	0.7783	0.7828	1.0226	1.0317	1.0272	0.9955	0.9955	0.9955
Abu Tabari 03/31									
Abu Tabari 03/34-1	0.8219	0.8037	0.8128	1.0502	1.0502	1.0502	0.8493	0.9498	0.8996
Conical Hill 95/4							0.8661	0.8583	0.8622
Conical Hill 95/4-1									
Conical Hill 02/3-4								1.0183	1.0183
Djabarona 96/1-1	0.6476		0.6476		1.0952	1.0952	0.9619	0.9905	0.9762
Djabarona 96/1-2							1.0167	0.9833	1.0000
Djabarona 96-4					0.9912	0.9912			
Djabarona 96/120-3									
Djabarona 96/120-4							0.9228	0.9144	0.9186
Djabarona 96/120-5									

	SDM057	SDM058	SDM057/58	SDM059	SDM060	SDM059/60	SDM063	SDM064	SDM063/64
♂ No.	3	2	3	3	4	4	3	4	5
♂ Min.	0.7873	0.7783	0.7828	1.0000	0.9864	0.9912	0.8661	0.8583	0.8622
♂ Max.	0.8235	0.7863	0.8235	1.0480	1.0687	1.0440	0.9983	1.0183	1.0183
♂ Mode									
♂ Median	0.8015	0.7823	0.7939	1.0136	1.0156	1.0172	0.9228	0.9640	0.9983
♂ Mean	0.8041	0.7823	0.8001	1.0205	1.0216	1.0174	0.9291	0.9512	0.9622
♂ S.D.	0.0182	0.0056	0.0210	0.0247	0.0397	0.0257	0.0663	0.0783	0.0689
♀ No.	10	9	12	9	6	10	12	11	13
♀ Min.	0.6476	0.7094	0.6476	0.9915	1.0043	0.9915	0.8493	0.9231	0.8996
♀ Max.	0.8930	0.8381	0.8651	1.0909	1.0952	1.0952	1.0190	1.0360	1.0190
♀ Mode							1.0000		1.0000
♀ Median	0.8086	0.7982	0.7991	1.0275	1.0360	1.0301	0.9862	0.9770	0.9770
♀ Mean	0.8007	0.7949	0.7915	1.0313	1.0422	1.0387	0.9652	0.9754	0.9729
♀ S.D.	0.0650	0.0380	0.0606	0.0272	0.0300	0.0324	0.0520	0.0320	0.0386
No.	13	11	15	12	10	14	15	15	18
Min.	0.6476	0.7094	0.6476	0.9915	0.9864	0.9912	0.8493	0.8583	0.8622
Max.	0.8930	0.8381	0.8651	1.0909	1.0952	1.0952	1.0190	1.0360	1.0190
Mode	0.7873	0.7783	0.7828				1.0000		1.0000
Median	0.8015	0.7926	0.7982	1.0251	1.0360	1.0301	0.9770	0.9770	0.9863
Mean	0.8015	0.7926	0.7932	1.0286	1.0340	1.0326	0.9580	0.9690	0.9699
S.D.	0.0568	0.0344	0.0544	0.0259	0.0338	0.0313	0.0546	0.0466	0.0468

Appendix XIV.D. Scaled postcranial measurements

	SPM001 - C1. *Clavicula* - Maximum length (l)	SPM002 - C1. *Clavicula* - Maximum length (r)	SPM003 - C4. Vertical diameter of the mid-shaft (l)	SPM004 - C4. Vertical diameter of the mid-shaft (r)	SPM005 - C5. Sagittal diameter of the mid-shaft (l)	SPM006 - C5. Sagittal diameter of the mid-shaft (r)	SPM007 - C6. Circumference of the mid-shaft (l)	SPM008 - C6. Circumference of the mid-shaft (r)	SPM009 - *Clavicula* - Cortical thickness (ant.)	SPM010 - *Clavicula* - Cortical thickness (post.)	SPM011 - *Clavicula* - Cortical thickness (sup.)	SPM012 - *Clavicula* - Cortical thickness (inf.)	SPM013 - *Clavicula* - Cortical thickness (max.)	SPM014 - *Clavicula* - Cortical thickness (min.)
Abu Tabari 95/2-3														
Abu Tabari 02/1-2	11.4894	11.4894	0.9362	0.8511	0.8511	0.8511	2.7234	2.7234	0.2553	0.2979	0.2979	0.2553	0.2979	0.2553
Abu Tabari 02/1-3														
Abu Tabari 02/1-5														
Abu Tabari 02/1-6														
Abu Tabari 02/1-7														
Abu Tabari 02/1-8														
Abu Tabari 02/28-2														
Abu Tabari 02/28-3				0.9459		1.1261		3.0631	0.3604	0.3153	0.3153	0.3153	0.3604	0.3153
Abu Tabari 02/28-4														
Abu Tabari 02/28-5	11.0169	10.5932	0.8475	0.8475	1.0169	1.0169	3.0508	3.0508						
Abu Tabari 02/28-7														
Abu Tabari 02/28-8		10.2326		0.8372		1.0233		2.8372	0.2791	0.2791	0.2791	0.2791	0.2791	0.2791
Abu Tabari 02/28-11														
Abu Tabari 02/28-13														
Abu Tabari 02/28-14														
Abu Tabari 02/28-15	13.1313		0.9596		1.2121		3.3333							
Abu Tabari 02/28-20			0.7970		1.1326		3.1040		0.2517	0.3356	0.2097	0.2097	0.3356	0.2097
Abu Tabari 02/28-21	11.5207		0.8295	0.8295	0.9677	1.0138	2.8571	2.9493	0.2765	0.3226	0.2765	0.2304	0.3226	0.2304
Abu Tabari 02/28-22	11.3248		0.7265	0.8120	0.9402	0.9829	2.6496	2.8205	0.2564	0.2991	0.3419	0.2137	0.3419	0.2137
Abu Tabari 02/28-23														
Abu Tabari 03/31														
Abu Tabari 03/34-1														
Conical Hill 95/4														
Conical Hill 95/4-1														
Conical Hill 02/3-4				1.0092		1.2385		3.4404			0.4128	0.3211	0.4128	0.3211
Djabarona 96/1-1	12.1429		0.8571		0.9048		3.0476							
Djabarona 96/1-2				0.7500		1.0000		2.5833			0.2500	0.1667	0.2500	0.1667
Djabarona 96-4														
Djabarona 96/120-3				0.8590		0.9494		2.7125	0.3617		0.2712		0.3617	0.2712
Djabarona 96/120-4														
Djabarona 96/120-5														

	SPM001	SPM002	SPM003	SPM004	SPM005	SPM006	SPM007	SPM008	SPM009	SPM010	SPM011	SPM012	SPM013	SPM014
♂ No.	0	0	1	1	1	1	1	1	1	1	2	2	2	2
♂ Min.			0.7970	1.0092	1.1326	1.2385	3.1040	3.4404	0.2517	0.3356	0.2097	0.2097	0.3356	0.2097
♂ Max.			0.7970	1.0092	1.1326	1.2385	3.1040	3.4404	0.2517	0.3356	0.4128	0.3211	0.4128	0.3211
♂ Mode														
♂ Median			0.7970	1.0092	1.1326	1.2385	3.1040	3.4404	0.2517	0.3356	0.3113	0.2654	0.3742	0.2654
♂ Mean			0.7970	1.0092	1.1326	1.2385	3.1040	3.4404	0.2517	0.3356	0.3113	0.2654	0.3742	0.2654
♂ S.D.											0.1436	0.0788	0.0546	0.0788
♀ No.	6	3	6	8	6	8	6	8	6	5	7	6	7	7
♀ Min.	11.0169	10.2326	0.7265	0.7500	0.8511	0.8511	2.6496	2.5833	0.2553	0.2791	0.2500	0.1667	0.2500	0.1667
♀ Max.	13.1313	11.4894	0.9596	0.9459	1.2121	1.1261	3.3333	3.0631	0.3617	0.3226	0.3419	0.3153	0.3617	0.3153
♀ Mode														
♀ Median	11.5050	10.5932	0.8523	0.8423	0.9540	1.0069	2.9524	2.8289	0.2778	0.2991	0.2791	0.2429	0.3226	0.2553
♀ Mean	11.7710	10.7717	0.8594	0.8415	0.9821	0.9954	2.9437	2.8425	0.2982	0.3028	0.2903	0.2434	0.3162	0.2474
♀ S.D.	0.7614	0.6471	0.0832	0.0544	0.1259	0.0773	0.2516	0.1700	0.0496	0.0169	0.0307	0.0520	0.0425	0.0486
No.	6	3	7	9	7	9	7	9	7	6	9	8	9	9
Min.	11.0169	10.2326	0.7265	0.7500	0.8511	0.8511	2.6496	2.5833	0.2517	0.2791	0.2097	0.1667	0.2500	0.1667
Max.	13.1313	11.4894	0.9596	1.0092	1.2121	1.2385	3.3333	3.4404	0.3617	0.3356	0.4128	0.3211	0.4128	0.3211
Mode														
Median	11.5050	10.5932	0.8475	0.8475	0.9677	1.0138	3.0476	2.8372	0.2765	0.3072	0.2791	0.2429	0.3356	0.2553
Mean	11.7710	10.7717	0.8505	0.8601	1.0036	1.0224	2.9666	2.9089	0.2916	0.3083	0.2949	0.2489	0.3291	0.2514
S.D.	0.7614	0.6471	0.0796	0.0756	0.1282	0.1086	0.2376	0.2549	0.0486	0.0202	0.0581	0.0541	0.0488	0.0511

	SPM015 - H1. *Humerus* - Maximum length (l)	SPM016 - H1. *Humerus* - Maximum length (r)	SPM015/16 - H1. *Humerus* - Maximum length (m)	SPM017 - H4a. Maximum bi-epicondylar width (l)	SPM018 - H4a. Maximum bi-epicondylar width (r)	SPM019 - H5. Maximum diameter of the mid-shaft (l)	SPM020 - H5. Maximum diameter of the mid-shaft (r)	SPM019/20 - H5. Maximum diameter of the mid-shaft (m)	SPM021 - H6. Minimum diameter of the mid-shaft (l)	SPM022 - H6. Minimum diameter of the mid-shaft (r)	SPM021/22 - H6. Minimum diameter of the mid-shaft (m)	SPM023 - H7. Least circumference of the shaft (l)
Abu Tabari 95/2-3	27.6846		27.6846			1.9715		1.9715	1.3423		1.3423	4.9497
Abu Tabari 02/1-2	28.9362	28.9362	28.9362			1.7447	1.6170	1.6809	1.2766	1.2340	1.2553	4.6809
Abu Tabari 02/1-3	31.4286	31.9048	31.6667			1.8095	1.9048	1.8571	1.3810	1.4286	1.4048	5.0476
Abu Tabari 02/1-5	28.9916	28.9916	28.9916				1.8067	1.8067		1.3025	1.3025	
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		26.0067	26.0067				1.6359	1.6359		1.3003	1.3003	
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		17.4766	17.4766	3.4579		1.2150	1.3084	1.2617	1.0748	0.9813	1.0280	3.5514
Abu Tabari 02/28-3		29.7297	29.7297			1.8919	1.7117	1.8018	1.5315	1.5315	1.5315	
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	23.3051	23.3051	23.3051			1.9068	1.9492	1.9280	1.2712	1.3559	1.3136	4.5763
Abu Tabari 02/28-7	26.6055		26.6055			1.5596		1.5596	1.1927		1.1927	
Abu Tabari 02/28-8		25.1163	25.1163									
Abu Tabari 02/28-11					5.0336							
Abu Tabari 02/28-13												
Abu Tabari 02/28-14		13.5965	13.5965				1.1842	1.1842		1.1404	1.1404	
Abu Tabari 02/28-15												
Abu Tabari 02/28-20						1.5940	1.5940	1.5940	1.3423	1.3423	1.3423	
Abu Tabari 02/28-21	27.6498		27.6498			1.8894	1.9355	1.9124	1.6590	1.4747	1.5668	5.6221
Abu Tabari 02/28-22	26.4957		26.4957			1.8803	1.8803	1.8803	1.4103	1.3675	1.3889	4.9573
Abu Tabari 02/28-23						1.8100		1.8100	1.3575		1.3575	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4						1.4679	1.4679	1.4679	1.3303	1.3303	1.3303	
Djabarona 96/1-1	29.5238	29.5238	29.5238			1.6667	1.8571	1.7619	1.6190	1.6190	1.6190	5.0476
Djabarona 96/1-2		23.7500	23.7500				1.5833	1.5833		1.3333	1.3333	
Djabarona 96-4						1.5929	1.5929	1.5929	1.4159	1.4159	1.4159	
Djabarona 96/120-3												
Djabarona 96/120-4		28.9430	28.9430				1.6359	1.6359		1.0906	1.0906	
Djabarona 96/120-5												

	SPM015	SPM016	SPM015/16	SPM017	SPM018	SPM019	SPM020	SPM019/20	SPM021	SPM022	SPM021/22	SPM023
♂ No.	2	3	4	0	1	4	6	7	4	6	7	1
♂ Min.	27.6846	26.0067	26.0067		5.0336	1.4679	1.4679	1.4679	1.3303	1.0906	1.0906	4.9497
♂ Max.	28.9916	28.9916	28.9916		5.0336	1.9715	1.8067	1.9715	1.4159	1.4159	1.4159	4.9497
♂ Mode							1.6359	1.6359	1.3423		1.3423	
♂ Median	28.3381	28.9430	28.3138		5.0336	1.5934	1.6149	1.6359	1.3423	1.3164	1.3303	4.9497
♂ Mean	28.3381	27.9804	27.9065		5.0336	1.6566	1.6222	1.6721	1.3577	1.2970	1.3035	4.9497
♂ S.D.	0.9242	1.7095	1.4036			0.2181	0.1094	0.1656	0.0392	0.1095	0.1014	
♀ No.	7	7	10	0	0	9	8	10	9	8	10	6
♀ Min.	23.3051	23.3051	23.3051			1.5596	1.5833	1.5596	1.1927	1.2340	1.1927	4.5763
♀ Max.	31.4286	31.9048	31.6667			1.9068	1.9492	1.9280	1.6590	1.6190	1.6190	5.6221
♀ Mode												5.0476
♀ Median	27.6498	28.9362	27.1276			1.8100	1.8687	1.8059	1.3810	1.3980	1.3732	5.0024
♀ Mean	27.7064	27.4665	27.2779			1.7954	1.8049	1.7775	1.4110	1.4181	1.3963	4.9886
♀ S.D.	2.6052	3.3632	2.7319			0.1188	0.1461	0.1309	0.1614	0.1219	0.1377	0.3672
No.	9	10	14	0	1	13	14	17	13	14	17	7
Min.	23.3051	23.3051	23.3051		5.0336	1.4679	1.4679	1.4679	1.1927	1.0906	1.0906	4.5763
Max.	31.4286	31.9048	31.6667		5.0336	1.9715	1.9492	1.9715	1.6590	1.6190	1.6190	5.6221
Mode							1.6359	1.6359	1.3423		1.3423	5.0476
Median	27.6846	28.9396	27.6672		5.0336	1.8095	1.6738	1.7619	1.3575	1.3491	1.3423	4.9573
Mean	27.8468	27.6207	27.4575		5.0336	1.7527	1.7266	1.7341	1.3946	1.3662	1.3581	4.9831
S.D.	2.2967	2.8726	2.3892			0.1605	0.1578	0.1509	0.1357	0.1284	0.1294	0.3355

	SPM024 - H7. Least circumference of the shaft (r)	SPM025 - H7a. Mid-shaft circumference (l)	SPM026 - H7a. Mid-shaft circumference (r)	SPM025/26 - H7a. Mid-shaft circumference (m)	SPM028 - *H19. *Tuberositas deltoidea* breadth (r)	SPM029 - *H20. *Crista tuberculi majoris* breadth (l)	SPM030 - *H20. *Crista tuberculi majoris* breadth (r)	SPM031 - *Humerus* - Cortical thickness (ant.)	SPM032 - *Humerus* - Cortical thickness (post.)	SPM033 - *Humerus* - Cortical thickness (med.)	SPM034 - *Humerus* - Cortical thickness (lat.)	SPM035 - *Humerus* - Cortical thickness (max.)	SPM036 - *Humerus* - Cortical thickness (min.)
Abu Tabari 95/2-3		5.4530		5.4530							0.4614	0.4614	0.4614
Abu Tabari 02/1-2	4.6809	4.9362	4.8511	4.8936		0.5106	0.4255	0.4681	0.4681	0.4255	0.4681	0.4681	0.4255
Abu Tabari 02/1-3	5.2381	5.4286	5.5238	5.4762	0.3333				0.3810			0.3810	0.3810
Abu Tabari 02/1-5	4.7899		5.0420	5.0420				0.5042	0.3361	0.4202	0.3361	0.5042	0.3361
Abu Tabari 02/1-6													
Abu Tabari 02/1-7			4.6980	4.6980				0.3775	0.3356	0.3356	0.2936	0.5034	0.2936
Abu Tabari 02/1-8													
Abu Tabari 02/28-2	3.5514	3.5514	3.7383	3.6449									
Abu Tabari 02/28-3	5.0450	5.4955	5.2252	5.3604				0.4505	0.3153	0.4054	0.3604	0.4505	0.3153
Abu Tabari 02/28-4													
Abu Tabari 02/28-5	4.9153	4.9153	5.4237	5.1695		0.5932	0.5932	0.2966				0.2966	0.2966
Abu Tabari 02/28-7		4.6789		4.6789				0.2752	0.2752		0.3211	0.3211	0.2752
Abu Tabari 02/28-8													
Abu Tabari 02/28-11								0.4614	0.3775	0.6711	0.4195	0.6711	0.3775
Abu Tabari 02/28-13													
Abu Tabari 02/28-14			3.6842	3.6842				0.3509	0.3070	0.3070	0.3070	0.3509	0.3070
Abu Tabari 02/28-15													
Abu Tabari 02/28-20		4.8658	4.8658	4.8658								0.4195	0.4195
Abu Tabari 02/28-21	5.5300	5.6221	5.7143	5.6682		0.5991		0.3687	0.2765	0.2765	0.2765	0.3687	0.2765
Abu Tabari 02/28-22	4.8718	5.2991	5.3846	5.3419		0.7692		0.3419	0.2564	0.2564	0.2991	0.3419	0.2564
Abu Tabari 02/28-23		4.9774		4.9774				0.3167	0.3620	0.3167	0.4072	0.4525	0.2715
Abu Tabari 03/31													
Abu Tabari 03/34-1													
Conical Hill 95/4													
Conical Hill 95/4-1													
Conical Hill 02/3-4		4.5872	4.5872	4.5872					0.3670			0.3670	0.3670
Djabarona 96/1-1	5.6190	5.2381	5.7143	5.4762		0.4762						0.4286	0.4286
Djabarona 96/1-2	4.3333		4.6667	4.6667				0.2500	0.5000			0.5000	0.2500
Djabarona 96-4		4.8673	4.8673	4.8673								0.3540	0.3097
Djabarona 96/120-3													
Djabarona 96/120-4	4.5302		4.7819	4.7819			0.5034			0.3356	0.3356	0.3356	0.3356
Djabarona 96/120-5													

	SPM024	SPM025	SPM026	SPM025/26	SPM028	SPM029	SPM030	SPM031	SPM032	SPM033	SPM034	SPM035	SPM036
♂ No.	2	4	6	7	0	0	1	3	4	4	5	8	8
♂ Min.	4.5302	4.5872	4.5872	4.5872			0.5034	0.3775	0.3356	0.3356	0.2936	0.3356	0.2936
♂ Max.	4.7899	5.4530	5.0420	5.4530			0.5034	0.5042	0.3775	0.6711	0.4614	0.6711	0.4614
♂ Mode										0.3356			
♂ Median	4.6601	4.8665	4.8238	4.8658			0.5034	0.4614	0.3516	0.3779	0.3361	0.4404	0.3516
♂ Mean	4.6601	4.9433	4.8070	4.8993			0.5034	0.4477	0.3540	0.4406	0.3692	0.4520	0.3626
♂ S.D.	0.1836	0.3644	0.1569	0.2831				0.0644	0.0214	0.1588	0.0689	0.1101	0.0563
♀ No.	8	9	8	10	1	5	2	8	8	5	6	10	10
♀ Min.	4.3333	4.6789	4.6667	4.6667	0.3333	0.4762	0.4255	0.2500	0.2564	0.2564	0.2765	0.2966	0.2500
♀ Max.	5.6190	5.6221	5.7143	5.6682	0.3333	0.7692	0.5932	0.4681	0.5000	0.4255	0.4681	0.5000	0.4286
♀ Mode			5.7143	5.4762									
♀ Median	4.9801	5.2381	5.4042	5.2557	0.3333	0.5932	0.5094	0.3293	0.3387	0.3167	0.3407	0.4048	0.2866
♀ Mean	5.0292	5.1768	5.3130	5.1709	0.3333	0.5897	0.5094	0.3460	0.3543	0.3361	0.3554	0.4009	0.3177
♀ S.D.	0.4286	0.3154	0.3822	0.3511		0.1134	0.1186	0.0792	0.0913	0.0760	0.0721	0.0686	0.0686
No.	10	13	14	17	1	5	3	11	12	9	11	18	18
Min.	4.3333	4.5872	4.5872	4.5872	0.3333	0.4762	0.4255	0.2500	0.2564	0.2564	0.2765	0.2966	0.2500
Max.	5.6190	5.6221	5.7143	5.6682	0.3333	0.7692	0.5932	0.5042	0.5000	0.6711	0.4681	0.6711	0.4614
Mode			5.7143	5.4762						0.3356			
Median	4.8935	4.9774	4.9546	4.9774	0.3333	0.5932	0.5034	0.3687	0.3491	0.3356	0.3361	0.4240	0.3254
Mean	4.9553	5.1049	5.0961	5.0591	0.3333	0.5897	0.5074	0.3737	0.3542	0.3826	0.3617	0.4236	0.3376
S.D.	0.4133	0.3348	0.3945	0.3441		0.1134	0.0839	0.0865	0.0737	0.1240	0.0674	0.0904	0.0658

	SPM037 - R1. *Radius* - Maximum length (l)	SPM038 - R1. *Radius* - Maximum length (r)	SPM039 - R3. Minimum circumference (l)	SPM040 - R3. Minimum circumference (r)	SPM041 - R4. Maximum transverse shaft diameter (l)	SPM042 - R4. Maximum transverse shaft diameter (r)	SPM043 - R4a. Transverse mid-shaft diameter (l)	SPM044 - R4a. Transverse mid-shaft diameter (r)	SPM045 - R5. Minimum sagittal shaft diameter (l)	SPM046 - R5. Minimum sagittal shaft diameter (r)	SPM047 - R5a. Sagittal mid-shaft diameter (l)	SPM048 - R5a. Sagittal mid-shaft diameter (r)
Abu Tabari 95/2-3						1.5101				1.0067		
Abu Tabari 02/1-2	21.0638		3.1489		1.2340		1.1489		0.9787		0.8936	
Abu Tabari 02/1-3			3.2381		1.3333				1.1429			
Abu Tabari 02/1-5	21.8487		3.1092		1.2605		1.1345				0.9244	
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2					0.9813	1.0280	0.8879	0.8411	0.7009	0.7477	0.7009	0.7009
Abu Tabari 02/28-3		22.5225					1.2162	1.2162			0.9910	0.9459
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	19.0678	19.0678	3.0085	3.1780	1.3136	1.3136	1.2288	1.2712	0.8898	0.8475	0.8898	0.8475
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		20.4651				1.3023		1.1628		0.9302		0.9302
Abu Tabari 02/28-11	19.7148	19.7148		3.1040	1.2584		1.1326	1.2164	0.8809		0.8809	0.8809
Abu Tabari 02/28-13												
Abu Tabari 02/28-14								0.9211			0.7456	0.7456
Abu Tabari 02/28-15		26.7677		3.8384		1.6162		1.4141		1.2121		1.2121
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	20.9402		3.2051	3.1624	1.3675	1.3248	1.2821	1.2821	0.9402	0.8974	0.9829	0.8974
Abu Tabari 02/28-23								1.0860				0.9050
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	22.8571	22.8571	3.4286		1.2857	1.3333	1.1429	0.9524				
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		23.0705						1.1745		0.8389		
Djabarona 96/120-5												

	SPM037	SPM038	SPM039	SPM040	SPM041	SPM042	SPM043	SPM044	SPM045	SPM046	SPM047	SPM048
♂ No.	2	2	1	1	2	1	2	2	1	2	2	1
♂ Min.	19.7148	19.7148	3.1092	3.1040	1.2584	1.5101	1.1326	1.1745	0.8809	0.8389	0.8809	0.8809
♂ Max.	21.8487	23.0705	3.1092	3.1040	1.2605	1.5101	1.1345	1.2164	0.8809	1.0067	0.9244	0.8809
♂ Mode												
♂ Median	20.7818	21.3926	3.1092	3.1040	1.2594	1.5101	1.1335	1.1955	0.8809	0.9228	0.9026	0.8809
♂ Mean	20.7818	21.3926	3.1092	3.1040	1.2594	1.5101	1.1335	1.1955	0.8809	0.9228	0.9026	0.8809
♂ S.D.	1.5089	2.3728			0.0015		0.0013	0.0297		0.1186	0.0308	
♀ No.	4	5	5	3	5	5	5	7	4	4	4	6
♀ Min.	19.0678	19.0678	3.0085	3.1624	1.2340	1.3023	1.1429	0.9524	0.8898	0.8475	0.8898	0.8475
♀ Max.	22.8571	26.7677	3.4286	3.8384	1.3675	1.6162	1.2821	1.4141	1.1429	1.2121	0.9910	1.2121
♀ Mode												
♀ Median	21.0020	22.5225	3.2051	3.1780	1.3136	1.3248	1.2162	1.2162	0.9594	0.9138	0.9383	0.9176
♀ Mean	20.9822	22.3361	3.2058	3.3929	1.3068	1.3780	1.2038	1.1978	0.9879	0.9718	0.9393	0.9564
♀ S.D.	1.5480	2.9209	0.1523	0.3859	0.0504	0.1336	0.0584	0.1492	0.1095	0.1638	0.0551	0.1298
No.	6	7	6	4	7	6	7	9	5	6	6	7
Min.	19.0678	19.0678	3.0085	3.1040	1.2340	1.3023	1.1326	0.9524	0.8809	0.8389	0.8809	0.8475
Max.	22.8571	26.7677	3.4286	3.8384	1.3675	1.6162	1.2821	1.4141	1.1429	1.2121	0.9910	1.2121
Mode												
Median	21.0020	22.5225	3.1770	3.1702	1.2857	1.3291	1.1489	1.2162	0.9402	0.9138	0.9090	0.9050
Mean	20.9154	22.0665	3.1897	3.3207	1.2933	1.4000	1.1837	1.1973	0.9665	0.9555	0.9271	0.9456
S.D.	1.3798	2.6150	0.1419	0.3466	0.0472	0.1311	0.0587	0.1297	0.1062	0.1398	0.0487	0.1218

	SPM049 - R5(4). Neck circumference (l)	SPM050 - R5(4). Neck circumference (r)	SPM051 - R5(5). Mid-shaft circumference (l)	SPM052 - R5(5). Mid-shaft circumference (r)	SPM053 - *R5(7). Maximum circumference (l)	SPM054 - *R5(7). Maximum circumference (r)	SPM055 - *R10. Longitudinal *Tuberositas radii* diameter (l)	SPM056 - *R10. Longitudinal *Tuberositas radii* diameter (r)	SPM057 - *R11. Transverse *Tuberositas radii* diameter (l)	SPM058 - *R11. Transverse *Tuberositas radii* diameter (r)
Abu Tabari 95/2-3		3.6913				3.8591				
Abu Tabari 02/1-2	3.1064		3.1915		3.3191		2.0426		0.9787	
Abu Tabari 02/1-3					3.8095					
Abu Tabari 02/1-5										
Abu Tabari 02/1-6										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8										
Abu Tabari 02/28-2			2.3832	2.3832	2.6168	2.6636			0.7009	
Abu Tabari 02/28-3			3.1532	3.1532						
Abu Tabari 02/28-4										
Abu Tabari 02/28-5			3.2627	3.3475	3.3051	3.4322	1.7797		0.8051	
Abu Tabari 02/28-7										
Abu Tabari 02/28-8				3.1628		3.5349				
Abu Tabari 02/28-11	3.4396		3.1879		3.4396		1.6359		0.8809	
Abu Tabari 02/28-13										
Abu Tabari 02/28-14			2.5439	2.6316						
Abu Tabari 02/28-15				4.0404		4.2424				
Abu Tabari 02/28-20										
Abu Tabari 02/28-21										
Abu Tabari 02/28-22			3.4188	3.3333	3.6752	3.4188		1.9658		1.0256
Abu Tabari 02/28-23				3.0769						
Abu Tabari 03/31										
Abu Tabari 03/34-1										
Conical Hill 95/4										
Conical Hill 95/4-1										
Conical Hill 02/3-4										
Djabarona 96/1-1	3.4286		3.4286		3.4286		2.3810		1.0476	
Djabarona 96/1-2										
Djabarona 96-4										
Djabarona 96/120-3										
Djabarona 96/120-4		2.5587						1.7617		0.8809
Djabarona 96/120-5										

	SPM049	SPM050	SPM051	SPM052	SPM053	SPM054	SPM055	SPM056	SPM057	SPM058
♂ No.	1	2	1	0	1	1	1	1	1	1
♂ Min.	3.4396	2.5587	3.1879		3.4396	3.8591	1.6359	1.7617	0.8809	0.8809
♂ Max.	3.4396	3.6913	3.1879		3.4396	3.8591	1.6359	1.7617	0.8809	0.8809
♂ Mode										
♂ Median	3.4396	3.1250	3.1879		3.4396	3.8591	1.6359	1.7617	0.8809	0.8809
♂ Mean	3.4396	3.1250	3.1879		3.4396	3.8591	1.6359	1.7617	0.8809	0.8809
♂ S.D.		0.8008								
♀ No.	2	0	5	6	5	4	3	1	3	1
♀ Min.	3.1064		3.1532	3.0769	3.3051	3.4188	1.7797	1.9658	0.8051	1.0256
♀ Max.	3.4286		3.4286	4.0404	3.8095	4.2424	2.3810	1.9658	1.0476	1.0256
♀ Mode										
♀ Median	3.2675		3.2627	3.2481	3.4286	3.4835	2.0426	1.9658	0.9787	1.0256
♀ Mean	3.2675		3.2909	3.3523	3.5075	3.6571	2.0677	1.9658	0.9438	1.0256
♀ S.D.	0.2278		0.1274	0.3536	0.2247	0.3937	0.3014		0.1250	
No.	3	2	6	6	6	5	4	2	4	2
Min.	3.1064	2.5587	3.1532	3.0769	3.3051	3.4188	1.6359	1.7617	0.8051	0.8809
Max.	3.4396	3.6913	3.4286	4.0404	3.8095	4.2424	2.3810	1.9658	1.0476	1.0256
Mode										
Median	3.4286	3.1250	3.2271	3.2481	3.4341	3.5349	1.9111	1.8638	0.9298	0.9533
Mean	3.3249	3.1250	3.2738	3.3523	3.4962	3.6975	1.9598	1.8638	0.9281	0.9533
S.D.	0.1893	0.8008	0.1215	0.3536	0.2029	0.3527	0.3274	0.1443	0.1068	0.1024

	SPM059 - *Radius* - Cortical thickness (ant.)	SPM060 - *Radius* - Cortical thickness (post.)	SPM061 - *Radius* - Cortical thickness (med.; *Margo interosseus*)	SPM062 - *Radius* - Cortical thickness (lat.)	SPM063 - *Radius* - Cortical thickness (max.)	SPM064 - *Radius* - Cortical thickness (min.)
Abu Tabari 95/2-3		0.3356			0.3356	0.3356
Abu Tabari 02/1-2	0.3830	0.3404	0.3404	0.4681	0.4681	0.3404
Abu Tabari 02/1-3		0.3333			0.3333	0.3333
Abu Tabari 02/1-5	0.2941		0.5042		0.5042	0.2941
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3		0.4054	0.3153		0.4054	0.3153
Abu Tabari 02/28-4						
Abu Tabari 02/28-5	0.2542				0.2542	0.2542
Abu Tabari 02/28-7						
Abu Tabari 02/28-8	0.2791	0.3721	0.3256	0.2791	0.3721	0.2791
Abu Tabari 02/28-11	0.2936	0.3356	0.3775	0.2936	0.3775	0.2936
Abu Tabari 02/28-13						
Abu Tabari 02/28-14						
Abu Tabari 02/28-15	0.4040	0.4040	0.4040	0.4545	0.4545	0.4040
Abu Tabari 02/28-20						
Abu Tabari 02/28-21	0.2304				0.2304	0.2304
Abu Tabari 02/28-22	0.2564	0.2564	0.2991	0.2564	0.2991	0.2564
Abu Tabari 02/28-23	0.2715	0.2715	0.4525	0.2715	0.4525	0.2715
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4						
Djabarona 96/1-1					0.3333	0.3333
Djabarona 96/1-2						
Djabarona 96-4						
Djabarona 96/120-3						
Djabarona 96/120-4			0.3356	0.3775	0.3775	0.3356
Djabarona 96/120-5						

	SPM059	SPM060	SPM061	SPM062	SPM063	SPM064
♂ No.	2	2	3	2	4	4
♂ Min.	0.2936	0.3356	0.3356	0.2936	0.3356	0.2936
♂ Max.	0.2941	0.3356	0.5042	0.3775	0.5042	0.3356
♂ Mode		0.3356			0.3775	0.3356
♂ Median	0.2939	0.3356	0.3775	0.3356	0.3775	0.3148
♂ Mean	0.2939	0.3356	0.4058	0.3356	0.3987	0.3147
♂ S.D.	0.0003	0.0000	0.0878	0.0593	0.0731	0.0241
♀ No.	7	7	6	5	10	10
♀ Min.	0.2304	0.2564	0.2991	0.2564	0.2304	0.2304
♀ Max.	0.4040	0.4054	0.4525	0.4681	0.4681	0.4040
♀ Mode					0.3333	0.3333
♀ Median	0.2715	0.3404	0.3330	0.2791	0.3527	0.2972
♀ Mean	0.2969	0.3405	0.3562	0.3459	0.3603	0.3018
♀ S.D.	0.0680	0.0593	0.0595	0.1058	0.0846	0.0527
No.	9	9	9	7	14	14
Min.	0.2304	0.2564	0.2991	0.2564	0.2304	0.2304
Max.	0.4040	0.4054	0.5042	0.4681	0.5042	0.4040
Mode		0.3356			0.3333	0.3356
Median	0.2791	0.3356	0.3404	0.2936	0.3748	0.3047
Mean	0.2963	0.3394	0.3727	0.3430	0.3713	0.3055
S.D.	0.0589	0.0514	0.0689	0.0898	0.0807	0.0457

	SPM065 - U1. *Ulna* - Maximum length (l)	SPM066 - U1. *Ulna* - Maximum length (r)	SPM065/66 - U1. *Ulna* - Maximum length (m)	SPM067 - U3. Least circumference (l)	SPM068 - U3. Least circumference (r)	SPM067/68 - U3. Least circumference (m)	SPM069 - U3b. *Tuberositas ulnae* circumference (l)	SPM070 - U3b. *Tuberositas ulnae* circumference (r)	SPM071 - *U3c. Crest circumference (l)	SPM072 - *U3c. Crest circumference (r)	SPM071/72 - *U3c. Crest circumference (m)	SPM073 - U11. Dorso-ventral shaft diameter (l)
Abu Tabari 95/2-3	22.6510	22.6510	22.6510	3.6074		3.6074			4.0268		4.0268	0.9228
Abu Tabari 02/1-2	22.7660	22.5532	22.6596	2.9362	2.8085	2.8723	4.7660	4.6809	4.1277		4.1277	1.1064
Abu Tabari 02/1-3	25.2381		25.2381	3.1429		3.1429	4.8571		4.5238		4.5238	1.1905
Abu Tabari 02/1-5	23.1092	23.1092	23.1092	2.8992		2.8992		5.4622		3.7815	3.7815	
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	13.9252		13.9252	2.2430	2.1495	2.1963			3.1776	3.0374	3.1075	0.8411
Abu Tabari 02/28-3		23.8739	23.8739		3.0631	3.0631	5.3153		3.9640	4.0541	4.0090	1.0811
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	19.9153	19.9153	19.9153	2.9661	3.1356	3.0508	4.3220	4.3220	3.4746	3.7288	3.6017	1.0593
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		21.3953	21.3953									1.1628
Abu Tabari 02/28-11	20.9732		20.9732	2.9362	2.9362	2.9362	4.5302	4.6980	3.4396	3.6913	3.5654	0.9648
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15		28.2828	28.2828		3.6364	3.6364				4.7475	4.7475	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	22.1198		22.1198				5.4378		4.1475		4.1475	1.4747
Abu Tabari 02/28-22	22.2222		22.2222	2.9915		2.9915	5.1282	4.9145	3.8462	3.9316	3.8889	1.2393
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	24.7619	24.7619	24.7619		2.9048	2.9048		5.0476				1.0476
Djabarona 96/1-2				2.5000	2.5000	2.5000						
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		23.4899	23.4899		2.5168	2.5168		4.1107		3.2718	3.2718	
Djabarona 96/120-5												

	SPM065	SPM066	SPM065/66	SPM067	SPM068	SPM067/68	SPM069	SPM070	SPM071	SPM072	SPM071/72	SPM073
♂ No.	3	3	4	3	2	4	1	3	2	3	4	2
♂ Min.	20.9732	22.6510	20.9732	2.8992	2.5168	2.5168	4.5302	4.1107	3.4396	3.2718	3.2718	0.9228
♂ Max.	23.1092	23.4899	23.4899	3.6074	2.9362	3.6074	4.5302	5.4622	4.0268	3.7815	4.0268	0.9648
♂ Mode												
♂ Median	22.6510	23.1092	22.8801	2.9362	2.7265	2.9177	4.5302	4.6980	3.7332	3.6913	3.6735	0.9438
♂ Mean	22.2445	23.0834	22.5558	3.1476	2.7265	2.9899	4.5302	4.7570	3.7332	3.5815	3.6614	0.9438
♂ S.D.	1.1246	0.4201	1.1095	0.3986	0.2966	0.4532		0.6777	0.4152	0.2720	0.3209	0.0297
♀ No.	6	6	9	5	6	8	6	4	6	4	7	8
♀ Min.	19.9153	19.9153	19.9153	2.5000	2.5000	2.5000	4.3220	4.3220	3.4746	3.7288	3.6017	1.0476
♀ Max.	25.2381	28.2828	28.2828	3.1429	3.6364	3.6364	5.4378	5.0476	4.5238	4.7475	4.7475	1.4747
♀ Mode												
♀ Median	22.4941	23.2135	22.6596	2.9661	2.9839	3.0212	4.9927	4.7977	4.0458	3.9928	4.1277	1.1346
♀ Mean	22.8372	23.4637	23.3854	2.9073	3.0080	3.0202	4.9711	4.7413	4.0139	4.1155	4.1494	1.1702
♀ S.D.	1.9445	2.9249	2.4757	0.2412	0.3802	0.3172	0.4092	0.3180	0.3499	0.4422	0.3843	0.1400
No.	9	9	13	8	8	12	7	7	8	7	11	10
Min.	19.9153	19.9153	19.9153	2.5000	2.5000	2.5000	4.3220	4.1107	3.4396	3.2718	3.2718	0.9228
Max.	25.2381	28.2828	28.2828	3.6074	3.6364	3.6364	5.4378	5.4622	4.5238	4.7475	4.7475	1.4747
Mode												
Median	22.6510	23.1092	22.6596	2.9512	2.9205	2.9638	4.8571	4.6980	3.9954	3.7815	4.0090	1.0937
Mean	22.6396	23.3370	23.1302	2.9974	2.9377	3.0101	4.9081	4.7480	3.9438	3.8867	3.9720	1.1249
S.D.	1.6634	2.3297	2.1337	0.3068	0.3644	0.3468	0.4090	0.4513	0.3592	0.4515	0.4244	0.1564

	SPM074 - U11. Dorso-ventral shaft diameter (r)	SPM073/74 - U11. Dorso-ventral shaft diameter (m)	SPM075 - U12. Transverse shaft diameter (l)	SPM076 - U12. Transverse shaft diameter (r)	SPM075/76 - U12. Transverse shaft diameter (m)	SPM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)	SPM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)	SPM077/78 - *U18. Longitudinal *Tuberositas ulnae* diameter (m)	SPM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)	SPM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)	SPM079/80 - *U19. Transverse *Tuberositas ulnae* diameter (m)
Abu Tabari 95/2-3		0.9228	1.4262		1.4262						
Abu Tabari 02/1-2		1.1064	1.4468		1.4468	1.4468	1.1915	1.3191	0.8085	0.6383	0.7234
Abu Tabari 02/1-3		1.1905	1.6190		1.6190	1.2381		1.2381	0.7143		0.7143
Abu Tabari 02/1-5	1.0504	1.0504		1.3866	1.3866	1.3025		1.3025	0.5462		0.5462
Abu Tabari 02/1-6											
Abu Tabari 02/1-7											
Abu Tabari 02/1-8											
Abu Tabari 02/28-2	0.9346	0.8879	1.0748	1.0748	1.0748						
Abu Tabari 02/28-3	1.0811	1.0811	1.5315	1.5766	1.5541					0.9009	0.9009
Abu Tabari 02/28-4											
Abu Tabari 02/28-5	1.1017	1.0805	1.2288	1.2712	1.2500	1.1864	1.2288	1.2076	0.5932	0.4661	0.5297
Abu Tabari 02/28-7											
Abu Tabari 02/28-8	1.1163	1.1395	1.3023	1.3023	1.3023						
Abu Tabari 02/28-11	1.0487	1.0067	1.3003	1.3423	1.3213	1.5101	1.2584	1.3842	0.6292	0.5872	0.6082
Abu Tabari 02/28-13											
Abu Tabari 02/28-14											
Abu Tabari 02/28-15	1.3636	1.3636		1.7172	1.7172						
Abu Tabari 02/28-20											
Abu Tabari 02/28-21		1.4747	1.1060		1.1060	1.1521		1.1521	0.7373		0.7373
Abu Tabari 02/28-22	1.1966	1.2179	1.2821	1.4103	1.3462		1.5385	1.5385		0.8547	0.8547
Abu Tabari 02/28-23											
Abu Tabari 03/31											
Abu Tabari 03/34-1											
Conical Hill 95/4											
Conical Hill 95/4-1											
Conical Hill 02/3-4											
Djabarona 96/1-1	1.0476	1.0476	1.3333	1.2381	1.2857						
Djabarona 96/1-2											
Djabarona 96-4											
Djabarona 96/120-3											
Djabarona 96/120-4	0.9228	0.9228		1.2584	1.2584		1.2584	1.2584		1.2584	1.2584
Djabarona 96/120-5											

	SPM074	SPM073/74	SPM075	SPM076	SPM075/76	SPM077	SPM078	SPM077/78	SPM079	SPM080	SPM079/80
♂ No.	3	4	2	3	4	2	2	3	2	2	3
♂ Min.	0.9228	0.9228	1.3003	1.2584	1.2584	1.3025	1.2584	1.2584	0.5462	0.5872	0.5462
♂ Max.	1.0504	1.0504	1.4262	1.3866	1.4262	1.5101	1.2584	1.3842	0.6292	1.2584	1.2584
♂ Mode		0.9228					1.2584				
♂ Median	1.0487	0.9648	1.3633	1.3423	1.3539	1.4063	1.2584	1.3025	0.5877	0.9228	0.6082
♂ Mean	1.0073	0.9757	1.3633	1.3291	1.3481	1.4063	1.2584	1.3150	0.5877	0.9228	0.8043
♂ S.D.	0.0732	0.0636	0.0890	0.0651	0.0738	0.1468	0.0000	0.0638	0.0587	0.4746	0.3945
♀ No.	6	9	8	6	9	4	3	5	4	4	6
♀ Min.	1.0476	1.0476	1.1060	1.2381	1.1060	1.1521	1.1915	1.1521	0.5932	0.4661	0.5297
♀ Max.	1.3636	1.4747	1.6190	1.7172	1.7172	1.4468	1.5385	1.5385	0.8085	0.9009	0.9009
♀ Mode											
♀ Median	1.1090	1.1395	1.3178	1.3563	1.3462	1.2123	1.2288	1.2381	0.7258	0.7465	0.7304
♀ Mean	1.1511	1.1891	1.3562	1.4193	1.4030	1.2559	1.3196	1.2911	0.7133	0.7150	0.7434
♀ S.D.	0.1153	0.1439	0.1672	0.1908	0.1965	0.1321	0.1905	0.1509	0.0896	0.2016	0.1297
No.	9	13	10	9	13	6	5	8	6	6	9
Min.	0.9228	0.9228	1.1060	1.2381	1.1060	1.1521	1.1915	1.1521	0.5462	0.4661	0.5297
Max.	1.3636	1.4747	1.6190	1.7172	1.7172	1.5101	1.5385	1.5385	0.8085	1.2584	1.2584
Mode		0.9228					1.2584				
Median	1.0811	1.0811	1.3178	1.3423	1.3462	1.2703	1.2584	1.2805	0.6717	0.7465	0.7234
Mean	1.1032	1.1234	1.3576	1.3892	1.3861	1.3060	1.2951	1.3001	0.6715	0.7843	0.7637
S.D.	0.1218	0.1591	0.1505	0.1608	0.1667	0.1443	0.1388	0.1197	0.0985	0.2845	0.2244

	SPM081 - *Ulna* - Cortical thickness (ant.)	SPM082 - *Ulna* - Cortical thickness (post.)	SPM083 - *Ulna* - Cortical thickness (med.)	SPM084 - *Ulna* - Cortical thickness (lat.; *Margo interosseus*)	SPM085 - *Ulna* - Cortical thickness (max.)	SPM086 - *Ulna* - Cortical thickness (min.)	SPM087 - P22. Maximum *Acetabulum* breadth (l)	SPM088 - P22. Maximum *Acetabulum* breadth (r)
Abu Tabari 95/2-3	0.3775				0.3775	0.3775		4.2785
Abu Tabari 02/1-2	0.3404	0.2979	0.3404	0.5106	0.5106	0.2979		
Abu Tabari 02/1-3		0.2381			0.2381	0.2381		
Abu Tabari 02/1-5	0.2521	0.3361	0.2521	0.5042	0.5042	0.2521	3.6555	
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8								
Abu Tabari 02/28-2								
Abu Tabari 02/28-3	0.3153	0.2703			0.3153	0.2703	3.9640	3.9640
Abu Tabari 02/28-4								
Abu Tabari 02/28-5								
Abu Tabari 02/28-7								
Abu Tabari 02/28-8	0.3256	0.4186	0.3721		0.4186	0.3256		
Abu Tabari 02/28-11	0.2517	0.3775	0.3775	0.4614	0.4614	0.2517		
Abu Tabari 02/28-13								
Abu Tabari 02/28-14								
Abu Tabari 02/28-15	0.4040	0.6566	0.4040	0.6061	0.6566	0.4040		
Abu Tabari 02/28-20								
Abu Tabari 02/28-21	0.4147	0.2765	0.2765	0.3226	0.4147	0.3226		
Abu Tabari 02/28-22	0.2991	0.3419	0.3419	0.4701	0.4701	0.2991		
Abu Tabari 02/28-23								
Abu Tabari 03/31								
Abu Tabari 03/34-1								
Conical Hill 95/4								
Conical Hill 95/4-1								
Conical Hill 02/3-4								
Djabarona 96/1-1								
Djabarona 96/1-2					0.2500	0.2500		
Djabarona 96-4								
Djabarona 96/120-3								
Djabarona 96/120-4	0.2517	0.2517	0.3775		0.3775	0.2517		
Djabarona 96/120-5								

	SPM081	SPM082	SPM083	SPM084	SPM085	SPM086	SPM087	SPM088
♂ No.	4	3	3	2	4	4	1	1
♂ Min.	0.2517	0.2517	0.2521	0.4614	0.3775	0.2517	3.6555	4.2785
♂ Max.	0.3775	0.3775	0.3775	0.5042	0.5042	0.3775	3.6555	4.2785
♂ Mode	0.2517		0.3775		0.3775	0.2517		
♂ Median	0.2519	0.3361	0.3775	0.4828	0.4195	0.2519	3.6555	4.2785
♂ Mean	0.2832	0.3218	0.3357	0.4828	0.4302	0.2832	3.6555	4.2785
♂ S.D.	0.0628	0.0641	0.0724	0.0303	0.0632	0.0628		
♀ No.	6	7	5	4	8	8	1	1
♀ Min.	0.2991	0.2381	0.2765	0.3226	0.2381	0.2381	3.9640	3.9640
♀ Max.	0.4147	0.6566	0.4040	0.6061	0.6566	0.4040	3.9640	3.9640
♀ Mode								
♀ Median	0.3330	0.2979	0.3419	0.4904	0.4167	0.2985	3.9640	3.9640
♀ Mean	0.3499	0.3571	0.3470	0.4773	0.4093	0.3009	3.9640	3.9640
♀ S.D.	0.0481	0.1446	0.0472	0.1179	0.1408	0.0524		
No.	10	10	8	6	12	12	2	2
Min.	0.2517	0.2381	0.2521	0.3226	0.2381	0.2381	3.6555	3.9640
Max.	0.4147	0.6566	0.4040	0.6061	0.6566	0.4040	3.9640	4.2785
Mode	0.2517		0.3775		0.3775	0.2517		
Median	0.3204	0.3170	0.3570	0.4871	0.4167	0.2841	3.8097	4.1212
Mean	0.3232	0.3465	0.3428	0.4792	0.4162	0.2950	3.8097	4.1212
S.D.	0.0615	0.1230	0.0530	0.0923	0.1175	0.0538	0.2181	0.2224

	SPM089 - F1. *Femur* - Maximum length (l)	SPM090 - F1. *Femur* - Maximum length (r)	SPM089/90 - F1. *Femur* - Maximum length (m)	SPM093 - F6. Anterior-posterior mid-shaft diameter (l)	SPM094 - F6. Anterior-posterior mid-shaft diameter (r)	SPM093/94 - F6. Anterior-posterior mid-shaft diameter (m)	SPM095 - F7. Medio-lateral mid-shaft diameter (l)	SPM096 - F7. Medio-lateral mid-shaft diameter (r)	SPM095/96 - F7. Medio-lateral mid-shaft diameter (m)	SPM097 - F8. Mid-shaft circumferen ce (l)	SPM098 - F8. Mid-shaft circumferen ce (r)	SPM097/98 - F8. Mid-shaft circumferen ce (m)
Abu Tabari 95/2-3	38.5906	38.5906	38.5906	2.4329	2.6426	2.5378		1.9295	1.9295		8.0537	8.0537
Abu Tabari 02/1-2	40.8511	40.8511	40.8511	2.4681	2.5532	2.5106	2.1702	2.1277	2.1489	7.2340	7.3191	7.2766
Abu Tabari 02/1-3		40.9524	40.9524	2.8571		2.8571	2.1905		2.1905	7.7143		7.7143
Abu Tabari 02/1-5	38.2353	38.2353	38.2353	2.3109	2.4370	2.3739	1.9328	1.9328	1.9328	6.5546	6.5546	6.5546
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	31.8792		31.8792	2.2232		2.2232	1.9295		1.9295	6.3758		6.3758
Abu Tabari 02/1-8	27.1493	27.1493	27.1493	1.6290	1.6290	1.6290	1.5837	1.6290	1.6063	4.7059	4.7964	4.7511
Abu Tabari 02/28-2	23.9252	24.1121	24.0187	1.5421	1.6355	1.5888	1.3551	1.3551	1.3551	4.5327	4.6262	4.5794
Abu Tabari 02/28-3		41.4414	41.4414	2.7027	2.7477	2.7252	2.1171	2.1171	2.1171	7.4775	7.2973	7.3874
Abu Tabari 02/28-4				2.7685		2.7685	2.3490		2.3490	7.8859		7.8859
Abu Tabari 02/28-5	33.4746		33.4746	2.2034	2.4576	2.3305	2.0339	2.1610	2.0975		6.9492	6.9492
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	33.4884		33.4884	2.4186		2.4186	1.8140		1.8140	6.5116		6.5116
Abu Tabari 02/28-11		35.2349	35.2349		2.3490	2.3490		2.0973	2.0973		6.4597	6.4597
Abu Tabari 02/28-13												
Abu Tabari 02/28-14							1.4035	1.4035	1.4035	4.4737	4.6491	4.5614
Abu Tabari 02/28-15	49.4949	49.4949	49.4949		2.9293	2.9293		2.7778	2.7778		8.2828	8.2828
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	39.1705		39.1705	2.8571		2.8571	2.3963		2.3963	7.3733		7.3733
Abu Tabari 02/28-22		38.0342	38.0342	2.4786	2.5214	2.5000	2.3077	2.2222	2.2650	7.0085	7.4359	7.2222
Abu Tabari 02/28-23												
Abu Tabari 03/31	42.7852		42.7852	2.7685		2.7685	2.5168		2.5168	8.1376		8.1376
Abu Tabari 03/34-1		41.0959	41.0959		2.1918	2.1918		1.7808	1.7808		6.2100	6.2100
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4	41.7431	41.7431	41.7431		2.6606	2.6606		2.0183	2.0183		7.3394	7.3394
Djabarona 96/1-1	40.9524	40.9524	40.9524	2.6190	2.5714	2.5952	2.0952	2.0000	2.0476	7.0476	7.0476	7.0476
Djabarona 96/1-2					1.9167	1.9167		1.5833	1.5833		5.5000	5.5000
Djabarona 96-4		40.7080	40.7080		2.6549	2.6549		2.0354	2.0354		7.5221	7.5221
Djabarona 96/120-3												
Djabarona 96/120-4				2.2651		2.2651	1.9295		1.9295	6.3758		6.3758
Djabarona 96/120-5												

	SPM089	SPM090	SPM089/90	SPM093	SPM094	SPM093/94	SPM095	SPM096	SPM095/96	SPM097	SPM098	SPM097/98
♂ No.	5	5	7	6	5	9	5	5	9	5	5	9
♂ Min.	31.8792	35.2349	31.8792	2.2232	2.3490	2.2232	1.9295	1.9295	1.9295	6.3758	6.4597	6.3758
♂ Max.	42.7852	41.7431	42.7852	2.7685	2.6606	2.7685	2.5168	2.0973	2.5168	8.1376	8.0537	8.1376
♂ Mode				2.7685		2.7685	1.9295		1.9295	6.3758		6.3758
♂ Median	38.5906	38.5906	38.5906	2.3719	2.6426	2.5378	1.9328	2.0183	2.0183	6.5546	7.3394	7.3394
♂ Mean	38.6467	38.9024	38.4538	2.4615	2.5488	2.5113	2.1315	2.0027	2.0820	7.0660	7.1859	7.1894
♂ S.D.	4.2628	2.5161	3.8366	0.2479	0.1457	0.2135	0.2814	0.0716	0.2118	0.8710	0.6737	0.7520
♀ No.	6	7	10	8	8	11	8	8	11	7	8	11
♀ Min.	33.4746	38.0342	33.4746	2.2034	1.9167	1.9167	1.8140	1.5833	1.5833	6.5116	5.5000	5.5000
♀ Max.	49.4949	49.4949	49.4949	2.8571	2.9293	2.9293	2.3963	2.7778	2.7778	7.7143	8.2828	8.2828
♀ Mode		40.9524	40.9524	2.8571		2.8571						
♀ Median	40.0108	40.9524	40.9017	2.5488	2.5373	2.5106	2.1437	2.1224	2.1171	7.2340	7.1725	7.2222
♀ Mean	39.5720	41.8318	39.8956	2.5756	2.4861	2.5302	2.1406	2.0962	2.1108	7.1953	7.0052	7.0432
♀ S.D.	5.9390	3.5672	4.5387	0.2270	0.3139	0.3098	0.1762	0.3501	0.3221	0.3886	0.8370	0.7529
No.	11	12	17	14	13	20	13	13	20	12	13	20
Min.	31.8792	35.2349	31.8792	2.2034	1.9167	1.9167	1.8140	1.5833	1.5833	6.3758	5.5000	5.5000
Max.	49.4949	49.4949	49.4949	2.8571	2.9293	2.9293	2.5168	2.7778	2.7778	8.1376	8.2828	8.2828
Mode		40.9524	40.9524	2.8571		2.8571	1.9295		1.9295	6.3758		6.3758
Median	39.1705	40.9017	40.7080	2.4734	2.5532	2.5242	2.1171	2.0354	2.0725	7.1408	7.2973	7.2494
Mean	39.1514	40.6112	39.3019	2.5267	2.5102	2.5217	2.1371	2.0603	2.0978	7.1414	7.0747	7.1090
S.D.	5.0138	3.3938	4.2002	0.2341	0.2560	0.2642	0.2110	0.2747	0.2715	0.6022	0.7539	0.7362

	SPM099 - F9. Subtrochanteric transverse diameter (l)	SPM100 - F9. Subtrochanteric transverse diameter (r)	SPM099/100 - F9. Subtrochanteric transverse diameter (m)	SPM101 - F10. Subtrochanteric sagittal diameter (l)	SPM102 - F10. Subtrochanteric sagittal diameter (r)	SPM101/102 - F10. Subtrochanteric sagittal diameter (m)	SPM103 - *F10(1). Subtrochanteric circumference (l)	SPM104 - *F10(1). Subtrochanteric circumference (r)	SPM103/104 - *F10(1). Subtrochanteric circumference (m)	SPM105 - F15. Vertical neck diameter (l)	SPM106 - F15. Vertical neck diameter (r)	SPM107 - F16. Sagittal neck diameter (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2.2553	2.1702	2.2128	2.0426	2.0000	2.0213	6.8936	6.8936	6.8936	2.3830		2.2128
Abu Tabari 02/1-3	2.5238		2.5238	2.0000		2.0000	7.3810		7.3810			
Abu Tabari 02/1-5	2.2689	2.3529	2.3109		2.0588	2.0588		6.6387	6.6387			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	2.0554		2.0554	1.4262		1.4262	5.7047		5.7047			
Abu Tabari 02/1-8		1.6742	1.6742		1.4480	1.4480		4.7964	4.7964			
Abu Tabari 02/28-2	2.0561	2.1495	2.1028	1.8692	1.6355	1.7523	5.5140	5.9813	5.7477			1.6822
Abu Tabari 02/28-3	2.7477	2.7027	2.7252	2.1171	2.0721	2.0946	7.4775	7.3874	7.4324			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2.2458		2.2458	1.6102	1.6102	1.6102	6.3559		6.3559	2.0763		1.7373
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	2.3256		2.3256	1.7674		1.7674						
Abu Tabari 02/28-11		2.3490	2.3490		1.6779	1.6779		6.5436	6.5436		2.3490	
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	2.8283	2.7273	2.7778	2.5253		2.5253	8.5859		8.5859			
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2.3963		2.3963	2.0737		2.0737	7.3733		7.3733			
Abu Tabari 02/28-22	2.4786	2.3932	2.4359	1.9658	2.0513	2.0085	6.9231	7.0085	6.9658			
Abu Tabari 02/28-23												
Abu Tabari 03/31	3.0201		3.0201	2.2651		2.2651	8.1376		8.1376			
Abu Tabari 03/34-1	2.1918	2.2831	2.2374	1.6895	1.7352	1.7123	6.1187	6.1187	6.1187			
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4	2.4771		2.4771	2.2018		2.2018	7.3394		7.3394			
Djabarona 96/1-1	2.4762	2.4762	2.4762	2.0952	2.0952	2.0952	7.3333	7.3333	7.3333			
Djabarona 96/1-2		2.1667	2.1667		1.7500	1.7500		6.0000	6.0000			
Djabarona 96-4		2.3894	2.3894		2.1239	2.1239		7.0796	7.0796			
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	SPM099	SPM100	SPM099/100	SPM101	SPM102	SPM101/102	SPM103	SPM104	SPM103/104	SPM105	SPM106	SPM107
♂ No.	4	3	6	3	3	6	3	3	6	0	1	0
♂ Min.	2.0554	2.3490	2.0554	1.4262	1.6779	1.4262	5.7047	6.5436	5.7047		2.3490	
♂ Max.	3.0201	2.3894	3.0201	2.2651	2.1239	2.2651	8.1376	7.0796	8.1376		2.3490	
♂ Mode												
♂ Median	2.3730	2.3529	2.3692	2.2018	2.0588	2.0914	7.3394	6.6387	6.8592		2.3490	
♂ Mean	2.4554	2.3638	2.4336	1.9644	1.9535	1.9589	7.0606	6.7540	6.9073		2.3490	
♂ S.D.	0.4140	0.0223	0.3204	0.4672	0.2409	0.3325	1.2402	0.2860	0.8223			
♀ No.	10	7	11	10	7	11	9	6	10	2	0	2
♀ Min.	2.1918	2.1667	2.1667	1.6102	1.6102	1.6102	6.1187	6.0000	6.0000	2.0763		1.7373
♀ Max.	2.8283	2.7273	2.7778	2.5253	2.0952	2.5253	8.5859	7.3874	8.5859	2.3830		2.2128
♀ Mode												
♀ Median	2.4363	2.3932	2.3963	2.0213	2.0000	2.0085	7.3333	6.9511	7.1496	2.2296		1.9750
♀ Mean	2.4469	2.4170	2.4112	1.9887	1.9020	1.9690	7.1602	6.7903	7.0440	2.2296		1.9750
♀ S.D.	0.2117	0.2322	0.2037	0.2600	0.1976	0.2531	0.7173	0.5975	0.7661	0.2169		0.3362
No.	14	10	17	13	10	17	12	9	16	2	1	2
Min.	2.0554	2.1667	2.0554	1.4262	1.6102	1.4262	5.7047	6.0000	5.7047	2.0763	2.3490	1.7373
Max.	3.0201	2.7273	3.0201	2.5253	2.1239	2.5253	8.5859	7.3874	8.5859	2.3830	2.3490	2.2128
Mode												
Median	2.4363	2.3712	2.3894	2.0426	2.0256	2.0213	7.3364	6.8936	7.0227	2.2296	2.3490	1.9750
Mean	2.4493	2.4011	2.4191	1.9831	1.9174	1.9654	7.1353	6.7782	6.9927	2.2296	2.3490	1.9750
S.D.	0.2657	0.1916	0.2411	0.2953	0.1989	0.2731	0.8099	0.4939	0.7630	0.2169		0.3362

	SPM108 - F16. Sagittal neck diameter (r)	SPM109 - F17. Neck circumference (l)	SPM110 - F17. Neck circumference (r)	SPM112 - F18. Verticaler head diameter (r)	SPM113 - F19. Transverse head diameter (l)	SPM114 - F19. Transverse head diameter (r)	SPM117 - *F34. *Linea aspera* breadth (l)	SPM118 - *F34. *Linea aspera* breadth (r)	SPM117/118 - *F34. *Linea aspera* breadth (m)	SPM119 - *F35. *Linea intertrochanterica* breadth (l)	SPM120 - *F35. *Linea intertrochanterica* breadth (r)
Abu Tabari 95/2-3				4.1107		4.1107					
Abu Tabari 02/1-2		7.4894			3.6596	3.7021	0.5532	0.5532	0.5532	0.7234	0.6383
Abu Tabari 02/1-3							0.5238		0.5238		
Abu Tabari 02/1-5							0.3782	0.4202	0.3992		
Abu Tabari 02/1-6											
Abu Tabari 02/1-7											
Abu Tabari 02/1-8							0.3620		0.3620		
Abu Tabari 02/28-2	1.7290									0.3738	0.3271
Abu Tabari 02/28-3								0.4955	0.4955		
Abu Tabari 02/28-4											
Abu Tabari 02/28-5		6.1441			3.2203	3.1356	0.5508	0.5085	0.5297		
Abu Tabari 02/28-7											
Abu Tabari 02/28-8											
Abu Tabari 02/28-11	1.9295		7.2148								
Abu Tabari 02/28-13											
Abu Tabari 02/28-14											
Abu Tabari 02/28-15								0.6061	0.6061		
Abu Tabari 02/28-20											
Abu Tabari 02/28-21											
Abu Tabari 02/28-22	2.1368						0.4274	0.4274	0.4274		
Abu Tabari 02/28-23											
Abu Tabari 03/31							0.5453		0.5453		
Abu Tabari 03/34-1								0.6393	0.6393		
Conical Hill 95/4											
Conical Hill 95/4-1											
Conical Hill 02/3-4								0.4128	0.4128		
Djabarona 96/1-1											
Djabarona 96/1-2											
Djabarona 96-4											
Djabarona 96/120-3											
Djabarona 96/120-4											
Djabarona 96/120-5											

	SPM108	SPM109	SPM110	SPM112	SPM113	SPM114	SPM117	SPM118	SPM117/118	SPM119	SPM120
♂ No.	1	0	1	1	0	1	2	2	3	0	0
♂ Min.	1.9295		7.2148	4.1107		4.1107	0.3782	0.4128	0.3992		
♂ Max.	1.9295		7.2148	4.1107		4.1107	0.5453	0.4202	0.5453		
♂ Mode											
♂ Median	1.9295		7.2148	4.1107		4.1107	0.4617	0.4165	0.4128		
♂ Mean	1.9295		7.2148	4.1107		4.1107	0.4617	0.4165	0.4524		
♂ S.D.							0.1182	0.0052	0.0807		
♀ No.	1	2	0	0	2	2	4	6	7	1	1
♀ Min.	2.1368	6.1441			3.2203	3.1356	0.4274	0.4274	0.4274	0.7234	0.6383
♀ Max.	2.1368	7.4894			3.6596	3.7021	0.5532	0.6393	0.6393	0.7234	0.6383
♀ Mode											
♀ Median	2.1368	6.8167			3.4400	3.4189	0.5373	0.5308	0.5297	0.7234	0.6383
♀ Mean	2.1368	6.8167			3.4400	3.4189	0.5138	0.5383	0.5393	0.7234	0.6383
♀ S.D.		0.9513			0.3106	0.4006	0.0592	0.0775	0.0700		
No.	2	2	1	1	2	3	6	8	10	1	1
Min.	1.9295	6.1441	7.2148	4.1107	3.2203	3.1356	0.3782	0.4128	0.3992	0.7234	0.6383
Max.	2.1368	7.4894	7.2148	4.1107	3.6596	4.1107	0.5532	0.6393	0.6393	0.7234	0.6383
Mode											
Median	2.0331	6.8167	7.2148	4.1107	3.4400	3.7021	0.5346	0.5020	0.5267	0.7234	0.6383
Mean	2.0331	6.8167	7.2148	4.1107	3.4400	3.6495	0.4964	0.5079	0.5132	0.7234	0.6383
S.D.	0.1465	0.9513			0.3106	0.4897	0.0749	0.0865	0.0805		

	SPM121 - *Femur* - Cortical thickness (ant.)	SPM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)	SPM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)	SPM124 - *Femur* - Cortical thickness (med.)	SPM125 - *Femur* - Cortical thickness (lat.)	SPM126 - *Femur* - Cortical thickness (max.)	SPM127 - *Femur* - Cortical thickness (min.)
Abu Tabari 95/2-3	0.7550					0.7550	0.7550
Abu Tabari 02/1-2	0.6809	0.8511	0.5957	0.5957	0.5957	0.8511	0.5532
Abu Tabari 02/1-3	0.4762	0.8571	0.5238	0.5714	0.7143	0.8571	0.3810
Abu Tabari 02/1-5	0.5042	0.7563	0.4202	0.4202	0.6303	0.7563	0.4202
Abu Tabari 02/1-6							
Abu Tabari 02/1-7	0.4195	0.8809	0.4614	0.4614	0.5453	0.8809	0.3356
Abu Tabari 02/1-8	0.3167	0.4525	0.3620	0.2715	0.3620	0.4525	0.2715
Abu Tabari 02/28-2							
Abu Tabari 02/28-3	0.3604	0.9459	0.5405	0.5856	0.4955	0.9459	0.3604
Abu Tabari 02/28-4	0.6711	0.8809	0.7131	0.6292	0.6711	0.8809	0.5034
Abu Tabari 02/28-5	0.4237	0.7627	0.4237	0.4237	0.4237	0.7627	0.4237
Abu Tabari 02/28-7							
Abu Tabari 02/28-8	0.4186		0.4651	0.3721	0.3721	0.4651	0.3721
Abu Tabari 02/28-11	0.5034	0.7550	0.5034	0.6711	0.6292	0.7550	0.5034
Abu Tabari 02/28-13							
Abu Tabari 02/28-14	0.3509	0.3947	0.3947	0.3509	0.3509	0.4386	0.3070
Abu Tabari 02/28-15	0.6061	1.0101	0.5556	0.7071	0.7071	1.0101	0.4040
Abu Tabari 02/28-20							
Abu Tabari 02/28-21	0.4608	0.6452		0.4147	0.4608	0.6452	0.4147
Abu Tabari 02/28-22	0.4274	0.9829	0.4274	0.4701	0.7692	0.9829	0.3419
Abu Tabari 02/28-23							
Abu Tabari 03/31	0.5453	0.8389	0.6292	0.5872	0.6711	0.8389	0.5453
Abu Tabari 03/34-1	0.5479	0.6849	0.6393	0.5023	0.5936	0.6849	0.4566
Conical Hill 95/4							
Conical Hill 95/4-1							
Conical Hill 02/3-4	0.5505	0.9633		0.6422	0.5963	0.9633	0.5963
Djabarona 96/1-1				0.5714	0.6190		
Djabarona 96/1-2	0.3333	0.7083		0.4167	0.2500	0.7083	0.2500
Djabarona 96-4	0.4867	1.1504		0.4867	0.5310	1.1504	0.4867
Djabarona 96/120-3							
Djabarona 96/120-4				0.4195	0.4195		
Djabarona 96/120-5						0.6329	0.4521

	SPM121	SPM122	SPM123	SPM124	SPM125	SPM126	SPM127
♂ No.	8	7	5	8	8	8	8
♂ Min.	0.4195	0.7550	0.4202	0.4195	0.4195	0.7550	0.3356
♂ Max.	0.7550	1.1504	0.7131	0.6711	0.6711	1.1504	0.7550
♂ Mode		0.8809			0.6711	0.7550	0.5034
♂ Median	0.5248	0.8809	0.5034	0.5370	0.6128	0.8599	0.5034
♂ Mean	0.5545	0.8894	0.5454	0.5397	0.5867	0.8726	0.5182
♂ S.D.	0.1082	0.1367	0.1221	0.1040	0.0852	0.1352	0.1238
♀ No.	10	9	8	11	11	11	11
♀ Min.	0.3333	0.6452	0.4237	0.3721	0.2500	0.4651	0.2500
♀ Max.	0.6809	1.0101	0.6393	0.7071	0.7692	1.0101	0.5532
♀ Mode				0.5714			
♀ Median	0.4441	0.8511	0.5322	0.5023	0.5936	0.7627	0.4040
♀ Mean	0.4735	0.8276	0.5214	0.5119	0.5456	0.7769	0.4009
♀ S.D.	0.1087	0.1346	0.0779	0.1026	0.1602	0.1691	0.0767
No.	18	16	13	19	19	19	19
Min.	0.3333	0.6452	0.4202	0.3721	0.2500	0.4651	0.2500
Max.	0.7550	1.1504	0.7131	0.7071	0.7692	1.1504	0.7550
Mode		0.8809		0.5714	0.6711	0.7550	0.5034
Median	0.4950	0.8541	0.5238	0.5023	0.5957	0.8389	0.4237
Mean	0.5095	0.8546	0.5306	0.5236	0.5629	0.8172	0.4503
S.D.	0.1131	0.1347	0.0931	0.1013	0.1324	0.1592	0.1130

	SPM130 - T1a. *Tibia* - Maximum length (l)	SPM131 - T1a. *Tibia* - Maximum length (r)	SPM130/131 - T1a. *Tibia* - Maximum length (m)	SPM134 - T4. Maximum sagittal tuberosity diameter (l)	SPM135 - T4. Maximum sagittal tuberosity diameter (r)	SPM136 - T5. Minimum transverse tuberosity diameter (l)	SPM137 - T5. Minimum transverse tuberosity diameter (r)	SPM138 - T8. Sagittal mid-shaft diameter (l)	SPM139 - T8. Sagittal mid-shaft diameter (r)	SPM138/139 - T8. Sagittal mid-shaft diameter (m)	SPM140 - T8a. Sagittal nutrient foramen diameter (l)	SPM141 - T8a. Sagittal nutrient foramen diameter (r)
Abu Tabari 95/2-3	33.5570		33.5570					2.8104		2.8104		
Abu Tabari 02/1-2	35.7447	35.7447	35.7447					2.2979	2.3404	2.3191	2.7660	
Abu Tabari 02/1-3	36.6667		36.6667					2.7619		2.7619		
Abu Tabari 02/1-5									2.2689	2.2689		
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		27.6846	27.6846						2.1393	2.1393		
Abu Tabari 02/1-8		21.7195	21.7195						1.6290	1.6290		1.6742
Abu Tabari 02/28-2		20.7477	20.7477	1.9159	1.9626	1.9626	1.9159	1.5421	1.5421	1.5421	1.6822	1.7290
Abu Tabari 02/28-3		35.1351	35.1351						2.1622	2.1622		2.6126
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	28.3898		28.3898	3.5593		3.8136		1.7797	1.8644	1.8220		
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	28.8372	28.8372	28.8372					2.1395		2.1395		
Abu Tabari 02/28-11		30.2013	30.2013		3.6913		2.6846		2.2651	2.2651		
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	19.7368	19.7368	19.7368					1.4474		1.4474		
Abu Tabari 02/28-15	43.4343	43.4343	43.4343					2.4747	2.5253	2.5000		3.1818
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	34.5622		34.5622					2.8571	2.8111	2.8341	3.0415	2.9493
Abu Tabari 02/28-22	33.3333		33.3333	3.4188		2.9915		2.2222	2.1368	2.1795	2.3077	2.3504
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	35.2381	35.2381	35.2381					2.3810	2.3810	2.3810	2.6667	2.6667
Djabarona 96/1-2												
Djabarona 96-4	35.3982		35.3982					2.9204		2.9204		
Djabarona 96/120-3												
Djabarona 96/120-4	31.8792		31.8792					2.2651		2.2651	2.4329	
Djabarona 96/120-5												

	SPM130	SPM131	SPM130/131	SPM134	SPM135	SPM136	SPM137	SPM138	SPM139	SPM138/139	SPM140	SPM141
♂ No.	3	2	5	0	1	0	1	3	3	6	1	0
♂ Min.	31.8792	27.6846	27.6846		3.6913		2.6846	2.2651	2.1393	2.1393	2.4329	
♂ Max.	35.3982	30.2013	35.3982		3.6913		2.6846	2.9204	2.2689	2.9204	2.4329	
♂ Mode										2.2651		
♂ Median	33.5570	28.9430	31.8792		3.6913		2.6846	2.8104	2.2651	2.2670	2.4329	
♂ Mean	33.6115	28.9430	31.7441		3.6913		2.6846	2.6653	2.2244	2.4449	2.4329	
♂ S.D.	1.7601	1.7796	2.9798					0.3509	0.0738	0.3313		
♀ No.	8	5	9	2	0	2	0	8	7	9	4	5
♀ Min.	28.3898	28.8372	28.3898	3.4188		2.9915		1.7797	1.8644	1.8220	2.3077	2.3504
♀ Max.	43.4343	43.4343	43.4343	3.5593		3.8136		2.8571	2.8111	2.8341	3.0415	3.1818
♀ Mode												
♀ Median	34.9002	35.2381	35.1351	3.4891		3.4025		2.3394	2.3404	2.3191	2.7163	2.6667
♀ Mean	34.5258	35.6779	34.5935	3.4891		3.4025		2.3643	2.3173	2.3444	2.6954	2.7522
♀ S.D.	4.7415	5.1829	4.4399	0.0994		0.5813		0.3444	0.3037	0.3193	0.3033	0.3208
No.	11	7	14	2	1	2	1	11	10	15	5	5
Min.	28.3898	27.6846	27.6846	3.4188	3.6913	2.9915	2.6846	1.7797	1.8644	1.8220	2.3077	2.3504
Max.	43.4343	43.4343	43.4343	3.5593	3.6913	3.8136	2.6846	2.9204	2.8111	2.9204	3.0415	3.1818
Mode										2.2651		
Median	34.5622	35.1351	34.0596	3.4891	3.6913	3.4025	2.6846	2.3810	2.2670	2.2689	2.6667	2.6667
Mean	34.2764	33.7536	33.5758	3.4891	3.6913	3.4025	2.6846	2.4464	2.2894	2.3846	2.6429	2.7522
S.D.	4.0668	5.4070	4.1074	0.0994		0.5813		0.3570	0.2544	0.3163	0.2877	0.3208

	SPM142 - T9. Transverse mid-shaft diameter (l)	SPM143 - T9. Transverse mid-shaft diameter (r)	SPM142/143 - T9. Transverse mid-shaft diameter (m)	SPM144 - T9a. Transverse nutrient foramen diameter (l)	SPM145 - T9a. Transverse nutrient foramen diameter (r)	SPM146 - T10. Mid-shaft circumference (l)	SPM147 - T10. Mid-shaft circumference (r)	SPM146/147 - T10. Mid-shaft circumference (m)	SPM148 - T10a. Nutient foramen circumference (l)	SPM149 - T10a. Nutient foramen circumference (r)	SPM150 - T10b. Minimum shaft circumference (l)	SPM151 - T10b. Minimum shaft circumference (r)
Abu Tabari 95/2-3	1.7617		1.7617			7.5503		7.5503				
Abu Tabari 02/1-2	1.7021	1.7021	1.7021	1.8723		6.2979	6.3830	6.3404	7.6596		5.7021	5.7872
Abu Tabari 02/1-3	1.8095		1.8095			7.3333		7.3333				6.0000
Abu Tabari 02/1-5		1.5126	1.5126				5.8824	5.8824				5.2941
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		1.5101	1.5101				5.8725	5.8725				
Abu Tabari 02/1-8		1.3122	1.3122		1.4027		4.6606	4.6606		4.9774		4.0724
Abu Tabari 02/28-2	1.2150	1.1682	1.1916	1.4486	1.4953	4.3925	4.2991	4.3458	5.1402	5.2336	4.0654	4.0187
Abu Tabari 02/28-3		1.7117	1.7117		1.8468		6.1261	6.1261		7.2072	5.6757	
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1.6949	1.6949	1.6949			5.5932	5.5932	5.5932			5.2542	5.2542
Abu Tabari 02/28-7											5.0459	
Abu Tabari 02/28-8	1.5814		1.5814			6.0465		6.0465				
Abu Tabari 02/28-11		1.9295	1.9295				6.4597	6.4597				
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	1.2719		1.2719			4.3860		4.3860				
Abu Tabari 02/28-15	1.8182	2.0202	1.9192		2.3232	6.7677	6.9697	6.8687		8.9899	6.3636	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2.1198	2.2581	2.1889		2.3502	7.7419	7.9263	7.8341		8.4793		
Abu Tabari 02/28-22	1.7094	1.7094	1.7094	1.8803	1.9231	6.1538	6.1538	6.1538	6.5812	6.9231	5.6410	5.7265
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	2.1905	2.1905	2.1905	2.0952	2.1429	7.1429	7.2381	7.1905	7.5238	7.5238		5.8095
Djabarona 96/1-2												
Djabarona 96-4	1.9469		1.9469			7.6106		7.6106				6.4602
Djabarona 96/120-3												
Djabarona 96/120-4	1.6779		1.6779	1.6779		6.2081		6.2081	6.3758		5.0336	
Djabarona 96/120-5												

	SPM142	SPM143	SPM142/143	SPM144	SPM145	SPM146	SPM147	SPM146/147	SPM148	SPM149	SPM150	SPM151
♂ No.	3	3	6	1	0	3	3	6	1	0	1	2
♂ Min.	1.6779	1.5101	1.5101	1.6779		6.2081	5.8725	5.8725	6.3758		5.0336	5.2941
♂ Max.	1.9469	1.9295	1.9469	1.6779		7.6106	6.4597	7.6106	6.3758		5.0336	6.4602
♂ Mode												
♂ Median	1.7617	1.5126	1.7198	1.6779		7.5503	5.8824	6.3339	6.3758		5.0336	5.8771
♂ Mean	1.7955	1.6507	1.7231	1.6779		7.1230	6.0715	6.5973	6.3758		5.0336	5.8771
♂ S.D.	0.1377	0.2414	0.1928			0.7929	0.3362	0.7927				0.8245
♀ No.	8	7	9	3	5	8	7	9	3	5	6	5
♀ Min.	1.5814	1.6949	1.5814	1.8723	1.8468	5.5932	5.5932	5.5932	6.5812	6.9231	5.0459	5.2542
♀ Max.	2.1905	2.2581	2.1905	2.0952	2.3502	7.7419	7.9263	7.8341	7.6596	8.9899	6.3636	6.0000
♀ Mode												
♀ Median	1.7595	1.7117	1.7117	1.8803	2.1429	6.5328	6.3830	6.3404	7.5238	7.5238	5.6584	5.7872
♀ Mean	1.8282	1.8981	1.8342	1.9493	2.1172	6.6347	6.6272	6.6096	7.2549	7.8247	5.6138	5.7155
♀ S.D.	0.2156	0.2517	0.2213	0.1264	0.2281	0.7334	0.7939	0.7324	0.5873	0.8762	0.4531	0.2774
No.	11	10	15	4	5	11	10	15	4	5	7	7
Min.	1.5814	1.5101	1.5101	1.6779	1.8468	5.5932	5.5932	5.5932	6.3758	6.9231	5.0336	5.2542
Max.	2.1905	2.2581	2.1905	2.0952	2.3502	7.7419	7.9263	7.8341	7.6596	8.9899	6.3636	6.4602
Mode												
Median	1.7617	1.7106	1.7117	1.8763	2.1429	6.7677	6.2684	6.3404	7.0525	7.5238	5.6410	5.7872
Mean	1.8193	1.8239	1.7898	1.8814	2.1172	6.7678	6.4605	6.6047	7.0351	7.8247	5.5309	5.7617
S.D.	0.1912	0.2635	0.2108	0.1705	0.2281	0.7445	0.7193	0.7287	0.6505	0.8762	0.4682	0.4133

	SPM150/151 - T10b. Minimum shaft circumference (m)	SPM154 - *T16. Transverse *Tuberosita tibiae* diameter (l)	SPM156 - *T17. *Linea musculi solei* breadth (l)	SPM157 - *T17. *Linea musculi solei* breadth (r)	SPM158 - *Tibia* - Cortical thickness (ant.)	SPM159 - *Tibia* - Cortical thickness (post.)	SPM160 - *Tibia* - Cortical thickness (med.)	SPM161 - *Tibia* - Cortical thickness (lat.)	SPM162 - *Tibia* - Cortical thickness (max.)	SPM163 - *Tibia* - Cortical thickness (min.)
Abu Tabari 95/2-3						0.6711		0.6711	0.6711	0.6711
Abu Tabari 02/1-2	5.7447				0.9787	0.5106	0.5957	0.4255	0.9787	0.3830
Abu Tabari 02/1-3	6.0000		0.3810				0.3333	0.2857	0.3333	0.2857
Abu Tabari 02/1-5	5.2941				0.7983	0.5882	0.3782	0.2941	0.7983	0.2941
Abu Tabari 02/1-6										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8	4.0724				0.5882	0.3167	0.2715	0.2262	0.5882	0.1810
Abu Tabari 02/28-2	4.0421									
Abu Tabari 02/28-3	5.6757				0.6306	0.5405		0.4054	0.6306	0.4054
Abu Tabari 02/28-4										
Abu Tabari 02/28-5	5.2542	1.4407	0.5085		0.6780	0.3390	0.3814	0.2542	0.6780	0.2542
Abu Tabari 02/28-7	5.0459					0.3670		0.3211	0.3670	0.3211
Abu Tabari 02/28-8					0.3721	0.3721	0.3721	0.2791	0.3721	0.2791
Abu Tabari 02/28-11						0.4195	0.4195	0.4195	0.4195	0.4195
Abu Tabari 02/28-13										
Abu Tabari 02/28-14					0.5263	0.3509	0.3070	0.2632	0.5263	0.2193
Abu Tabari 02/28-15	6.3636			0.9091						
Abu Tabari 02/28-20										
Abu Tabari 02/28-21					0.8295	0.4608	0.3687		0.8295	0.3687
Abu Tabari 02/28-22	5.6838		0.5128	0.4274	0.8120	0.5983	0.4274	0.3419	0.8120	0.3419
Abu Tabari 02/28-23										
Abu Tabari 03/31										
Abu Tabari 03/34-1										
Conical Hill 95/4										
Conical Hill 95/4-1										
Conical Hill 02/3-4									0.3670	0.3670
Djabarona 96/1-1	5.8095				0.7619	0.4286		0.3810	0.7619	0.3810
Djabarona 96/1-2										
Djabarona 96-4	6.4602				1.6814	0.8407	0.4425	0.4425	1.6814	0.4425
Djabarona 96/120-3										
Djabarona 96/120-4	5.0336				0.7970	0.4195	0.4195	0.4195	0.7970	0.4195
Djabarona 96/120-5										

	SPM150/151	SPM154	SPM156	SPM157	SPM158	SPM159	SPM160	SPM161	SPM162	SPM163
♂ No.	3	0	0	0	3	5	4	5	6	6
♂ Min.	5.0336				0.7970	0.4195	0.3782	0.2941	0.3670	0.2941
♂ Max.	6.4602				1.6814	0.8407	0.4425	0.6711	1.6814	0.6711
♂ Mode						0.4195	0.4195	0.4195		0.4195
♂ Median	5.2941				0.7983	0.5882	0.4195	0.4195	0.7341	0.4195
♂ Mean	5.5960				1.0922	0.5878	0.4149	0.4493	0.7890	0.4356
♂ S.D.	0.7597				0.5102	0.1786	0.0268	0.1370	0.4744	0.1271
♀ No.	8	1	3	2	7	8	6	8	9	9
♀ Min.	5.0459	1.4407	0.3810	0.4274	0.3721	0.3390	0.3333	0.2542	0.3333	0.2542
♀ Max.	6.3636	1.4407	0.5128	0.9091	0.9787	0.5983	0.5957	0.4255	0.9787	0.4054
♀ Mode										
♀ Median	5.7142	1.4407	0.5085	0.6682	0.7619	0.4447	0.3767	0.3315	0.6780	0.3419
♀ Mean	5.6972	1.4407	0.4674	0.6682	0.7233	0.4521	0.4131	0.3367	0.6403	0.3356
♀ S.D.	0.4091		0.0749	0.3406	0.1914	0.0923	0.0944	0.0627	0.2337	0.0534
No.	11	1	3	2	10	13	10	13	15	15
Min.	5.0336	1.4407	0.3810	0.4274	0.3721	0.3390	0.3333	0.2542	0.3333	0.2542
Max.	6.4602	1.4407	0.5128	0.9091	1.6814	0.8407	0.5957	0.6711	1.6814	0.6711
Mode						0.4195	0.4195	0.4195	0.3670	0.4195
Median	5.6838	1.4407	0.5085	0.6682	0.7976	0.4608	0.4004	0.3810	0.6780	0.3687
Mean	5.6696	1.4407	0.4674	0.6682	0.8339	0.5043	0.4138	0.3800	0.6998	0.3756
S.D.	0.4846		0.0749	0.3406	0.3377	0.1426	0.0721	0.1087	0.3424	0.0999

	SPM164 - Fi1. *Fibula* - Maximum length (l)	SPM165 - Fi1. *Fibula* - Maximum length (r)	SPM166 - Fi2. Maximum mid-shaft diameter (l)	SPM167 - Fi2. Maximum mid-shaft diameter (r)	SPM168 - Fi3. Minimum mid-shaft diameter (l)	SPM169 - Fi3. Minimum mid-shaft diameter (r)	SPM170 - Fi4. Mid-shaft circumference (l)	SPM171 - Fi4. Mid-shaft circumference (r)	SPM172 - Fi4a. Minimum circumference (l)	SPM173 - Fi4a. Minimum circumference (r)
Abu Tabari 95/2-3										
Abu Tabari 02/1-2	34.4681	34.4681	1.2340	1.2340	0.9362	0.9362	3.5745	3.4894	2.7234	
Abu Tabari 02/1-3										
Abu Tabari 02/1-5				1.0924		0.6723		2.9412		
Abu Tabari 02/1-6										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8				0.7692		0.5882		2.2172		
Abu Tabari 02/28-2		19.6262	0.8879	0.8879	0.6542	0.6542	2.4299	2.4299		1.9159
Abu Tabari 02/28-3	33.7838									
Abu Tabari 02/28-4										
Abu Tabari 02/28-5		27.9661	1.1441	1.1441	0.7627	0.8475	3.2203	3.2627	2.5424	2.6271
Abu Tabari 02/28-7										
Abu Tabari 02/28-8										
Abu Tabari 02/28-11				1.1745		0.8809		3.3138		
Abu Tabari 02/28-13										
Abu Tabari 02/28-14			0.7456		0.6579		2.1930			
Abu Tabari 02/28-15			1.5657		1.0606		4.2424			
Abu Tabari 02/28-20										
Abu Tabari 02/28-21										
Abu Tabari 02/28-22	32.4786		1.0256	1.0256	0.7692	0.8547	2.9060		2.1368	
Abu Tabari 02/28-23										
Abu Tabari 03/31										
Abu Tabari 03/34-1										
Conical Hill 95/4										
Conical Hill 95/4-1										
Conical Hill 02/3-4										
Djabarona 96/1-1	33.3333	33.3333	1.2381	1.4286	0.8571	0.9048		3.6667		
Djabarona 96/1-2										
Djabarona 96-4	33.6283		1.6814		0.8407		3.4513			
Djabarona 96/120-3										
Djabarona 96/120-4	30.6208	30.6208	1.0067		0.7131		2.9362			2.2651
Djabarona 96/120-5										

	SPM164	SPM165	SPM166	SPM167	SPM168	SPM169	SPM170	SPM171	SPM172	SPM173
♂ No.	2	1	2	2	2	2	2	2	0	1
♂ Min.	30.6208	30.6208	1.0067	1.0924	0.7131	0.6723	2.9362	2.9412		2.2651
♂ Max.	33.6283	30.6208	1.6814	1.1745	0.8407	0.8809	3.4513	3.3138		2.2651
♂ Mode										
♂ Median	32.1246	30.6208	1.3441	1.1335	0.7769	0.7766	3.1938	3.1275		2.2651
♂ Mean	32.1246	30.6208	1.3441	1.1335	0.7769	0.7766	3.1938	3.1275		2.2651
♂ S.D.	2.1266		0.4771	0.0580	0.0902	0.1475	0.3642	0.2635		
♀ No.	4	3	5	4	5	4	4	3	3	1
♀ Min.	32.4786	27.9661	1.0256	1.0256	0.7627	0.8475	2.9060	3.2627	2.1368	2.6271
♀ Max.	34.4681	34.4681	1.5657	1.4286	1.0606	0.9362	4.2424	3.6667	2.7234	2.6271
♀ Mode										
♀ Median	33.5586	33.3333	1.2340	1.1891	0.8571	0.8797	3.3974	3.4894	2.5424	2.6271
♀ Mean	33.5160	31.9225	1.2415	1.2081	0.8772	0.8858	3.4858	3.4729	2.4675	2.6271
♀ S.D.	0.8342	3.4730	0.2008	0.1700	0.1248	0.0422	0.5736	0.2025	0.3004	
No.	6	4	7	6	7	6	6	5	3	2
Min.	30.6208	27.9661	1.0067	1.0256	0.7131	0.6723	2.9060	2.9412	2.1368	2.2651
Max.	34.4681	34.4681	1.6814	1.4286	1.0606	0.9362	4.2424	3.6667	2.7234	2.6271
Mode										
Median	33.4808	31.9771	1.2340	1.1593	0.8407	0.8678	3.3358	3.3138	2.5424	2.4461
Mean	33.0522	31.5971	1.2708	1.1832	0.8485	0.8494	3.3885	3.3347	2.4675	2.4461
S.D.	1.3558	2.9094	0.2594	0.1396	0.1189	0.0927	0.4967	0.2714	0.3004	0.2560

	SPM174 - *Fibula* - Cortical thickness (ant.)	SPM175 - *Fibula* - Cortical thickness (post.)	SPM176 - *Fibula* - Cortical thickness (med.)	SPM177 - *Fibula* - Cortical thickness (lat.)	SPM178 - *Fibula* - Cortical thickness (max.)	SPM179 - *Fibula* - Cortical thickness (min.)
Abu Tabari 95/2-3						
Abu Tabari 02/1-2	0.5532	0.2128	0.2979	0.2979	0.5532	0.2128
Abu Tabari 02/1-3						
Abu Tabari 02/1-5	0.4202	0.2521	0.2521	0.2521	0.4202	0.2521
Abu Tabari 02/1-6						
Abu Tabari 02/1-7						
Abu Tabari 02/1-8						
Abu Tabari 02/28-2						
Abu Tabari 02/28-3				0.2703	0.2703	0.2703
Abu Tabari 02/28-4						
Abu Tabari 02/28-5	0.5085	0.2542	0.1695	0.4237	0.5085	0.1695
Abu Tabari 02/28-7						
Abu Tabari 02/28-8						
Abu Tabari 02/28-11	0.2517	0.3775	0.2936	0.2936	0.4614	0.2097
Abu Tabari 02/28-13						
Abu Tabari 02/28-14					0.2632	0.1754
Abu Tabari 02/28-15						
Abu Tabari 02/28-20						
Abu Tabari 02/28-21					0.2765	0.2765
Abu Tabari 02/28-22	0.3419	0.3419	0.2137	0.3846	0.3846	0.2137
Abu Tabari 02/28-23						
Abu Tabari 03/31						
Abu Tabari 03/34-1						
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4						
Djabarona 96/1-1					0.2857	0.2857
Djabarona 96/1-2						
Djabarona 96-4			0.3097	0.2655	0.3097	0.2655
Djabarona 96/120-3						
Djabarona 96/120-4	0.4195	0.1678	0.1678	0.2517	0.4195	0.1678
Djabarona 96/120-5						

	SPM174	SPM175	SPM176	SPM177	SPM178	SPM179
♂ No.	3	3	4	4	4	4
♂ Min.	0.2517	0.1678	0.1678	0.2517	0.3097	0.1678
♂ Max.	0.4202	0.3775	0.3097	0.2936	0.4614	0.2655
♂ Mode						
♂ Median	0.4195	0.2521	0.2729	0.2588	0.4198	0.2309
♂ Mean	0.3638	0.2658	0.2558	0.2657	0.4027	0.2238
♂ S.D.	0.0971	0.1055	0.0635	0.0197	0.0650	0.0443
♀ No.	3	3	3	4	6	6
♀ Min.	0.3419	0.2128	0.1695	0.2703	0.2703	0.1695
♀ Max.	0.5532	0.3419	0.2979	0.4237	0.5532	0.2857
♀ Mode						
♀ Median	0.5085	0.2542	0.2137	0.3412	0.3352	0.2420
♀ Mean	0.4678	0.2696	0.2270	0.3441	0.3798	0.2381
♀ S.D.	0.1114	0.0659	0.0652	0.0720	0.1250	0.0463
No.	6	6	7	8	10	10
Min.	0.2517	0.1678	0.1678	0.2517	0.2703	0.1678
Max.	0.5532	0.3775	0.3097	0.4237	0.5532	0.2857
Mode						
Median	0.4198	0.2532	0.2521	0.2819	0.4020	0.2329
Mean	0.4158	0.2677	0.2435	0.3049	0.3890	0.2324
S.D.	0.1095	0.0787	0.0606	0.0644	0.1012	0.0436

Appendix XV. Age at death

Appendix XV.A. Individual estimates

	Analysis age at death	Approximate age at death	Age at death category
Abu Tabari 95/2-3	30.0	-	adult or older
Abu Tabari 02/1-2	37.5	35-40	late *Adultus*
Abu Tabari 02/1-3	50.0	40-x	*Maturus* - x
Abu Tabari 02/1-5	35.0	30-40	middle to late *Adultus*
Abu Tabari 02/1-6	30.0	-	adult or older
Abu Tabari 02/1-7	40.0	30-x	middle *Adultus* - x
Abu Tabari 02/1-8	13.5	12-15	early to middle *Iuvenis*
Abu Tabari 02/28-2	7.0	6-8	*Infans II*
Abu Tabari 02/28-3	45.0	40-50	early to middle *Maturus*
Abu Tabari 02/28-4	30.0	-	probably adult or older
Abu Tabari 02/28-5	22.5	20-25	early *Adultus*
Abu Tabari 02/28-7	17.5	15-20	late *Iuvenis*
Abu Tabari 02/28-8	21.0	18-24	late *Iuvenis* to early *Adultus*
Abu Tabari 02/28-11	30.0	-	adult or older
Abu Tabari 02/28-13	20.0	-	probably late *Iuvenis* to early *Adultus*
Abu Tabari 02/28-14	9.5	7-12	*Infans II*
Abu Tabari 02/28-15	25.0	20-30	early to middle *Adultus*
Abu Tabari 02/28-20	22.5	20-25	early to middle *Adultus*
Abu Tabari 02/28-21	35.0	30-40	middle to late *Adultus*
Abu Tabari 02/28-22	40.0	35-45	late *Adultus* - early *Maturus*
Abu Tabari 02/28-23	21.5	18-25	late *Iuvenis* to early *Adultus*
Abu Tabari 03/31	30.0	-	probably adult or older
Abu Tabari 03/34-1	20.0	15-25	late *Iuvenis* to early *Adultus*
Conical Hill 95/4	40.0	35-45	late *Adultus* to early *Maturus*
Conical Hill 95/4-1	11.5	9-14	*Infans II* to early *Iuvenis*
Conical Hill 02/3-4	20.0	18-22	late *Iuvenis* to early *Adultus*
Djabarona 96/1-1	21.0	17-25	late *Iuvenis* to early *Adultus*
Djabarona 96/1-2	21.0	17-25	late *Iuvenis* to early *Adultus*
Djabarona 96-4	20.5	16-25	late *Iuvenis* to early *Adultus*
Djabarona 96/120-3	30.0	25-35	middle *Adultus*
Djabarona 96/120-4	30.0	25-35	middle *Adultus*
Djabarona 96/120-5	30.0	20-40	*Adultus*

Appendix XV.B. Descriptive statistics

	Analysis age at death	Analysis age at death (without sub-adults)	Analysis age at death (without < 20)
♂ No.	15	11	11
♂ Min.	7.0	20.0	20.0
♂ Max.	40.0	40.0	40.0
♂ Mode	30.0	30.0	30.0
♂ Median	30.0	30.0	30.0
♂ Mean	24.6	29.8	29.8
♂ S.D.	10.7	6.9	6.9
♀ No.	16	15	14
♀ Min.	11.5	17.5	20.0
♀ Max.	50.0	50.0	50.0
♀ Mode	21.0	21.0	21.0
♀ Median	23.8	25.0	27.5
♀ Mean	28.0	29.1	30.0
♀ S.D.	10.8	10.2	10.0
No.	32	28	27
Min.	7.0	17.5	20.0
Max.	50.0	50.0	50.0
Mode	30.0	30.0	30.0
Median	27.5	30.0	30.0
Mean	26.8	29.1	29.5
S.D.	10.3	8.6	8.5

Appendix XVI. Living height and weight

Appendix XVI.A. Living height, living weight and height-weight indices

	Living height	Living weight	Quetelet index	Body mass index	Rohrer index	*Index ponderalis*
Abu Tabari 95/2-3	165.66	47.79	2.89	1.74	1.05	2.19
Abu Tabari 02/1-2	165.88	48.21	2.91	1.75	1.06	2.19
Abu Tabari 02/1-3	159.02	45.24	2.84	1.79	1.12	2.24
Abu Tabari 02/1-5	159.90	50.82	3.18	1.99	1.24	2.32
Abu Tabari 02/1-6						
Abu Tabari 02/1-7	151.94	38.03	2.50	1.65	1.08	2.21
Abu Tabari 02/1-8	134.30	31.00	2.31	1.72	1.28	2.34
Abu Tabari 02/1-8 (sub-adult values)	122.44	26.29	2.15	1.75	1.43	2.43
Abu Tabari 02/28-2	130.77	37.86	2.90	2.22	1.69	2.57
Abu Tabari 02/28-2 (sub-adult values)	113.93	21.79	1.91	1.68	1.47	2.45
Abu Tabari 02/28-3	160.00	52.23	3.26	2.04	1.27	2.34
Abu Tabari 02/28-4		48.01				
Abu Tabari 02/28-5	149.22	42.58	2.85	1.91	1.28	2.34
Abu Tabari 02/28-7	150.58	45.59	3.03	2.01	1.34	2.37
Abu Tabari 02/28-7 (sub-adult values)	157.62	34.22	2.17	1.38	0.87	2.06
Abu Tabari 02/28-8	144.32	41.06	2.85	1.97	1.37	2.39
Abu Tabari 02/28-11	157.82	45.39	2.88	1.82	1.15	2.26
Abu Tabari 02/28-13						
Abu Tabari 02/28-14	131.36	43.89	3.34	2.54	1.94	2.69
Abu Tabari 02/28-14 (sub-adult values)	109.06	21.52	1.97	1.81	1.66	2.55
Abu Tabari 02/28-15	167.84	51.53	3.07	1.83	1.09	2.22
Abu Tabari 02/28-20		46.42				
Abu Tabari 02/28-21	157.06	46.67	2.97	1.89	1.21	2.29
Abu Tabari 02/28-22	160.00	50.72	3.17	1.98	1.24	2.31
Abu Tabari 02/28-23		46.08				
Abu Tabari 03/31	173.19	64.61	3.73	2.15	1.24	2.32
Abu Tabari 03/34-1	159.46	39.99	2.51	1.57	0.99	2.14
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4	161.18	49.52	3.07	1.91	1.18	2.28
Djabarona 96/1-1	156.08	45.93	2.94	1.88	1.21	2.29
Djabarona 96/1-2	149.10	44.48	2.98	2.00	1.34	2.38
Djabarona 96-4	165.66	49.68	3.00	1.81	1.09	2.22
Djabarona 96/120-3						
Djabarona 96/120-4	161.74	46.46	2.87	1.78	1.10	2.22
Djabarona 96/120-5						

	Living height (without sub-adults)	Living weight (without sub-adults)	Quetelet index (without sub-adults)	Body mass index (without sub-adults)	Rohrer index (without sub-adults)	*Index ponderalis* (without sub-adults)
♂ No.	8	10	8	8	8	8
♂ Min.	151.94	38.03	2.50	1.65	1.05	2.19
♂ Max.	173.19	64.61	3.73	2.15	1.24	2.32
♂ Mode	165.66					
♂ Median	161.46	47.90	2.94	1.82	1.13	2.24
♂ Mean	162.14	48.67	3.01	1.86	1.14	2.25
♂ S.D.	6.28	6.63	0.35	0.16	0.07	0.05
♀ No.	12	13	12	12	12	12
♀ Min.	144.32	39.99	2.51	1.57	0.99	2.14
♀ Max.	167.84	52.23	3.26	2.04	1.37	2.39
♀ Mode	160.00					
♀ Median	158.04	45.93	2.96	1.90	1.22	2.30
♀ Mean	156.55	46.18	2.95	1.89	1.21	2.29
♀ S.D.	7.06	3.78	0.19	0.13	0.12	0.08
No.	20	23	20	20	20	20
Min.	144.32	38.03	2.50	1.57	0.99	2.14
Max.	173.19	64.61	3.73	2.15	1.37	2.39
Mode	165.66					
Median	159.68	46.46	2.96	1.89	1.19	2.29
Mean	158.78	47.26	2.98	1.87	1.18	2.28
S.D.	7.16	5.23	0.26	0.14	0.11	0.07

Abu Tabari 02/28-7 was treated as an adult.

	Living height (with adjusted sub-adult values)	Living weight (with adjusted sub-adult values)	Quetelet index (with adjusted sub-adult values)	Body mass index (with adjusted sub-adult values)	Rohrer index (with adjusted sub-adult values)	*Index ponderalis* (with adjusted sub-adult values)
♂ No.	11	13	11	11	11	11
♂ Min.	109.06	21.52	1.91	1.65	1.05	2.19
♂ Max.	173.19	64.61	3.73	2.15	1.66	2.55
♂ Mode	165.66					
♂ Median	159.90	46.46	2.88	1.81	1.18	2.28
♂ Mean	149.32	42.79	2.74	1.83	1.25	2.31
♂ S.D.	22.77	12.61	0.56	0.14	0.19	0.12
♀ No.	12	13	12	12	12	12
♀ Min.	144.32	39.99	2.51	1.57	0.99	2.14
♀ Max.	167.84	52.23	3.26	2.04	1.37	2.39
♀ Mode	160.00					
♀ Median	158.04	45.93	2.96	1.90	1.22	2.30
♀ Mean	156.55	46.18	2.95	1.89	1.21	2.29
♀ S.D.	7.06	3.78	0.19	0.13	0.12	0.08
No.	23	26	23	23	23	23
Min.	109.06	21.52	1.91	1.57	0.99	2.14
Max.	173.19	64.61	3.73	2.15	1.66	2.55
Mode	165.66					
Median	159.02	46.25	2.91	1.83	1.21	2.29
Mean	153.09	44.49	2.85	1.86	1.23	2.30
S.D.	16.56	9.28	0.41	0.14	0.16	0.10

	Living height (only adjusted sub-adult values)	Living weight (only adjusted sub-adult values)	Quetelet index (only adjusted sub-adult values)	Body mass index (only adjusted sub-adult values)	Rohrer index (only adjusted sub-adult values)	*Index ponderalis* (only adjusted sub-adult values)
♂ No.	3	3	3	3	3	3
♂ Min.	109.06	21.52	1.91	1.68	1.43	2.43
♂ Max.	122.44	26.29	2.15	1.81	1.66	2.55
♂ Mode						
♂ Median	113.93	21.79	1.97	1.75	1.47	2.45
♂ Mean	115.14	23.20	2.01	1.75	1.52	2.48
♂ S.D.	6.77	2.68	0.12	0.07	0.12	0.06
♀ No.	0	0	0	0	0	0
♀ Min.						
♀ Max.						
♀ Mode						
♀ Median						
♀ Mean						
♀ S.D.						
No.	3	3	3	3	3	3
Min.	109.06	21.52	1.91	1.68	1.43	2.43
Max.	122.44	26.29	2.15	1.81	1.66	2.55
Mode						
Median	113.93	21.79	1.97	1.75	1.47	2.45
Mean	115.14	23.20	2.01	1.75	1.52	2.48
S.D.	6.77	2.68	0.12	0.07	0.12	0.06

Appendix XVI.B. Living height

Appendix XVI.B.1. Preliminary results and adjustment values

	Allbrook (1961)[1]: "*Nilotes*"	Raxter *et al*. (2008): "Egyptians"	Trotter/Gleser (1952, 1977): African Americans	Raxter *et al*. (2008) + Trotter/Gleser (1952, 1977): mean	Raxter *et al*. (2008)-Trotter/Gleser (1952, 1977)-mean minus Allbrook (1961)
Abu Tabari 95/2-3	167.66	169.54	170.12	169.83	2.17
Abu Tabari 02/1-2	167.88	167.40	168.08	167.74	-0.14
Abu Tabari 02/1-3	161.02	162.23	163.77	163.00	1.98
Abu Tabari 02/1-5	161.90	170.35	170.44	170.39	8.50
Abu Tabari 02/1-6					
Abu Tabari 02/1-7	153.94	154.46	156.71	155.58	1.64
Abu Tabari 02/1-8	136.30	130.24	133.85	132.05	-4.25
Abu Tabari 02/28-2	132.77	125.24	124.73	124.99	-7.79
Abu Tabari 02/28-3	162.00	163.65	165.19	164.42	2.42
Abu Tabari 02/28-4					
Abu Tabari 02/28-5	151.22	150.66	152.32	151.49	0.27
Abu Tabari 02/28-7		152.92	154.02	153.47	
Abu Tabari 02/28-8	146.32	146.20	148.49	147.34	1.02
Abu Tabari 02/28-11	159.82	160.55	161.54	161.04	1.22
Abu Tabari 02/28-13					
Abu Tabari 02/28-14	133.36	125.37	119.71	122.54	-10.82
Abu Tabari 02/28-15	169.84	171.79	171.68	171.73	1.89
Abu Tabari 02/28-20					
Abu Tabari 02/28-21	159.06	158.47	158.30	158.39	-0.67
Abu Tabari 02/28-22	162.00	161.05	162.57	161.81	-0.19
Abu Tabari 02/28-23					
Abu Tabari 03/31		179.04	178.91	178.97	
Abu Tabari 03/34-1		162.29	162.40	162.35	
Conical Hill 95/4					
Conical Hill 95/4-1					
Conical Hill 02/3-4		166.62	167.31	166.96	
Djabarona 96/1-1	158.08	158.48	160.54	159.51	1.43
Djabarona 96/1-2		151.51	152.48	151.99	
Djabarona 96-4	167.66	169.57	171.53	170.55	2.89
Djabarona 96/120-3					
Djabarona 96/120-4	163.74	171.79	172.87	172.33	8.59
Djabarona 96/120-5					

[1] Formulae for *Tibiae* or, if tibial measurements were unavailable, *Ulnae* of male "*Nilotes*". Raw female living heights were adjusted by subtracting 3.7 cm.

	Raxter *et al*. (2008): male-female difference	Trotter/Gleser (1952, 1977): male-female difference - African Americans
Abu Tabari 95/2-3	3.25	3.50
Abu Tabari 02/1-2	4.45	3.38
Abu Tabari 02/1-3	3.39	3.54
Abu Tabari 02/1-5	5.74	3.40
Abu Tabari 02/1-6		
Abu Tabari 02/1-7	3.90	3.32
Abu Tabari 02/1-8	4.14	4.00
Abu Tabari 02/28-2	5.44	1.61
Abu Tabari 02/28-3	4.60	3.30
Abu Tabari 02/28-4		
Abu Tabari 02/28-5	4.82	2.78
Abu Tabari 02/28-7	6.15	1.43
Abu Tabari 02/28-8	4.94	2.75
Abu Tabari 02/28-11	4.05	3.37
Abu Tabari 02/28-13		
Abu Tabari 02/28-14	7.08	-0.42
Abu Tabari 02/28-15	3.65	3.70
Abu Tabari 02/28-20		
Abu Tabari 02/28-21	3.63	3.07
Abu Tabari 02/28-22	4.62	3.19
Abu Tabari 02/28-23		
Abu Tabari 03/31	2.71	2.83
Abu Tabari 03/34-1	3.21	3.85
Conical Hill 95/4		
Conical Hill 95/4-1		
Conical Hill 02/3-4	3.16	3.77
Djabarona 96/1-1	4.68	3.17
Djabarona 96/1-2	6.27	1.30
Djabarona 96-4	2.59	3.84
Djabarona 96/120-3		
Djabarona 96/120-4	5.72	3.47
Djabarona 96/120-5		
Mean	4.44	2.96
Mean (without sub-adults)	4.28	3.15
Mean (♀ -without sub-adults)	4.53	2.95

	Mean	Mean (without sub-adults)	Mean (♀ -without sub-adults)
Raxter *et al*. (2008): male-female difference	4.44	4.28	4.53
Trotter/Gleser (1952, 1977): male-female difference - African Americans	2.96	3.15	2.95
Mean	3.70	3.71	3.74

Appendix XVI.B.2. Author-, sex- and sample-specific mean living heights

	Allbrook (1961): mean - male "*Nilotes*"	Allbrook (1961): mean - male "*Nilohamites*"	Allbrook (1961): mean - male "*Bantu*"	Raxter *et al*. (2008): mean - male "*Egyptians*"	Raxter *et al*. (2008): mean - female "*Egyptians*"	Trotter/Gleser (1952, 1977): mean - male African Americans	Trotter/Gleser (1952, 1977): mean - female African Americans	Didia *et al*. (2009): *Tibia* - male Nigerians	Didia *et al*. (2009): *Tibia* - female Nigerians
Abu Tabari 95/2-3	163.88	168.58	162.40	169.54	166.29	170.12	166.62	164.00	160.31
Abu Tabari 02/1-2	165.17	169.96	164.29	171.85	167.40	171.46	168.08	169.86	164.96
Abu Tabari 02/1-3	161.51	166.26	159.71	165.61	162.23	167.31	163.77	159.60	156.82
Abu Tabari 02/1-5	161.90	167.59	161.41	170.35	164.60	170.44	167.04		
Abu Tabari 02/1-6									
Abu Tabari 02/1-7	153.94	157.19	147.50	154.46	150.55	156.71	153.39	143.50	144.02
Abu Tabari 02/1-8	136.30	139.19	125.00	130.24	126.10	133.85	129.85	117.14	123.09
Abu Tabari 02/28-2	124.72	131.05	120.54	125.24	119.80	124.73	123.13	111.86	118.90
Abu Tabari 02/28-3	162.00	166.76	160.34	168.25	163.65	168.49	165.19	161.07	157.98
Abu Tabari 02/28-4									
Abu Tabari 02/28-5	151.23	156.37	148.60	155.48	150.66	155.10	152.32	144.96	145.19
Abu Tabari 02/28-7				159.08	152.92	155.45	154.02		
Abu Tabari 02/28-8	147.88	153.06	144.67	151.14	146.20	151.24	148.49	137.64	139.37
Abu Tabari 02/28-11	156.37	161.32	154.16	160.55	156.49	161.54	158.16	152.28	151.00
Abu Tabari 02/28-13									
Abu Tabari 02/28-14	133.36	136.19	121.25	125.37	118.28	119.71	120.13	112.74	119.60
Abu Tabari 02/28-15	168.62	173.21	167.77	175.44	171.79	175.38	171.68	172.78	167.29
Abu Tabari 02/28-20									
Abu Tabari 02/28-21	156.05	161.19	154.41	162.10	158.47	161.37	158.30	156.68	154.49
Abu Tabari 02/28-22	161.11	165.95	159.53	165.67	161.05	165.77	162.57	161.07	157.98
Abu Tabari 02/28-23									
Abu Tabari 03/31				179.04	176.33	178.91	176.08		
Abu Tabari 03/34-1				165.50	162.29	166.25	162.40		
Conical Hill 95/4									
Conical Hill 95/4-1									
Conical Hill 02/3-4				166.62	163.46	167.31	163.54		
Djabarona 96/1-1	159.15	163.95	157.03	163.17	158.48	163.72	160.54	155.21	153.33
Djabarona 96/1-2				157.78	151.51	153.78	152.48		
Djabarona 96-4	167.66	171.19	165.00	169.57	166.98	171.53	167.69	164.00	160.31
Djabarona 96/120-3									
Djabarona 96/120-4	163.72	168.21	161.52	171.79	166.07	172.87	169.39	158.14	155.66
Djabarona 96/120-5									

Appendix XVI.B.3. Equation-specific results

	Allbrook (1961): mean - *Tibia* - male "*Nilotes*" (±3.65)	Allbrook (1961): mean - *Ulna* - male "*Nilotes*" (±5.06)	Allbrook (1961): mean - *Tibia* - male "*Nilohamites*" (±1.89)	Allbrook (1961): mean - *Ulna* - male "*Nilohamites*" (±2.97)	Allbrook (1961): mean - *Tibia* - male "*Bantu*" (±3.73)	Allbrook (1961): mean - *Ulna* - male "*Bantu*" (±4.63)	Raxter *et al.* (2008): mean - *Femur* - male "*Egyptians*" (±3.22)	Raxter *et al.* (2008): mean - *Tibia* - male "*Egyptians*" (±3.00)	Raxter *et al.* (2008): mean - *Humerus* - male "*Egyptians*" (±4.22)	Raxter *et al.* (2008): mean - *Radius* - male "*Egyptians*" (±3.73)	Raxter *et al.* (2008): mean - *Femur+Tibia* - male "*Egyptians*" (±2.85)	Raxter *et al.* (2008): mean - *Humerus+Radius* - male "*Egyptians*" (±3.35)	Raxter *et al.* (2008): mean - *Femur* - female "*Egyptians*" (±2.52)	Raxter *et al.* (2008): mean - *Tibia* - female "*Egyptians*" (±1.92)
Abu Tabari 95/2-3	167.66	160.10	171.19	165.96	165.00	159.79	167.75	171.37	169.45		169.60		164.63	169.04
Abu Tabari 02/1-2	171.58	158.75	175.19	164.74	170.00	158.58	172.27	176.48	172.05	166.27	174.73	169.30	169.31	174.44
Abu Tabari 02/1-3	164.72	158.31	168.19	164.33	161.25	158.17	160.98	167.54	170.10		163.83		157.61	164.99
Abu Tabari 02/1-5		161.90		167.59		161.41	166.62		173.34	169.58		171.85	163.46	
Abu Tabari 02/1-6														
Abu Tabari 02/1-7	153.94		157.19		147.50		149.70	153.49	164.26		150.37		145.91	150.15
Abu Tabari 02/1-8	136.3		139.19		125.00		131.64	130.51			128.58		127.19	125.86
Abu Tabari 02/28-2	132.77	116.66	135.59	126.51	120.50	120.59	121.93	125.91	132.36		120.76		117.13	120.00
Abu Tabari 02/28-3	165.70	158.31	169.19	164.33	162.50	158.17	167.75	168.82	169.45	166.94	168.32	168.21	164.63	166.34
Abu Tabari 02/28-4														
Abu Tabari 02/28-5	154.92	147.54	158.19	154.55	148.75	148.45	153.08	154.77	155.19	160.33	152.94	156.56	149.42	151.50
Abu Tabari 02/28-7									159.08					
Abu Tabari 02/28-8	150.02	145.74	153.19	152.92	142.50	146.83	145.18	148.38	153.89	159.01	145.24	155.10	141.23	144.75
Abu Tabari 02/28-11	159.82	152.92	163.19	159.44	155.00	153.31	158.72	161.15		162.97	159.35		155.27	158.24
Abu Tabari 02/28-13														
Abu Tabari 02/28-14	133.36		136.19		121.25			126.68	124.06					121.81
Abu Tabari 02/28-15	173.54	163.69	177.19	169.22	172.50	163.03	174.52	179.03		170.90	177.29		171.65	177.14
Abu Tabari 02/28-20														
Abu Tabari 02/28-21	162.76	149.33	166.19	156.18	158.75	150.07	159.85	164.99	161.67		161.91		156.44	162.29
Abu Tabari 02/28-22	165.70	156.51	169.19	162.70	162.50	156.55	164.37	168.82	164.26	165.61	166.40	164.57	161.12	166.34
Abu Tabari 02/28-23														
Abu Tabari 03/31							179.04						176.33	
Abu Tabari 03/34-1							165.50						162.29	
Conical Hill 95/4														
Conical Hill 95/4-1														
Conical Hill 02/3-4							166.62						163.46	
Djabarona 96/1-1	161.78	156.51	165.19	162.70	157.50	156.55	160.98	163.71	164.26	164.29	161.91	163.84	157.61	160.94
Djabarona 96/1-2									157.78					
Djabarona 96-4	167.66		171.19		165.00		167.75	171.37			169.60		164.63	169.04
Djabarona 96/120-3														
Djabarona 96/120-4	163.74	163.69	167.19	169.22	160.00	163.03		166.26	173.34	173.54		174.03		163.64
Djabarona 96/120-5														

	Raxter *et al*. (2008): mean - *Humerus* - female "*Egyptians*" (±2.73)	Raxter *et al*. (2008): mean - *Radius* - female "*Egyptians*" (±4.06)	Raxter *et al*. (2008): mean - *Femur+Tibia* - female "*Egyptians*" (±1.97)	Raxter *et al*. (2008): mean - *Humerus +Radius* - female "*Egyptians*" (±3.25)	Trotter/Gleser (1952, 1977): mean - *Humerus* - male African Americans (±4.40)	Trotter/Gleser (1952, 1977): mean - *Radius* - male African Americans (±4.80)	Trotter/Gleser (1952, 1977): mean - *Ulna* - male African Americans (±5.00)	Trotter/Gleser (1952, 1977): mean - *Femur* - male African Americans (±4.50)	Trotter/Gleser (1952, 1977): mean - *Tibia* - male African Americans (±4.00)	Trotter/Gleser (1952, 1977): mean - *Humerus* - female African Americans (±4.30)	Trotter/Gleser (1952, 1977): mean - *Radius* - female African Americans (±4.60)	Trotter/Gleser (1952, 1977): mean *Ulna* - female African Americans (±4.80)	Trotter/Gleser (1952, 1977): mean - *Femur* - female African Americans (±3.40)	Trotter/Gleser (1952, 1977): mean *Tibia* - female African Americans (±3.70)
Abu Tabari 95/2-3	164.23		167.28		168.85		168.56	168.36	174.70	166.34		164.77	164.68	170.70
Abu Tabari 02/1-2	167.06	158.83	172.53	162.26	172.20	165.46	167.18	172.58	179.90	169.42	162.63	163.53	169.24	175.60
Abu Tabari 02/1-3	164.94		161.37		169.69		166.72	162.03	170.80	167.11		163.12	157.84	167.03
Abu Tabari 02/1-5	168.47	161.96		164.52	173.88	170.18	170.40	167.31		170.96	167.22	166.43	163.54	
Abu Tabari 02/1-6														
Abu Tabari 02/1-7	158.58		147.58		162.15			151.48	156.50	160.18			146.44	153.55
Abu Tabari 02/1-8			125.26					134.60	133.10				128.20	131.50
Abu Tabari 02/28-2	123.80		117.25		120.95		124.03	125.53	128.42	122.30		124.72	118.40	127.09
Abu Tabari 02/28-3	164.23	159.46	165.97	161.29	168.85	166.40	166.72	168.36	172.10	166.34	163.55	163.12	164.68	168.25
Abu Tabari 02/28-4														
Abu Tabari 02/28-5	148.68	153.18	150.21	150.96	150.43	156.95	155.68	154.65	157.80	149.40	154.38	153.19	149.86	154.78
Abu Tabari 02/28-7	152.92				155.45					154.02				
Abu Tabari 02/28-8	147.27	151.93	142.33	149.67	148.75	155.06	153.84	147.26	151.30	147.86	152.54	151.53	141.88	148.65
Abu Tabari 02/28-11		155.69	156.77			160.73	161.20	159.92	164.30		158.05	158.15	155.56	160.90
Abu Tabari 02/28-13														
Abu Tabari 02/28-14	114.76				110.23				129.20	112.44				127.83
Abu Tabari 02/28-15		163.22	175.16			172.07	172.24	174.69	182.50		169.06	168.08	171.52	178.05
Abu Tabari 02/28-20														
Abu Tabari 02/28-21	155.75		159.40		158.80		157.52	160.98	168.20	157.10		154.84	156.70	164.58
Abu Tabari 02/28-22	158.58	158.20	163.00	158.06	162.15	164.51	164.88	165.20	172.10	160.18	161.72	161.46	161.26	168.25
Abu Tabari 02/28-23														
Abu Tabari 03/31								178.91					176.08	
Abu Tabari 03/34-1								166.25					162.40	
Conical Hill 95/4														
Conical Hill 95/4-1														
Conical Hill 02/3-4								167.31					163.54	
Djabarona 96/1-1	158.58	156.95	159.40	157.42	162.15	162.62	164.88	162.03	166.90	160.18	159.88	161.46	157.84	163.35
Djabarona 96/1-2	151.51				153.78					152.48				
Djabarona 96-4			167.28					168.36	174.70				164.68	170.70
Djabarona 96/120-3														
Djabarona 96/120-4	168.47	165.73		166.45	173.88	175.85	172.24		169.50	170.96	172.73	168.08		165.80
Djabarona 96/120-5														

Appendix XVI.B.4. Sub-adult results

	Telkkä *et al*. (1962): sex- and age-specific mean	Ruff (2007): age-specific mean	Smith (2007): sex- and age-specific mean	Visser (2007): age-specific mean	Mean height
Abu Tabari 02/1-8	123.15	118.17	123.77	124.68	122.44
Abu Tabari 02/28-2	110.75	116.56	113.46	114.98	113.93
Abu Tabari 02/28-7	156.09	159.14			157.62
Abu Tabari 02/28-14	105.91	112.77	108.46	109.10	109.06

	Telkkä *et al*. (1962): *Humerus* - male - 10-15 (±4.2)	Telkkä *et al*. (1962): *Radius* - male - 10-15 (±4.6)	Telkkä *et al*. (1962): *Femur* - male - 10-15 (±5.3)	Telkkä *et al*. (1962): *Tibia* - male - 10-15 (±4.7)	Telkkä *et al*. (1962): *Humerus* - male - 1-9 (±3.0)	Telkkä *et al*. (1962): *Radius* - male - 1-9 (±3.3)	Telkkä *et al*. (1962): *Femur* - male – 1-9 (±4.1)	Telkkä *et al*. (1962): *Tibia* - male - 1-9 (±3.3)
Abu Tabari 02/1-8			121.90	124.40			118.32	120.42
Abu Tabari 02/28-2	108.32		105.86	118.37	110.47		107.52	114.25
Abu Tabari 02/28-7	158.89				155.89			
Abu Tabari 02/28-8	149.07	161.62	144.28	147.85	147.07	163.36	132.80	144.43
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	92.61			119.38	96.36			115.28
Abu Tabari 02/28-23								
Abu Tabari 03/34-1			177.85				153.37	
Conical Hill 02/3-4			179.72				154.48	
Djabarona 96/1-1	168.71	173.54	170.39	167.95	164.71	176.12	148.91	165.01
Djabarona 96/1-2	156.44				153.69			
Djabarona 96-4			181.58	178.00			155.58	175.30

	Telkkä *et al*. (1962): *Humerus* - female - 10-15 (±5.7)	Telkkä *et al*. (1962): *Radius* - female - 10-15 (±4.7)	Telkkä *et al*. (1962): *Femur* - female - 10-15 (±5.3)	Telkkä *et al*. (1962): *Tibia* - female - 10-15 (±6.8)	Telkkä *et al*. (1962): *Humerus* - female - 1-9 (±4.9)	Telkkä *et al*. (1962): *Radius* - female - 1-9 (±3.5)	Telkkä *et al*. (1962): *Femur* - female - 1-9 (±4.1)	Telkkä *et al*. (1962): *Tibia* - female - 1-9 (±5.2)
Abu Tabari 02/1-8			127.10	128.30			118.02	119.56
Abu Tabari 02/28-2	113.76		113.68	123.08	110.16		106.95	113.55
Abu Tabari 02/28-7	156.09				154.04			
Abu Tabari 02/28-8	147.87	164.00	145.82	148.60	145.52	164.66	132.86	142.94
Abu Tabari 02/28-13								
Abu Tabari 02/28-14	100.61			123.95	96.53			114.55
Abu Tabari 02/28-23								
Abu Tabari 03/34-1			173.90				153.94	
Conical Hill 02/3-4			175.46				155.08	
Djabarona 96/1-1	164.31	175.70	167.66	166.00	162.56	177.32	149.37	162.98
Djabarona 96/1-2	154.04				151.91			
Djabarona 96-4			177.02	174.70			156.21	173.00

	Ruff (2007): *Humerus* - 7 (±2.8)	Ruff (2007): *Femur* - 7 (±2.2)	Ruff (2007): *Tibia* - 7 (±2.2)	Ruff (2007): *Femur+Tibia* - 7 (±1.9)	Ruff (2007): *Humerus* - 9 (±3.8)	Ruff (2007): *Tibia* - 9 (±2.1)	Ruff (2007): *Femur* - 13 (±3.2)	Ruff (2007): *Tibia* - 13 (±3.2)	Ruff (2007): *Femur+Tibia* - 13 (±2.8)	Ruff (2007): *Humerus* - 17 (±4.4)
Abu Tabari 02/1-8		127.30	124.80	126.08		126.66	119.40	117.14	117.96	
Abu Tabari 02/28-2	116.42	114.66	118.95	116.20	118.08	120.83	107.02	111.36	108.26	118.35
Abu Tabari 02/28-7	162.25				164.22					159.14
Abu Tabari 02/28-8	153.35	144.94	147.55	147.14	155.26	149.34	136.68	139.61	138.63	151.22
Abu Tabari 02/28-13										
Abu Tabari 02/28-14	102.18		119.93		103.74	121.80		112.33		105.68
Abu Tabari 02/28-23										
Abu Tabari 03/34-1		171.40					162.60			
Conical Hill 02/3-4		172.87					164.04			
Djabarona 96/1-1	171.15	165.52	167.05	168.20	173.18	168.78	156.84	158.87	159.30	167.06
Djabarona 96/1-2	160.03				161.98					157.16
Djabarona 96-4		174.34	176.80	177.92		178.50	165.48	168.50	168.84	

	Smith (2007): *Humerus* - male - 3-10 (±2.41)	Smith (2007): *Radius* - male - 3-10 (±2.75)	Smith (2007): *Ulna* - male - 3-10 (±2.66)	Smith (2007): *Femur* - male - 3-10 (±2.63)	Smith (2007): *Tibia* - male - 3-10 (±1.73)	Smith (2007): *Fibula* - male - 3-10 (±1.53)	Smith (2007): *Femur+Tibia* - male - 3-10 (±1.77)	Smith (2007): *Humerus* - female - 3-10 (±3.40)	Smith (2007): *Radius* - female - 3-10 (±3.23)	Smith (2007): *Ulna* - female - 3-10 (±2.94)	Smith (2007): *Femur* - female - 3-10 (±2.26)	Smith (2007): *Tibia* - female - 3-10 (±2.57)	Smith (2007): *Fibula* - female - 3-10 (±2.68)	Smith (2007): *Femur+Tibia* - female - 3-10 (±2.10)
Abu Tabari 02/1-8				124.34	123.16		123.82				125.13	123.04		124.18
Abu Tabari 02/28-2	113.99		110.78	112.04	116.71	113.19	114.03	114.30		112.28	112.30	116.79	113.37	114.32
Abu Tabari 02/28-7	161.83							162.38						
Abu Tabari 02/28-8	152.54	163.42	158.62	141.50	148.22		144.70	153.04	165.67	160.11	143.03	147.37		145.19
Abu Tabari 02/28-13														
Abu Tabari 02/28-14	99.13				117.79			99.36				117.83		
Abu Tabari 02/28-23														
Abu Tabari 03/34-1				167.24							169.89			
Conical Hill 02/3-4				168.67							171.38			
Djabarona 96/1-1	171.12	175.86	176.33	161.52	169.71	164.22	165.58	171.71	178.20	177.83	163.92	168.22	163.77	166.19
Djabarona 96/1-2	159.51						37.10	160.04						
Djabarona 96-4				170.10	180.45	175.15	175.22				172.87	178.64	174.57	175.89

	Visser (2007): *Humerus* - 3-13 (±1.25)	Visser (2007): *Femur* - 3-13 (±1.24)	Visser (2007): *Tibia* - 3-13 (±0.97)	Feldesman *et al*. (1990): *Femur* - male - 12-18	Feldesman *et al*. (1990): *Femur* - female - 12-18	Feldesman (1992): *Femur*
Abu Tabari 02/1-8		125.70	123.65	109.33	110.46	112.19
Abu Tabari 02/28-2	114.77	112.84	117.33	93.66	94.62	96.11
Abu Tabari 02/28-7	162.91					
Abu Tabari 02/28-8	153.56	143.65	148.25	131.20	132.55	134.63
Abu Tabari 02/28-13						
Abu Tabari 02/28-14	99.82		118.38			
Abu Tabari 02/28-23						
Abu Tabari 03/34-1		170.58		164.00	165.68	168.29
Conical Hill 02/3-4		172.08		165.82	167.53	170.16
Djabarona 96/1-1	172.25	164.60	169.33	156.71	158.32	160.81
Djabarona 96/1-2	160.57					
Djabarona 96-4		173.57	179.88	167.64	169.37	172.03

Appendix XVI.C. Living weight

Appendix XVI.C.1. Preliminary results

	McHenry (1992) + Hartwig-Scherer (1993): weighted mean	McHenry (1992) + Hartwig-Scherer (1993): mean	McHenry (1992): mean	Hartwig-Scherer (1993): mean (without F7.-formula values)
Abu Tabari 95/2-3		47.8		47.8
Abu Tabari 02/1-2	48.2	47.6	48.9	46.3
Abu Tabari 02/1-3	45.2	45.5	45.0	46.1
Abu Tabari 02/1-5	50.8	49.2	52.4	46.1
Abu Tabari 02/1-6				
Abu Tabari 02/1-7	38.0	40.4	35.6	45.2
Abu Tabari 02/1-8	31.0	34.9	27.1	42.7
Abu Tabari 02/28-2	37.9	39.7	36.0	43.4
Abu Tabari 02/28-3	52.2	50.2	54.2	46.2
Abu Tabari 02/28-4		48.0		48.0
Abu Tabari 02/28-5	42.6	43.7	41.5	45.9
Abu Tabari 02/28-7		45.6		45.6
Abu Tabari 02/28-8	41.1	42.5	39.6	45.5
Abu Tabari 02/28-11	45.4	45.6	45.2	46.0
Abu Tabari 02/28-13				
Abu Tabari 02/28-14		43.9		43.9
Abu Tabari 02/28-15	51.5	49.8	53.3	46.3
Abu Tabari 02/28-20		46.4		46.4
Abu Tabari 02/28-21	46.7	46.5	46.8	46.3
Abu Tabari 02/28-22	50.7	49.3	52.1	46.4
Abu Tabari 02/28-23		46.1		46.1
Abu Tabari 03/31	64.6	58.9	70.3	47.6
Abu Tabari 03/34-1	40.0	41.4	38.5	44.3
Conical Hill 95/4				
Conical Hill 95/4-1				
Conical Hill 02/3-4	49.5	48.3	50.8	45.7
Djabarona 96/1-1	45.9	45.9	46.0	45.8
Djabarona 96/1-2	44.5	44.7	44.3	45.1
Djabarona 96-4	49.7	48.6	50.8	46.4
Djabarona 96/120-3				
Djabarona 96/120-4		46.5		46.5
Djabarona 96/120-5				

Appendix XVI.C.2. Equation-specific results

	McHenry (1992): (F9. · F10.)	McHenry (1992): (F9. · F10.)	Hartwig-Scherer (1993): H7a.	Hartwig-Scherer (1993): *R5(7).	Hartwig-Scherer (1993): F8.	Hartwig-Scherer (1993): T10.	Hartwig-Scherer (1993): (F9. · F10.)	Hartwig-Scherer (1993): *F10(1).	Hartwig-Scherer (1993): F7.	Hartwig-Scherer (1993): mean (*Humerus* + *Radius*)	Hartwig-Scherer (1993): mean (*Femur* + *Tibia*; without F7.-formula values)
Abu Tabari 95/2-3			47.161	47.726	48.174	48.112			45.677	47.443	48.143
Abu Tabari 02/1-2	48.847	48.873	46.367	46.494	47.249	46.807	45.322	45.332	46.449	46.431	46.177
Abu Tabari 02/1-3	44.981	44.921	46.367	46.683	46.817	47.035	44.828	44.928	45.677	46.525	45.902
Abu Tabari 02/1-5	52.342	52.452	46.642		46.516	46.377	45.735	45.103	45.677	46.642	45.933
Abu Tabari 02/1-6											
Abu Tabari 02/1-7	35.749	35.516	46.195		46.308	46.377	43.452	43.731	45.677	46.195	44.967
Abu Tabari 02/1-8	27.270	26.926			43.354	44.258	41.831	41.450	43.535		42.723
Abu Tabari 02/28-2	36.115	35.887	43.853	44.088	42.803	43.553	43.513	42.812	41.862	43.971	43.170
Abu Tabari 02/28-3	54.154	54.310	46.588		46.915	46.177	45.939	45.500	45.855	46.588	46.133
Abu Tabari 02/28-4					48.006				47.304		48.006
Abu Tabari 02/28-5	41.550	41.420	46.749	46.637	46.915	45.971	44.353	44.628	46.284	46.693	45.467
Abu Tabari 02/28-7			45.590							45.590	
Abu Tabari 02/28-8	39.675	39.509		46.301	45.651	45.865	44.076		44.312	46.301	45.198
Abu Tabari 02/28-11	45.205	45.150		46.868	46.413	47.035	44.858	44.986	46.367	46.868	45.823
Abu Tabari 02/28-13											
Abu Tabari 02/28-14			44.333		43.277	44.054			42.676	44.333	43.665
Abu Tabari 02/28-15	53.187	53.318		47.047	46.915	46.177	45.831	45.773	47.155	47.047	46.174
Abu Tabari 02/28-20			46.423							46.423	
Abu Tabari 02/28-21	46.798	46.777	46.802		46.718	47.718	45.065	45.218	46.691	46.802	46.180
Abu Tabari 02/28-22	52.096	52.200	46.907	46.958	47.155	46.572	45.707	45.388	46.849	46.932	46.205
Abu Tabari 02/28-23			46.079							46.079	
Abu Tabari 03/31	69.988	70.599			48.257		47.475	46.981	47.874		47.571
Abu Tabari 03/34-1	38.637	38.452			45.420		43.917	43.595	44.312		44.311
Conical Hill 95/4											
Conical Hill 95/4-1											
Conical Hill 02/3-4	50.750	50.821	45.462		46.718		45.551	45.218	45.310	45.462	45.829
Djabarona 96/1-1	45.971	45.933	46.367	45.897	46.095	46.899	44.958	44.868	45.120	46.132	45.705
Djabarona 96/1-2	44.307	44.233	46.195		45.181		44.738	44.254	44.097	46.195	44.724
Djabarona 96-4	50.750	50.821	46.079		47.202	47.799	45.551	45.218	45.677	46.079	46.442
Djabarona 96/120-3											
Djabarona 96/120-4			46.310		46.308	46.761			45.677	46.310	46.534
Djabarona 96/120-5											

Appendix XVI.C.3. Sub-adult results

	Visser (2007): mean
Abu Tabari 02/1-8	26.3
Abu Tabari 02/28-2	21.8
Abu Tabari 02/28-7	34.2
Abu Tabari 02/28-14	21.5

	Visser (2007): Tanner *et al*. - *Humerus* - 3-13 (±4.1)	Visser (2007): Tanner *et al*. - *Tibia* - 3-13 (±3.2)	Visser (2007): Maresh - *Humerus* - 3-13 (±0.5)	Visser (2007): Maresh - *Tibia* - 3-13 (±0.3)	Visser (2007): Maresh - *Femur* - 3-13 (±0.4)
Abu Tabari 02/1-8		22.810		30.721	25.335
Abu Tabari 02/28-2	20.682	19.113	19.680	26.599	22.855
Abu Tabari 02/28-7	33.744		34.691		
Abu Tabari 02/28-8		35.135		44.461	45.175
Abu Tabari 02/28-13					
Abu Tabari 02/28-14	20.682	19.113	19.680	26.599	
Abu Tabari 02/28-23	44.940		47.558		
Abu Tabari 03/34-1					40.215
Conical Hill 02/3-4	30.012		30.402		52.615
Djabarona 96/1-1	39.342	40.065	41.125	49.957	48.275
Djabarona 96/1-2	41.208		43.269		37.735
Djabarona 96-4	37.476	59.785	38.980	71.941	55.095

Appendix XVII. Cranial morphological traits

	CN001 - Cranial length (*Norma verticalis*)	CN002 - Cranial shape (*Norma verticalis*)	CN002a - Cranial shape (*Norma verticalis*) - main	CN002b - Cranial shape (*Norma verticalis*) - additional tendency	CN003 - Cranial height (*Norma lateralis*)	CN004 - Cranial height (*Norma occipitalis*)	CN005 - Cranial shape (*Norma occipitalis*)	CN005a - Cranial shape (*Norma occipitalis*) - main	CN005b - Cranial shape (*Norma occipitalis*) - additional tendency	CN006 - Occipital bunning	CN006a - Occipital bunning - degree	CN006b - Occipital bunning - shape
Abu Tabari 95/2-3					[(6)]					[(70)]	7	0
Abu Tabari 02/1-2												
Abu Tabari 02/1-3										(75)	7	5
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	7	75	7	5	6	8	70	7	0	45	4	5
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(6)]				[(6)]	[(6)]						
Abu Tabari 02/28-7	[(9)]				6							
Abu Tabari 02/28-8	7	76	7	6	6	7	87	8	7	72	7	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14					[(4)]							
Abu Tabari 02/28-15										(10)	1	0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	9	75	7	5	9	9	82	8	2	80	8	0
Abu Tabari 02/28-23	7	75	7	5	(5)	(5)	80	8	0	70	7	0
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	9	(70)	7	0	[(4)]	8	87	8	7	[(30)]	3	0
Conical Hill 95/4-1												
Conical Hill 02/3-4	[(8)]	[(75)]	7	5								
Djabarona 96/1-1	(6)	(75)	7	5	[(6)]	(7)	74	7	4	10	1	0
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CN001	CN002	CN002a	CN002b	CN003	CN004	CN005	CN005a	CN005b	CN006	CN006a	CN006b
♂ No.	2	2	2	2	2	1	1	1	1	2	2	2
♂ Min.	8				4	8					3	
♂ Max.	9				6	8					7	
♂ Mode			7									0
♂ Median	8.50				5.00	8.00					5.00	
♂ Mean	8.50				5.00	8.00					5.00	
♂ Freq.	(8) 1:2, 50.0%; (9) 1:2, 50.0%	(70) 1:2, 50.0%; (75) 1:2, 50.0%	(7) 2:2, 100.0%	(0) 1:2, 50.0%;(5) 1:2, 50.0%	(4) 1:2, 50.0%; (6) 1:2, 50.0%	(8) 1:1, 100.0%	(87) 1:1, 100.0%	(8) 1:1, 100.0%	(7) 1:1, 100.0%	(30) 1:2, 50.0%; (70) 1:2, 50.0%	(3) 1:2, 50.0%; (7) 1:2, 50.0%	(0) 2:2, 100.0%
♀ No.	7	5	5	5	8	6	5	5	5	7	7	7
♀ Min.	6				4	5					1	
♀ Max.	9				9	9					8	
♀ Mode	7	75	7	5	6	7		8	0	10	7	0
♀ Median	7.00				6.00	7.00					7.00	
♀ Mean	7.29				6.00	7.00					5.00	
♀ Freq.	(6) 2:7, 28.6%; (7) 3:7, 42.9%; (9) 2:7, 28.6%;	(75) 4:5, 80.0%; (76) 1:5, 20.0%;	(7) 5:5, 100.0%	(5) 4:5, 80.0%; (6) 1:5, 20.0%;	(4) 1:8, 12.5%; (5) 1:8, 12.5%; (6) 5:8, 62.5%; (9) 1:8, 12.5%	(5) 1:6, 16.7%; (6) 1:6, 16.7%; (7) 2:6, 33.3%; (8) 1:6, 16.7%; (9) 1:6, 16.7%	(70) 1:5, 20%; (74) 1:5, 20%; (80) 1:5, 20%; (82) 1:5, 20%; (87) 1:5, 20%	(7) 2:5, 40%; (8) 3:5, 60%	(0) 2:5, 40%; (2) 1:5, 20%; (4) 1:5, 20%; (7) 1:5, 20%	(10) 2:7, 28.6%; (45) 1:7, 14.3%; (70) 1:7, 14.3%; (72) 1:7, 14.3%; (75) 1:7, 14.3%; (80) 1:7, 14.3%	(1) 2:7, 28.6%; (4) 1:7, 14.3%; (7) 3:7, 42.9%; (8) 1:7, 14.3%	(0) 4:7, 57.1%; (2) 1:7, 14.3%; (5) 2:7, 28.6%
No.	9	7	7	7	10	7	6	6	6	9	9	9
Min.	6				4	5					1	
Max.	9				9	9					8	
Mode	7	75	7	5	6	8	87	8	0	70	7	0
Median	7.00				6.00	7.00					7.00	
Mean	7.56				5.80	7.14					5.00	
Freq.	(6) 2:9, 22.2%; (7) 3:9 33.3%; (8) 1:9, 11.1%; (9) 3:9, 33.3%	(70) 1:7, 14.3%; (75) 5:7, 71.4%; (76) 1:7, 14.3%	(7) 7:7, 100%	(0) 1:7, 14.3%; (5) 5:7, 71.4%; (6) 1:7, 14.3%	(4) 2:10, 20.0%; (5) 1:10, 10.0%; (6) 6:10, 60.0%; (9) 1:10, 10.0%	(5) 1:7, 14.3%;(6) 1:7, 14.3%; (8) 2:7, 28.6%; (7) 2:7, 28.6%; (9) 1:7, 14.3%	(70) 1:6, 16.7%; (74) 1:6, 16.7%; (80) 1:6, 16.7%; (82) 1:6, 16.7%; (87) 2:6, 33.3%	(7) 2:6, 33.3%; (8) 4:6, 66.7%	(0) 2:6, 33.3%; (4) 1:6, 16.7%; (2) 1:6, 16.7%; (7) 2:6, 33.3%	(10) 2:9, 22.2%; (30) 1:9, 11.1%; (45) 1:9, 11.1%; (70) 2:9, 22.2%; (72) 1:9, 11.1%; (75) 1:9, 11.1%; (80) 1:9, 11.1%	(1) 2:9, 22.2%; (3) 1:9, 11.1%; (4) 1:9, 11.1%; (7) 4:9, 44.4%; (8) 1:9, 11.1%	(0) 6:9, 66.7%; (2) 1:9, 11.1%; (5) 2:9, 22.2%;

	CN007 - Sagittal keeling	CN007a - Sagittal keeling – degree	CN007b - Sagittal keeling - shape	CN008 - *Bregma* depression	CN009 - *Tuberculum mastoideum* (l)	CN010 - *Tuberculum mastoideum* (r)	CN009/10 - *Tuberculum mastoideum* (m)	CN011 - Relative facial height	CN012 - Relative facial breadth	CN013 - Orbital geometry	CN013a - Orbital geometry - main	CN013b - Orbital geometry - additional tendency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2						5	5	[(8)]	[(8)]	13	1	3
Abu Tabari 02/1-3						(6)	6					
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	55	5	5	4	(2)		2		[(6)]	(10)	1	0
Abu Tabari 02/28-3										[(30)]	3	0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	[(10)]	1	0	[(2)]	(1)		1	6	4	12	1	2
Abu Tabari 02/28-7				(3)								
Abu Tabari 02/28-8	60	6	0	(1)	1		1	[(8)]		[(30)]	3	0
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15								[(8)]	[(7)]			
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	70	7	0	(4)		[(1)]	1	(9)	[(8)]	[(13)]	1	3
Abu Tabari 02/28-23	65	6	5	5				[(9)]	[(9)]	[(30)]	3	0
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	95	9	5	[(4)]								
Conical Hill 95/4-1												
Conical Hill 02/3-4								[(9)]	[(8)]			
Djabarona 96/1-1	(30)	3	0	[(2)]					[(7)]	[(30)]	3	0
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5					[(1)]		1					

	CN007	CN007a	CN007b	CN008	CN009	CN010	CN009/10	CN011	CN012	CN013	CN013a	CN013b
♂ No.	1	1	1	1	0	0	0	1	1	0	0	0
♂ Min.		9		4				9	8			
♂ Max.		9		4				9	8			
♂ Mode												
♂ Median		9.00		4.00				9.00	8.00			
♂ Mean		9.00		4.00				9.00	8.00			
♂ Freq.	(95) 1:1, 100.0%	(9) 1:1, 100.0%	(5) 1:1, 100.0%	(4) 1:1, 100.0%				(9) 1:1, 100.0%	(8) 1:1, 100.0%			
♀ No.	6	6	6	7	4	3	7	6	7	8	8	8
♀ Min.		1		1	1	1	1	6	4			
♀ Max.		7		5	2	6	6	9	9			
♀ Mode		6	0	4	1		1	8	8	30	1	0
♀ Median		5.50		3.00	1.00	5.00	1.00	8.00	7.00			
♀ Mean		4.67		3.00	1.25	4.00	2.43	8.00	7.00			
♀ Freq.	(10) 1:6, 16.7%; (30) 1:6, 16.7%; (55) 1:6, 16.7%; (60) 1:6, 16.7%; (65) 1:6, 16.7%; (70) 1:6, 16.7%	(1) 1:6, 16.7%; (3) 1:6, 16.7%; (5) 1:6, 16.7%; (6) 2:6, 33.3%; (7) 1:6, 16.7%	(0) 4:6, 66.7%; (5) 2:6, 33.3%	(1) 1:7, 14.3%; (2) 2:7, 28.6%; (3) 1:7, 14.3%; (4) 2:7, 28.6%; (5) 1:7, 14.3%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 1:3, 33.3%; (5) 1:3, 33.3%; (6) 1:3, 33.3%	(1) 4:7, 57.1%; (2) 1:7, 14.3%; (5) 1:7, 14.3%; (6) 1:7, 14.3%	(6) 1:6, 16.7%; (8) 3:6, 50.0%; (9) 2:6, 33.3%	(4) 1:7, 14.3%; (6) 1:7, 14.3%; (7) 2:7, 28.6%; (8) 2:7, 28.6%; (9) 1:7, 14.3%	(10) 1:8, 12.5%; (12) 1:8, 12.5%; (13) 2:8, 25.0%; (30) 4:8, 50%	(1) 4:8, 50%; (3) 4:8, 50%	(0) 5:8, 62.5%; (2) 1:8, 12.5%%; (3) 2:8, 25.0%
No.	7	7	7	8	4	3	7	7	8	8	8	8
Min.		1		1	1	1	1	6	4			
Max.		9		5	2	6	6	9	9			
Mode		6	0	4	1		1	8	8	30	1	0
Median		6.00		3.50	1.00	5.00	1.00	8.00	7.50			
Mean		5.29		3.13	1.25	4.00	2.43	8.14	7.13			
Freq.	(10) 1:7, 14.3%; (30) 1:7, 14.3%; (55) 1:7, 14.3%; (60) 1:7, 14.3%; (65) 1:7, 14.3%; (70) 1:7, 14.3%; (95) 1:7, 14.3%	(1) 1:7, 14.3%; (3) 1:7, 14.3%; (5) 1:7, 14.3%; (6) 2:7, 28.6%; (7) 1:7, 14.3%; (9) 1:7, 14.3%	(0) 4:7, 57.1%; (5) 3:7, 42.9%	(1) 1:8, 12.5%; (2) 2:8, 25.0%; (3) 1:8, 12.5%; (4) 3:8, 37.5%; (5) 1:8, 12.5%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 1:3, 33.3%; (5) 1:3, 33.3%; (6) 1:3, 33.3%	(1) 4:7, 57.1%; (2) 1:7, 14.3%; (5) 1:7, 14.3%; (6) 1:7, 14.3%	(6) 1:7, 14.3%; (8) 3:7, 42.9%; (9) 3:7, 42.9%	(4) 1:8, 12.5%; (6) 1:8, 12.5%; (7) 2:8, 25.0%; (8) 3:8, 37.5%; (9) 1:8, 12.5%	(10) 1:8, 12.5%; (12) 1:8, 12.5%; (13) 2:8, 25.0%; (30) 4:8, 50%	(1) 4:8, 50%; (3) 4:8, 50%	(0) 5:8, 62.5%; (2) 1:8, 12.5%%; (3) 2:8, 25.0%

	CN014 - Malar prominence (upper facial flatness)	CN015 - Course of the *Sutura zygomatico maxillaris*	CN016 - Interorbital breadth	CN017 - Shape of the *Sella nasi*	CN017a - Shape of the *Sella nasi* - main	CN017b - Shape of the *Sella nasi* - additional tendency/s uperstructu re	CN018 - Interorbital projection	CN019 - Orientation of the *Processus frontales maxillae*	CN020 - Nasal profile	CN021 - Relative nasal breadth	CN022 - *Spina nasalis anterior*	CN023 - *Margo infranasalis*
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(6)]	(3)								(1)	[(2)]	33
Abu Tabari 02/1-3		(3)		[(10)]	1	0		[(3)]		[(1)]		(30)
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	[(3)]	1	[(7)]					[(4)]		[(1)]		30
Abu Tabari 02/28-3	[(7)]			[(10)]	1	0	[(1)]	[(3)]		[(1)]		(30)
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(7)	(3)	9	(17)	1	7	1	2	[(12)]	(1)		[(30)]
Abu Tabari 02/28-7	[(6)]											
Abu Tabari 02/28-8	[(5)]		[(8)]	(10)	1	0	1	[(3)]				
Abu Tabari 02/28-11			(9)	(10)	1	0	1	2				
Abu Tabari 02/28-13				[(10)]	1	0	[(1)]	[(2)]				
Abu Tabari 02/28-14							[(1)]			[(1)]		
Abu Tabari 02/28-15	[(6)]			[(20)]	2	0	[(1)]	[(4)]		(1)	[(2)]	30
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(7)]	[(3)]								[(2)]		[(30)]
Abu Tabari 02/28-22	5	(3)	9	(20)	2	0	[(2)]	4				
Abu Tabari 02/28-23	[(6)]	[(1)]					(1)				[(2)]	40
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4										(1)		[(30)]
Conical Hill 95/4-1												
Conical Hill 02/3-4	[(5)]							[(3)]				[(30)]
Djabarona 96/1-1		[(3)]	[(9)]	[(28)]	2	8		[(4)]		[(2)]		[(33)]
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4			[(9)]	[(10)]	1	0	[(1)]					
Djabarona 96/120-5										[(1)]		[(10)]

	CN014	CN015	CN016	CN017	CN017a	CN017b	CN018	CN019	CN020	CN021	CN022	CN023
♂ No.	1	0	2	2	2	2	2	2	0	1	0	2
♂ Min.	5		9				1	2		1		
♂ Max.	5		9				1	3		1		
♂ Mode			9	10	1	0	1					30
♂ Median	5.00		9.00				1.00	2.50		1.00		
♂ Mean	5.00		9.00				1.00	2.50		1.00		
♂ Freq.	(5) 1:1, 100.0%		(9) 2:2, 100%	(10) 2:2, 100.0%	(1) 2:2, 100.0%	(0) 2:2, 100.0%	(1) 2:2, 100.0%	(2) 1:2, 50.0%; (3) 1:2, 50.0%		(1) 1:1, 100.0%		(30) 2:2, 100.0%
♀ No.	10	8	5	7	7	7	7	8	1	10	3	10
♀ Min.	3		7				1	2		1	2	
♀ Max.	7		9				2	4		2	2	
♀ Mode	6	3	9	10	1	0	1	4		1	2	30
♀ Median	6.00		9.00				1.00	3.50		1.00	2.00	
♀ Mean	5.80		8.40				1.14	3.38		1.20	2.00	
♀ Freq.	(3) 1:10, 10.0%; (5) 2:10, 20.0%; (6) 4:10, 40.0%; (7) 3:10, 30.0%	(1) 2:8, 25.0%; (3) 6:8, 75.0%	(7) 1:5, 20.0%; (8) 1:5, 20.0%; (9) 3:5, 60.0%	(10) 3:7, 42.9%; (17) 1:7, 14.3%; (20) 2:7, 28.6%; (28) 1:7, 14.3%	(1) 4:7, 57.1%; (2) 3:7, 42.9%	(0) 5:7, 71.4%; (7) 1:7, 14.3%; (8) 1:7, 14.3%	(1) 6:7, 85.7%; (2) 1:7, 14.3%	(2) 1:8, 12.5%; (3) 3:8, 37.5%; (4) 4:8, 50%	(12) 1:1, 100.0%	(1) 8:10, 80.0%; (2) 2:10, 20.0%	(2) 3:3, 100.0%	(10) 1:10, 10.0%; (30) 6:10, 60.0%; (33) 2:10, 10.0%; (40) 1:10, 10.0%
No.	11	8	7	10	10	10	10	11	1	11	3	12
Min.	3		7				1	2		1	2	
Max.	7		9				2	4		2	2	
Mode	6	3	9	10	1	0	1	3		1	2	30
Median	6.00		9.00				1.00	3.00		1.00	2.00	
Mean	5.73		8.57				1.10	3.09		1.18	2.00	
Freq.	(3) 1:11, 9.1%; (5) 3:11, 27.3%; (6) 4:11, 36.4%; (7) 3:11, 27.3%	(1) 2:8, 25.0%; (3) 6:8, 75.0%	(7) 1:7, 14.3%; (8) 1:7, 14.3%; (9) 5:7, 71.4%	(10) 6:10, 60.0%; (17) 1:10, 10.0%; (20) 2:10, 20.0%; (28) 1:10, 10.0%	(1) 7:10, 70.0%; (2) 3:10, 30.0%;	(0) 8:10, 80.0%; (7) 1:10, 10.0%; (8) 1:10, 10.0%	(1) 9:10, 90.0%; (2) 1:10, 10.0%	(2) 3:11, 27.3%; (3) 4:11, 36.4%; (4) 4:11, 36.4%	(12) 1:1, 100.0%	(1) 9:11, 81.8%; (2) 2:11, 18.2%	(2) 3:3, 100.0%	(10) 1:12, 8.3%; (30) 8:12, 66.7%; (33) 2:12, 16.6%; (40) 1:12, 8.3%

	CN023a - *Margo infranasalis* - main	CN023b - *Margo infranasalis* - additional tendency/degree	CN024 - Alveolar prognathism	CN025 - Dental arch breadth	CN026 - Dental arch shape	CN027 - *Sutura palatina transversa*	CN028 - Symphyseal height	CN029 - Ramus geometry	CN030 - Ramus shape	CN031 - Ramus inversion	CN032 - Ramus angle
Abu Tabari 95/2-3											
Abu Tabari 02/1-2	3	3	7	(7)	(5)		6	3	3	1	(5)
Abu Tabari 02/1-3	3	0	7	[(6)]	[(4)]		8				[(5)]
Abu Tabari 02/1-5											
Abu Tabari 02/1-6											
Abu Tabari 02/1-7			[(8)]				9				
Abu Tabari 02/1-8							[(7)]				
Abu Tabari 02/28-2	3	0	[(8)]	[(4)]	[(5)]		[(7)]	[(2)]	[(1)]	[(7)]	(5)
Abu Tabari 02/28-3	3	0	[(8)]	[(9)]	[(3)]		[(8)]	[(3)]	(2)	[(4)]	[(7)]
Abu Tabari 02/28-4											
Abu Tabari 02/28-5	3	0	8	(3)	(5)		5	3	2	(6)	(6)
Abu Tabari 02/28-7			[(8)]	[(8)]	(5)						
Abu Tabari 02/28-8			7				(8)	[(7)]		[(4)]	[(5)]
Abu Tabari 02/28-11											
Abu Tabari 02/28-13											
Abu Tabari 02/28-14			[(8)]		[(3)]		(9)				
Abu Tabari 02/28-15	3	0	8	4	6		8	7	2	(5)	(5)
Abu Tabari 02/28-20										[(7)]	
Abu Tabari 02/28-21	3	0	8	[(3)]	[(6)]		[(7)]	(4)	2	[(5)]	[(5)]
Abu Tabari 02/28-22			7	(7)	(5)		9	(2)	(2)	9	(7)
Abu Tabari 02/28-23	4	0	7	2	(4)		5	2	3	(8)	(6)
Abu Tabari 03/31											
Abu Tabari 03/34-1											
Conical Hill 95/4	3	0	[(8)]	(5)	5	[5 (l); 1 (r)]	9			8	[(4)]
Conical Hill 95/4-1											
Conical Hill 02/3-4	3	0	[(8)]	[(5)]	[(5)]		[(8)]				
Djabarona 96/1-1	3	3	[(8)]	(1)	(5)		(8)	6	[(2)]	[(6)]	(9)
Djabarona 96/1-2											
Djabarona 96-4											
Djabarona 96/120-3											
Djabarona 96/120-4											
Djabarona 96/120-5	1	0	[(8)]				[(6)]				[(6)]

	CN023a	CN023b	CN024	CN025	CN026	CN027	CN028	CN029	CN030	CN031	CN032
♂ No.	2	2	3	2	2	1	3	0	0	2	1
♂ Min.			8	5			8			7	4
♂ Max.			8	5			9			8	4
♂ Mode	3	0	8	5	5		9				
♂ Median			8.00	5.00			9.00			7.50	4.00
♂ Mean			8.00	5.00			8.67			7.50	4.00
♂ Freq.	(3) 2:2, 100.0%	(0) 2:2, 100.0%	(8) 3:3, 100.0%	(5) 2:2, 100.0%	(5) 2:2, 100.0%	(6) 1:1, 100.0%	(8) 1:3, 33.3%; (9) 2:3, 66.7%			(7) 1:2, 50.0%; (8) 1:2, 50.0%	(4) 1:1, 100.0%
♀ No.	10	10	14	11	12	0	14	10	9	10	12
♀ Min.			7	1			5	2	1	1	5
♀ Max.			8	9			9	7	3	9	9
♀ Mode	3	0	8	7	5		8	3	2	4	5
♀ Median			8.00	4.00			7.50	3.00	2.00	5.50	5.50
♀ Mean			7.64	4.91			7.21	3.90	2.11	5.50	5.92
♀ Freq.	(1) 1:10, 10.0%; (3) 8:10, 60.0%; (4) 1:10, 10.0%	(0) 8:10, 80.0%; (3) 2:10, 10.0%	(7) 5:14, 35.7%; (8) 9:14, 64.3%	(1) 1:11, 9.1%; (2) 1:11, 9.1%; (3) 2:11, 18.2%; (4) 2:11, 18.2%; (6) 1:11, 9.1%; (7) 2:11, 18.2%; (8) 1:11, 9.1%; (9) 1:11, 9.1%	(3) 2:12, 16.7%; (4) 2:12, 16.7%; (5) 6:12, 50.0%; (6) 2:12, 16.7%		(5) 2:14, 14.3%; (6) 2:14, 14.3%; (7) 3:14, 21.4; (8) 5:14, 35.7%; (9) 2:14, 14.3%	(2) 3:10, 30.0%; (3) 3:10, 30.0%; (4) 1:10, 10.0%; (6) 1:10, 10.0%; (7) 2:10, 20.0%	(1) 1:9, 11.1%; (2) 6:9, 66.7%; (3) 2:9, 22.2%	(1) 1:10, 10.0%; (4) 2:10, 20.0%; (5) 2:10, 20.0%; (6) 2:10, 20.0%; (7) 1:10, 10.0%; (8) 1:10, 10.0%; (9) 1:10, 10.0%	(5) 6:12, 50.0%; (6) 3:12, 25.0%; (7) 2:12, 16.7%; (9) 1:12, 8.3%
No.	12	12	17	13	14	1	17	10	9	12	13
Min.			7	1			5	2	1	1	4
Max.			8	9			9	7	3	9	9
Mode	3	0	8	7	5		8	3	2	7	5
Median			8.00	5.00			8.00	3.00	2.00	6.00	5.00
Mean			7.71	4.92			7.47	3.90	2.11	5.83	5.77
Freq.	(1) 1:12, 8.3%; (3) 10:12, 83.3%; (4) 1:12, 8.3%	(0) 10:12, 83.3%; (3) 2:12, 16.6%	(7) 5:17, 29.4%; (8) 12:17, 70.6%	(1) 1:13, 7.7%; (2) 1:13, 7.7%; (3) 2:13, 15.4%; (4) 2:13, 15.4%; (5) 2:13, 15.4%; (6) 1:13, 7.7%; (7) 2:13, 15.4%; (8) 1:13, 7.7%; (9) 1:13, 7.7%	(3) 2:14, 14.3%; (4) 2:14, 14.3%; (5) 8:14, 57.1%; (6) 2:14, 14.3%	(6) 1:1, 100.0%	(5) 2:17, 11.8%; (6) 2:17, 11.8%; (7) 3:17, 17.6%; (8) 6:17, 35.3%; (9) 4:17, 23.5%	(2) 3:10, 30.0%; (3) 3:10, 30.0%; (4) 1:10, 10.0%; (6) 1:10, 10.0%; (7) 2:10, 20.0%	(1) 1:9, 11.1%; (2) 6:9, 66.7%; (3) 2:9, 22.2%	(1) 1:12, 8.3%; (4) 2:12, 16.7%; (5) 2:12, 16.7%; (6) 2:12, 16.7%; (7) 2:12, 16.7%; (8) 2:12, 16.7%; (9) 1:12, 8.3%	(4) 1:13, 7.7%; (5) 6:13, 46.2%; (6) 3:13, 23.1%; (7) 2:13, 15.4%; (9) 1:13, 7.7%

Appendix XVIII. Epigenetic traits

Appendix XVIII.A. Cranial epigenetic traits

	CE001 - *Ossa suturae coronalis*	CE002 - *Ossa suturae sagittalis*	CE003 - *Ossa suturae lambdoidae*	CE004 - *Ossa suturae squamosae* (l)	CE005 - *Ossa suturae squamosae* (r)	CE004/5 - *Ossa suturae squamosae* (m)	CE006 - *Os bregmaticum*	CE007 - *Os lambdae*	CE008 - *Os epiptericum* (l)	CE009 - *Os epiptericum* (r)	CE008/9 - *Os epiptericum* (m)	CE010 - *Os astericum* (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(1)											
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(1)	1	2	(1)		1	1	1	2		2	2
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(1)	(1)	(1)	(1)	(1)	1	1					(2)
Abu Tabari 02/28-7												
Abu Tabari 02/28-8	(1)	[(1)]	[(1)]				1					1
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	[(1)]	[(1)]	(1)	[(1)]		1		1				(1)
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												[(1)]
Abu Tabari 02/28-22	(1)	(1)	2	(1)		1	1	(2)		(1)	1	(2)
Abu Tabari 02/28-23	[(1)]	(1)		(1)	(1)	1	1	[(2)]				
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	[(1)]	(1)	[(1)]	[(1)]		1	(1)					[(1)]
Conical Hill 95/4-1												
Conical Hill 02/3-4			[(2)]									
Djabarona 96/1-1	(1)	(1)	2				1	(1)				[(1)]
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE001	CE002	CE003	CE004	CE005	CE004/5	CE006	CE007	CE008	CE009	CE008/9	CE010
♂ No.	2	2	3	2	0	2	2	1	1	0	1	2
♂ Min.												
♂ Max.												
♂ Mode	1	1	2	1		1	1					
♂ Median												
♂ Mean												
♂ Freq.	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 1:1, 100.0%	(2) 1:1, 100.0%		(2) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%
♀ No.	7	6	5	4	2	4	5	4	0	1	1	6
♀ Min.												
♀ Max.												
♀ Mode	1	1	1	1	1	1	1	1				1
♀ Median												
♀ Mean												
♀ Freq.	(1) 7:7, 100.0%	(1) 6:6, 100.0%	(1) 3:5, 60.0%; (2) 2:5, 40.0%	(1) 4:4, 100.0%	(1) 2:2, 100.0%	(1) 4:4, 100.0%	(1) 5:5, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 4:6, 66.7%; (2) 2:6, 33.3%
No.	9	8	8	6	2	6	7	5	1	1	2	8
Min.												
Max.												
Mode	1	1	2	1	1	1	1	1				1
Median												
Mean												
Freq.	(1) 9:9, 100.0%	(1) 8:8, 100.0%	(1) 4:8, 50.0%; (2) 4:8, 50.0%	(1) 6:6, 100.0%	(1) 2:2, 100.0%	(1) 6:6, 100.0%	(1) 7:7, 100.0%	(1) 3:5, 60.0%; (2) 2:5, 40.0%	(2) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 5:8, 62.5%; (2) 3:8, 37.5%

	CE011 - *Os asterícum* (r)	CE010/11 - *Os asterícum* (m)	CE012 - *Os incisurae parietalis* (l)	CE013 - *Os incisurae parietalis* (r)	CE012/13 - *Os incisurae parietalis* (m)	CE014 - *Os incae*	CE015 - *Os incisivum/Sutura incisiva*	CE016 - *Os japonicum* (l)	CE017 - *Os japonicum* (r)	CE016/17 - *Os japonicum* (m)	CE018 - *Os squamosum* (l)	CE019 - *Os squamosum* (r)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2							1		1	1		
Abu Tabari 02/1-3						(1)	1	1		1		
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		2	1		1	2	2	1	(1)	1	(1)	
Abu Tabari 02/28-3								1		1		
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		2	(1)		1			1	1	1	(1)	
Abu Tabari 02/28-7						[(1)]		(1)		1		
Abu Tabari 02/28-8		1	(1)		1	1		[(1)]		1	[(1)]	
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(1)	1				1	1					
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		1					(1)	1		1	(1)	
Abu Tabari 02/28-22	2	2	1	2	2	1		1	1	1	(1)	
Abu Tabari 02/28-23						[(1)]	(3)		1	1		
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		1	(1)		1	[(1)]	3				[(1)]	
Conical Hill 95/4-1												
Conical Hill 02/3-4						[(1)]	[(1)]	(1)	(1)	1		
Djabarona 96/1-1		1				1	[(1)]	1	1	1		
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE011	CE010/11	CE012	CE013	CE012/13	CE014	CE015	CE016	CE017	CE016/17	CE018	CE019
♂ No.	0	2	2	0	2	3	3	2	2	2	2	0
♂ Min.												
♂ Max.												
♂ Mode			1		1	1		1	1	1	1	
♂ Median												
♂ Mean												
♂ Freq.		(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	
♀ No.	2	6	3	1	3	7	6	8	5	10	4	0
♀ Min.												
♀ Max.												
♀ Mode		1	1		1	1	1	1	1	1	1	
♀ Median												
♀ Mean												
♀ Freq.	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 4:6, 66.7%; (2) 2:6, 33.3%	(1) 3:3, 100.0%	(2) 1:1, 100.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 7:7, 100.0%	(1) 5:6, 83.3%; (3) 1:6, 16.7%	(1) 8:8, 100.0%	(1) 5:5, 100.0%	(1) 10:10, 100.0%	(1) 4:4, 100.0%	
No.	2	8	5	1	5	10	9	10	7	12	6	0
Min.												
Max.												
Mode		1	1		1	1	1	1	1	1	1	
Median												
Mean												
Freq.	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 5:8, 62.5%; (2) 3:8, 37.5%	(1) 5:5, 100.0%	(2) 1:1, 100.0%	(1) 4:5, 80.0%; (2) 1:5, 20.0%	(1) 9:10, 90.0%; (2) 1:10, 10.0%	(1) 6:9, 66.7%; (2) 1:9, 11.1%; (3) 2:9, 22.2%	(1) 10:10, 100.0%	(1) 7:7, 100.0%	(1) 12:12, 100.0%	(1) 6:6, 100.0%	

	CE018/19 - *Os squamosum* (m)	CE020 - *Os metopicum*	CE021 - *Sutura metopica*	CE022 - *Fissura metopica*	CE023 - *Sutura parietalis* (l)	CE024 - *Sutura parietalis* (r)	CE023/24 - *Sutura parietalis* (m)	CE025 - *Sutura occipitalis*	CE026 - *Sutura zygomatica* (l)	CE027 - *Sutura zygomatica* (r)	CE026/27 - *Sutura zygomatica* (m)	CE028 - *Sutura fronto-temporalis* (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2										1	1	
Abu Tabari 02/1-3		(1)	1	(1)				(1)	(1)		1	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	1	1	1		1	1	1	1	1	(1)	1	
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1	(1)	(1)	1	1	1	1		1	1	1	
Abu Tabari 02/28-7				(1)	1		1	1	(1)		1	
Abu Tabari 02/28-8	1	1	1	(1)	1	1	1	1	[(1)]		1	
Abu Tabari 02/28-11		1	1	1								
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15					(1)		1	1				
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	1								1		1	[(1)]
Abu Tabari 02/28-22	1	1	1	1	1	1	1	1	1	1	1	
Abu Tabari 02/28-23		1	1		1	(1)	1	(1)		1	1	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	1	(1)	(1)		(1)	[(1)]	1	[(1)]				
Conical Hill 95/4-1												
Conical Hill 02/3-4			[(1)]	1				1	(1)	(1)	1	
Djabarona 96/1-1		1	1		(1)	(1)	1	1	1	1	1	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4			(1)	1								
Djabarona 96/120-5												

	CE018/19	CE020	CE021	CE022	CE023	CE024	CE023/24	CE025	CE026	CE027	CE026/27	CE028
♂ No.	2	3	5	3	2	2	2	3	2	2	2	0
♂ Min.												
♂ Max.												
♂ Mode	1	1	1	1	1	1	1	1	1	1	1	
♂ Median												
♂ Mean												
♂ Freq.	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 5:5, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	
♀ No.	4	6	6	5	7	5	7	7	7	5	9	1
♀ Min.												
♀ Max.												
♀ Mode	1	1	1	1	1	1	1	1	1	1	1	
♀ Median												
♀ Mean												
♀ Freq.	(1) 4:4, 100.0%	(1) 6:6, 100.0%	(1) 6:6, 100.0%	(1) 5:5, 100.0%	(1) 7:7, 100.0%	(1) 5:5, 100.0%	(1) 7:7, 100.0%	(1) 7:7, 100.0%	(1) 7:7, 100.0%	(1) 5:5, 100.0%	(1) 9:9, 100.0%	(1) 1:1, 100.0%
No.	6	9	11	8	9	7	9	10	9	7	11	1
Min.												
Max.												
Mode	1	1	1	1	1	1	1	1	1	1	1	
Median												
Mean												
Freq.	(1) 6:6, 100.0%	(1) 9:9, 100.0%	(1) 11:11, 100.0%	(1) 8:8, 100.0%	(1) 9:9, 100.0%	(1) 7:7, 100.0%	(1) 9:9, 100.0%	(1) 10:10, 100.0%	(1) 9:9, 100.0%	(1) 7:7, 100.0%	(1) 11:11, 100.0%	(1) 1:1, 100.0%

	CE029 - *Sutura fronto-temporalis* (r)	CE028/29 - *Sutura fronto-temporalis* (m)	CE030 - *Foramen parietale* (l)	CE031 - *Foramen parietale* (r)	CE030/31 - *Foramen parietale* (m)	CE030a - *Foramen parietale* (l) - presence	CE031a - *Foramen parietale* (r) - presence	CE030a/31 a - *Foramen parietale* (m) - presence	CE030b - *Foramen parietale* (l) - number	CE031b - *Foramen parietale* (r) - number	CE030a/31 b - *Foramen parietale* (m) - number	CE032 - *Foramen mastoideum* (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2												
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			(10)	(10)	10	1	1	1	0	0	0	(1)
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(21)	21		2	2		1	1	
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												[(1)]
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		1										
Abu Tabari 02/28-22												(2)
Abu Tabari 02/28-23				(21)	21		2	2		1	1	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE029	CE028/29	CE030	CE031	CE030/31	CE030a	CE031a	CE030a/31a	CE030b	CE031b	CE030a/31b	CE032
♂ No.	0	0	1	1	1	1	1	1	1	1	1	1
♂ Min.									0	0	0.0	
♂ Max.									0	0	0.0	
♂ Mode												
♂ Median									0.00	0.00	0.00	
♂ Mean									0.00	0.00	0.00	
♂ Freq.			(10) 1:1, 100.0%	(10) 1:1, 100.0%	(10) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(0) 1:1, 100.0%	(0) 1:1, 100.0%	(0) 1:1, 100.0%	(1) 1:1, 100.0%
♀ No.	0	1	0	2	2	0	2	2	0	2	2	2
♀ Min.										1	1.0	
♀ Max.										1	1.0	
♀ Mode				21	21		2	2		1	1.0	
♀ Median										1.00	1.00	
♀ Mean										1.00	1.00	
♀ Freq.		(1) 1:1, 100.0%		(21) 2:2, 100.0%	(21) 2:2, 100.0%		(2) 2:2, 100.0%	(2) 2:2, 100.0%		(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 1:2, 100.0%; (2) 1:2, 100.0%
No.	0	1	1	3	3	1	3	3	1	3	3	3
Min.									0	0	0.0	
Max.									0	1	1.0	
Mode				21	21		2	2		1	1.0	1
Median									0.00	1.00	1.00	
Mean									0.00	0.67	0.67	
Freq.		(1) 1:1, 100.0%	(10) 1:1, 100.0%	(10) 1:3, 33.3%; (21) 2:3, 66.7%	(10) 1:3, 33.3%; (21) 2:3, 66.7%	(1) 1:1, 100%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 1:1, 100.0%	(0) 1:3, 33.3%; (1) 2:3, 66.7%	(0) 1:3, 33.3%; (1) 2:3, 66.7%	(1) 2:3, 66.7%; (2) 1:3, 33.3%

	CE033 - *Foramen mastoideum* (r)	CE032/33 - *Foramen mastoideum* (m)	CE034 - *Canalis condylaris* (l)	CE035 - *Canalis condylaris* (r)	CE034/35 - *Canalis condylaris* (m)	CE036 - *Foramen supraorbitale* (l)	CE037 - *Foramen supraorbitale* (r)	CE036/37 - *Foramen supraorbitale* (m)	CE038 - *Foramen frontale* (l)	CE039 - *Foramen frontale* (r)	CE038/39 - *Foramen frontale* (m)	CE038a - *Foramen frontale* (l) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2										(10)	10	
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		1				(2)		2	10		10	1
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5						4	(4)	4	21	21	21	2
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		1										
Abu Tabari 02/28-11							(2)	2	[(10)]	[(10)]	10	1
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22		2				1	(4)	4	(10)	(21)	21	1
Abu Tabari 02/28-23			[(2)]	2	2							
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE033	CE032/33	CE034	CE035	CE034/35	CE036	CE037	CE036/37	CE038	CE039	CE038/39	CE038a
♂ No.	0	1	0	0	0	1	1	2	2	1	2	2
♂ Min.												
♂ Max.												
♂ Mode								2	10		10	1
♂ Median												
♂ Mean												
♂ Freq.		(1) 1:1, 100.0%				(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 2:2, 100.0%	(10) 2:2, 100.0%	(10) 1:1, 100.0%	(10) 2:2, 100.0%	(1) 2:2, 100.0%
♀ No.	0	2	1	1	1	2	2	2	2	3	3	2
♀ Min.												
♀ Max.												
♀ Mode							4	4		21	21	
♀ Median												
♀ Mean												
♀ Freq.		(1) 1:2, 100.0%; (2) 1:2, 100.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(1) 1:2, 50.0%; (4) 1:2, 50.0%	(4) 2:2, 100.0%	(4) 2:2, 100.0%	(10) 1:2, 50.0%; (21) 1:2, 50.0%	(10) 1:3, 33.3%; (21) 2:3, 66.7%	(10) 1:3, 33.3%; (21) 2:3, 66.7%	(1) 1:2, 50.0%; (2) 1:2, 50.0%
No.	0	3	1	1	1	3	3	4	4	4	5	4
Min.												
Max.												
Mode		1					4	2	10	10	10	1
Median												
Mean												
Freq.		(1) 2:3, 66.7%; (2) 1:3, 33.3%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (4) 1:3, 33.3%	(2) 1:3, 33.3%; (4) 2:3, 66.7%	(2) 2:4, 50.0%; (4) 2:4, 50.0%	(10) 3:4, 75.0%; (21) 1:4, 25.0%	(10) 2:4, 50.0%; (21) 2:4, 50.0%	(10) 3:5, 60.0%; (21) 2:5, 40.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%

	CE039a - *Foramen frontale* (r) - presence	CE038a/39 a - *Foramen frontale* (m) - presence	CE038b - *Foramen frontale* (l) - number	CE039b - *Foramen frontale* (r) - number	CE038b/39 b - *Foramen frontale* (m) - number	CE040 - *Foramen zygomatico faciale* (l)	CE041 - *Foramen zygomatico faciale* (r)	CE040/41 - *Foramen zygomatico faciale* (m)	CE040a - *Foramen zygomatico faciale* (l) - presence	CE041a - *Foramen zygomatico faciale* (r) - presence	CE040a/41 a - *Foramen zygomatico faciale* (m) - presence	CE040b - *Foramen zygomatico faciale* (l) - number
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1		0	0		21	21		2	2	
Abu Tabari 02/1-3						10		10	1		1	0
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		1	0		0	22		22	2		2	2
Abu Tabari 02/28-3						[(22)]		22	2		2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2	2	1	1	1	22	22	22	2	2	2	2
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11	1	1	0	0	0							
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21						[(22)]		22	2		2	2
Abu Tabari 02/28-22	2	2	0	1	1	23	(22)	22.5	2	2	2	3
Abu Tabari 02/28-23							21	21		2	2	
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE039a	CE038a/39a	CE038b	CE039b	CE038b/39b	CE040	CE041	CE040/41	CE040a	CE041a	CE040a/41a	CE040b
♂ No.	1	2	2	1	2	1	0	1	1	0	1	1
♂ Min.			0	0	0.0							2
♂ Max.			0	0	0.0							2
♂ Mode		1	0		0.0							
♂ Median			0.00	0.00	0.00							2.00
♂ Mean			0.00	0.00	0.00							2.00
♂ Freq.	(1) 1:1, 100.0%	(1) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 1:1, 100.0%	(0) 2:2, 100.0%	(22) 1:1, 100.0%		(22) 1:1, 100.0%	(2) 1:1, 100.0%		(2) 1:1, 100.0%	(2) 1:1, 100.0%
♀ No.	3	3	2	3	3	5	4	7	5	4	7	5
♀ Min.			0	0	0.0							0
♀ Max.			1	1	1.0							3
♀ Mode	2	2		1	1.0	22	21	22	2	2	2	2
♀ Median			0.50	1.00	1.00							2.00
♀ Mean			0.50	0.67	0.67							1.80
♀ Freq.	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 1:2, 50.0%; (1) 1:2, 50.0%	(0) 1:3, 33.3%; (1) 2:3, 66.7%	(0) 1:3, 33.3%; (1) 2:3, 66.7%	(10) 1:5, 20.0%; (22) 3:5, 60.0%; (23) 1:5, 20.0%	(21) 2:4, 50.0%; (22) 2:4, 50.0%	(10) 1:7, 14.3%; (21) 2:7, 28.6%; (22) 3:7, 42.9%; (22.5) 1:7, 14.3%	(1) 1:5, 20.0%; (2) 4:5, 80.0%	(2) 4:4, 100.0%	(1) 1:7, 14.3%; (2) 6:7, 85.7%	(0) 1:5, 20.0%; (2) 3:5, 60.0%; (3) 1:5, 20.0%
No.	4	5	4	4	5	6	4	8	6	4	8	6
Min.			0	0	0.0							0
Max.			1	1	1.0							3
Mode	1	1	0	0	0.0	22	21	22	2	2	2	2
Median			0.00	0.50	0.00							2.00
Mean			0.25	0.50	0.40							1.83
Freq.	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(1) 3:5, 60.0%; (2) 2:5, 40.0%	(0) 3:4, 75.0%; (1) 1:4, 25.0%	(0) 2:4, 50.0%; (1) 2:4, 50.0%	(0) 3:5, 60.0%; (1) 2:5, 40.0%	(10) 1:6, 16.7%; (22) 4:6, 66.7%; (23) 1:6, 16.7%	(21) 2:4, 50.0%; (22) 2:4, 50.0%	(10) 1:8, 12.5%; (21) 2:8, 25.0%; (22) 4:8, 50.0%; (22.5) 1:8, 12.5%	(1) 1:6, 16.7%; (2) 5:6, 83.3%	(2) 4:4, 100.0%	(1) 1:8, 12.5%; (2) 7:8, 87.5%	(0) 1:6, 16.7%; (2) 4:6, 66.7%; (3) 1:6, 16.7%

	CE041b - *Foramen zygomatico faciale* (r) - number	CE040b/41 b - *Foramen zygomatico faciale* (m) - number	CE042 - *Foramen ethmoidale posterius* (l)	CE043 - *Foramen ethmoidale posterius* (r)	CE042/43 - *Foramen ethmoidale posterius* (m)	CE044 - *Foramen ethomoidal e accessoriu m* (l)	CE045 - *Foramen ethomoidal e accessoriu m* (r)	CE044/45 - *Foramen ethomoidal e accessoriu m* (m)	CE046 - *Foramen ethmoidale anterius extrasutural e* (l)	CE047 - *Foramen ethmoidale anterius extrasutural e* (r)	CE046/47 - *Foramen ethmoidale anterius extrasutural e* (m)	CE048 - *Foramen tympanicu m* Huschkei (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1										
Abu Tabari 02/1-3		0										
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2		2										
Abu Tabari 02/28-3		2										
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2	2										
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		2										
Abu Tabari 02/28-22	2	2.5										
Abu Tabari 02/28-23	1	1										1
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE041b	CE040b/41b	CE042	CE043	CE042/43	CE044	CE045	CE044/45	CE046	CE047	CE046/47	CE048
♂ No.	0	1	0	0	0	0	0	0	0	0	0	0
♂ Min.		2.0										
♂ Max.		2.0										
♂ Mode												
♂ Median		2.00										
♂ Mean		2.00										
♂ Freq.		(2) 1:1, 100.0%										
♀ No.	4	7	0	0	0	0	0	0	0	0	0	1
♀ Min.	1	0.0										
♀ Max.	2	2.5										
♀ Mode	1	2.0										
♀ Median	1.50	2.00										
♀ Mean	1.50	1.50										
♀ Freq.	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(0) 1:7, 14.3%; (1) 2:7, 28.6%; (2) 3:7, 42.9%; (2.5) 1:7, 14.3%										(1) 1:1, 100.0%
No.	4	8	0	0	0	0	0	0	0	0	0	1
Min.	1	0.0										
Max.	2	2.5										
Mode	1	2.0										
Median	1.50	2.00										
Mean	1.50	1.56										
Freq.	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(0) 1:8, 12.5%; (1) 2:8, 25.0%; (2) 4:8, 50.0%; (2.5) 1:8, 12.5%										(1) 1:1, 100.0%

	CE049 - *Foramen tympanicum* Huschkei (r)	CE048/49 - *Foramen tympanicum* Huschkei (m)	CE050 - *Foramen infraorbitale accessorium* (l)	CE051 - *Foramen infraorbitale accessorium* (r)	CE050/51 - *Foramen infraorbitale accessorium* (m)	CE050a - *Foramen infraorbitale accessorium* (l) - presence	CE051a - *Foramen infraorbitale accessorium* (r) - presence	CE050a/51a - *Foramen infraorbitale accessorium* (m) - presence	CE050b - *Foramen infraorbitale accessorium* (l) - number	CE051b - *Foramen infraorbitale accessorium* (r) - number	CE050b/51b - *Foramen infraorbitale accessorium* (m) - number	CE052 - *Foramen infraorbitale partitum* (l)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1		(23)	23		2	2		3	3	
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2			11	11	11	1	1	1	1	1	1	1
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5												
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	(1)	1	(22)		22	2		2	2		2	1
Abu Tabari 02/28-23	1	1										
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE049	CE048/49	CE050	CE051	CE050/51	CE050a	CE051a	CE050a/51a	CE050b	CE051b	CE050b/51b	CE052
♂ No.	0	0	1	1	1	1	1	1	1	1	1	1
♂ Min.									1	1	1.0	
♂ Max.									1	1	1.0	
♂ Mode												
♂ Median									1.00	1.00	1.00	
♂ Mean									1.00	1.00	1.00	
♂ Freq.			(11) 1:1, 100.0%	(11) 1:1, 100.0%	(11) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%
♀ No.	3	3	1	1	2	1	1	2	1	1	2	1
♀ Min.									2	3	2.0	
♀ Max.									2	3	3.0	
♀ Mode	1	1						2				
♀ Median									2.00	3.00	2.50	
♀ Mean									2.00	3.00	2.50	
♀ Freq.	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(22) 1:1, 100.0%	(23) 1:1, 100.0%	(22) 1:2, 50.0%; (23) 1:2, 50.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 2:2, 100.0%	(2) 1:1, 100.0%	(3) 1:1, 100.0%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 1:1, 100.0%
No.	3	3	2	2	3	2	2	3	2	2	3	2
Min.									1	1	1.0	
Max.									2	3	3.0	
Mode	1	1						2				1
Median									1.50	2.00	2.00	
Mean									1.50	2.00	2.00	
Freq.	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(11) 1:2, 50.0%; (22) 1:2, 50.0%	(11) 1:2, 50.0%; (23) 1:2, 50.0%	(11) 1:3, 33.3%; (22) 1:3, 33.3%; (23) 1:3, 33.3%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 2:2, 100.0%

	CE053 - *Foramen infraorbitale partitum* (r)	CE052/53 - *Foramen infraorbitale partitum* (m)	CE054 - **Foramina paranasalia*	CE054a - **Foramina paranasalia* (l)	CE054b - **Foramina paranasalia* (r)	CE054a/54 b - **Foramina paranasalia* (m)	CE055 - *Foramen palatinum minus accessorium* (l)	CE056 - *Foramen palatinum minus accessorium* (r)	CE055/56 - *Foramen palatinum minus accessorium* (m)	CE057 - *Foramen mentale accessorium* (l)	CE058 - *Foramen mentale accessorium* (r)	CE057/58 - *Foramen mentale accessorium* (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(1)	1	04	0	4	4				11	11	11
Abu Tabari 02/1-3										11	11	11
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	1	1	44	4	4	4				(11)	(11)	11
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			22	2	2	2					22	22
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13			[(04)]	0	4	4						
Abu Tabari 02/28-14			[(02)]	0	2	2						
Abu Tabari 02/28-15			(04)	0	4	4				11		11
Abu Tabari 02/28-20												
Abu Tabari 02/28-21											11	11
Abu Tabari 02/28-22		1	40	4	0	4				11		11
Abu Tabari 02/28-23			(40)	4	0	4				(11)	11	11
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4							2	2	2		11	11
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1			(44)	4	4	4					(11)	11
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE053	CE052/53	CE054	CE054a	CE054b	CE054a/54b	CE055	CE056	CE055/56	CE057	CE058	CE057/58
♂ No.	1	1	2	2	2	2	1	1	1	1	2	2
♂ Min.												
♂ Max.												
♂ Mode											11	11
♂ Median												
♂ Mean												
♂ Freq.	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(02) 1:2, 50.0%; (44) 1:2, 50.0%	(0) 1:2, 50.0%; (4) 1:2, 50.0%	(2) 1:2, 50.0%; (4) 1:2, 50.0%	(2) 1:2, 50.0%; (4) 1:2, 50.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(11) 1:1, 100.0%	(11) 2:2, 100.0%	(11) 2:2, 100.0%
♀ No.	1	2	6	6	6	6	0	0	0	5	6	8
♀ Min.												
♀ Max.												
♀ Mode		1	4	4	4	4				11	11	11
♀ Median												
♀ Mean												
♀ Freq.	(1) 1:1, 100.0%	(1) 2:2, 100.0%	(22) 1:6, 16.7%; (04) 2:6, 33.3%; (40) 2:6, 33.3%; (44) 1:6, 16.7%	(0) 2:6, 33.3%; (2) 1:6, 16.7%; (4) 3:6, 50.0%	(0) 2:6, 33.3%; (2) 1:6, 16.7%; (4) 3:6, 50.0%	(2) 1:6, 16.7%; (4) 5:6, 83.3%				(11) 5:5, 100.0%	(11) 5:6, 83.3%; (22) 1:6, 16.7%	(11) 7:8, 87.5%; (22) 1:8, 12.5%
No.	2	3	9	9	9	9	1	1	1	6	8	10
Min.												
Max.												
Mode	1	1	4	0	4	4				11	11	11
Median												
Mean												
Freq.	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(02) 1:9, 11.1%; (22) 1:9, 11.1%; (04) 3:9, 33.3%; (40) 2:9, 22.2%; (44) 2:9, 22.2%	(0) 4:9, 44.4%; (2) 1:9, 11.1%; (4) 4:9, 44.4%	(0) 2:9, 22.2%; (2) 2:9, 22.2%; (4) 5:9, 55,6%	(2) 2:9, 22.2%; (4) 7:9, 77.8%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(11) 6:6, 100.0%	(11) 7:8, 87.5%; (22) 1:8, 12.5%	(11) 9:10, 90.0%; (22) 1:10, 10.0%

	CE057a - *Foramen mentale accessorium* (l) - presence	CE058a - *Foramen mentale accessorium* (r) - presence	CE057a/58a - *Foramen mentale accessorium* (m) - presence	CE057b - *Foramen mentale accessorium* (l) - number	CE058b - *Foramen mentale accessorium* (r) - number	CE057b/58b - *Foramen mentale accessorium* (m) - number	CE059 - *Foramen ovale incompletum* (l)	CE060 - *Foramen ovale incompletum* (r)	CE059/60 - *Foramen ovale incompletum* (m)	CE061 - *Foramen spinosum incompletum* (l)	CE062 - *Foramen spinosum incompletum* (r)	CE061/62 - *Foramen spinosum incompletum* (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1	1	1	1	1						
Abu Tabari 02/1-3	1	1	1	1	1	1						
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	1	1	1	1	1	1						
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		2	2		2	2						
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13							1		1			
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	1		1	1		1						
Abu Tabari 02/28-20							1		1			
Abu Tabari 02/28-21		1	1		1	1						
Abu Tabari 02/28-22	1		1	1		1	1	1	1	1	1	1
Abu Tabari 02/28-23	1	1	1	1	1	1						
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4		1	1		1	1						
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		1	1		1	1						
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE057a	CE058a	CE057a/58a	CE057b	CE058b	CE057b/58b	CE059	CE060	CE059/60	CE061	CE062	CE061/62
♂ No.	1	2	2	1	2	2	1	0	1	0	0	0
♂ Min.				1	1	1.0						
♂ Max.				1	1	1.0						
♂ Mode		1	1		1	1.0						
♂ Median				1.00	1.00	1.00						
♂ Mean				1.00	1.00	1.00						
♂ Freq.	(1) 1:1, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 1:1, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%			
♀ No.	5	6	8	5	6	8	1	1	1	1	1	1
♀ Min.				1	1	1.0						
♀ Max.				1	2	2.0						
♀ Mode	1	1	1	1	1	1.0						
♀ Median				1.00	1.00	1.00						
♀ Mean				1.00	1.17	1.13						
♀ Freq.	(1) 5:5, 100.0%	(1) 5:6, 83.3%; (2) 1:6, 16.7%	(1) 7:8, 87.5%; (2) 1:8, 12.5%	(1) 5:5, 100.0%	(1) 5:6, 83.3%; (2) 1:6, 16.7%	(1) 7:8, 87.5%; (2) 1:8, 12.5%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%
No.	6	8	10	6	8	10	3	1	3	1	1	1
Min.				1	1	1.0						
Max.				1	2	2.0						
Mode	1	1	1	1	1	1.0	1		1			
Median				1.00	1.00	1.00						
Mean				1.00	1.13	1.10						
Freq.	(1) 6:6, 100.0%	(1) 7:8, 87.5%; (2) 1:8, 12.5%	(1) 9:10, 90.0%; (2) 1:10, 10.0%	(1) 6:6, 100.0%	(1) 7:8, 87.5%; (2) 1:8, 12.5%	(1) 9:10, 90.0%; (2) 1:10, 10.0%	(1) 3:3, 100.0%	(1) 1:1, 100.0%	(1) 3:3, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:1, 100.0%

	CE063 - Mylohyoid bridging (l)	CE064 - Mylohyoid bridging (r)	CE063/64 - Mylohyoid bridging (m)	CE065 - *Torus maxillaris* (l)	CE066 - *Torus maxillaris* (r)	CE065/66 - *Torus maxillaris* (m)	CE067 - *Torus acusticus* (l)	CE068 - *Torus acusticus* (r)	CE067/68 - *Torus acusticus* (m)	CE069 - *Torus occipitalis*	CE070 - *Tuberculum praecondylare* (l)	CE071 - *Tuberculum praecondylare* (r)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		1	1	(1)	1	1		(1)	1			
Abu Tabari 02/1-3										1		
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2				(1)	(1)	1	(1)		1	1		
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5							(1)	(1)	1			
Abu Tabari 02/28-7										1		
Abu Tabari 02/28-8		[(1)]	1							1		
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(2)		2	1	1	1				1		
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	[(1)]		1				(1)	[(1)]	1	1		
Abu Tabari 02/28-23	[(1)]	(1)	1	1		1	1	1	1	1		
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	1		1	1	1	1				1		
Conical Hill 95/4-1												
Conical Hill 02/3-4				(1)		1				(1)		
Djabarona 96/1-1	1		1	[(1)]		1				1		
Djabarona 96/1-2										(1)		
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	CE063	CE064	CE063/64	CE065	CE066	CE065/66	CE067	CE068	CE067/68	CE069	CE070	CE071
♂ No.	1	0	1	3	2	3	1	0	1	3	0	0
♂ Min.												
♂ Max.												
♂ Mode				1	1	1				1		
♂ Median												
♂ Mean												
♂ Freq.	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 3:3, 100.0%		
♀ No.	4	3	6	4	2	4	3	4	4	8	0	0
♀ Min.												
♀ Max.												
♀ Mode	1	1	1	1	1	1	1	1	1	1		
♀ Median												
♀ Mean												
♀ Freq.	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 3:3, 100.0%	(1) 5:6, 83.3%; (2) 1:6, 16.7%	(1) 4:4, 100.0%	(1) 2:2, 100.0%	(1) 4:4, 100.0%	(1) 3:3, 100.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%	(1) 8:8, 100.0%		
No.	5	3	7	7	4	7	4	4	5	11	0	0
Min.												
Max.												
Mode	1	1	1	1	1	1	1	1	1	1		
Median												
Mean												
Freq.	(1) 4:5, 80.0%; (2) 1:5, 20.0%	(1) 3:3, 100.0%	(1) 6:7, 85.7%; (2) 1:7, 14.3%	(1) 7:7, 100.0%	(1) 4:4, 100.0%	(1) 7:7, 100.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%	(1) 5:5, 100.0%	(1) 11:11, 100.0%		

	CE070/71 - *Tuberculum praecondylare* (m)	CE072 - *Facies articularis condylaris bipartita* (l)	CE073 - *Facies articularis condylaris bipartita* (r)	CE072/73 - *Facies articularis condylaris bipartita* (m)	CE074 - *Linea nuchalis suprema*
Abu Tabari 95/2-3					
Abu Tabari 02/1-2					
Abu Tabari 02/1-3					(1)
Abu Tabari 02/1-5					
Abu Tabari 02/1-6					
Abu Tabari 02/1-7					
Abu Tabari 02/1-8					
Abu Tabari 02/28-2					1
Abu Tabari 02/28-3					
Abu Tabari 02/28-4					
Abu Tabari 02/28-5					
Abu Tabari 02/28-7					
Abu Tabari 02/28-8					
Abu Tabari 02/28-11					
Abu Tabari 02/28-13					
Abu Tabari 02/28-14					
Abu Tabari 02/28-15					1
Abu Tabari 02/28-20					
Abu Tabari 02/28-21					
Abu Tabari 02/28-22					(1)
Abu Tabari 02/28-23					
Abu Tabari 03/31					
Abu Tabari 03/34-1					
Conical Hill 95/4					1
Conical Hill 95/4-1					
Conical Hill 02/3-4					
Djabarona 96/1-1					
Djabarona 96/1-2					
Djabarona 96-4					
Djabarona 96/120-3					
Djabarona 96/120-4					
Djabarona 96/120-5					

	CE070/71	CE072	CE073	CE072/73	CE074
♂ No.	0	0	0	0	2
♂ Min.					
♂ Max.					
♂ Mode					1
♂ Median					
♂ Mean					
♂ Freq.					(1) 2:2, 100.0%
♀ No.	0	0	0	0	3
♀ Min.					
♀ Max.					
♀ Mode					1
♀ Median					
♀ Mean					
♀ Freq.					(1) 3:3, 100.0%
No.	0	0	0	0	5
Min.					
Max.					
Mode					1
Median					
Mean					
Freq.					(1) 5:5, 100.0%

Appendix XVIII.B. Dental epigenetic traits

	DE001 - Winging UI1 (l)	DE002 - Winging UI1 (r)	DE001/2 - Winging UI1 (m)	DE003 - Labial curvature UI1 (l)	DE004 - Labial curvature UI1 (r)	DE003/4 - Labial curvature UI1 (m)	DE005 - Shovel UI1 (l)	DE006 - Shovel UI1 (r)	DE005/6 - Shovel UI1 (m)	DE007 - Double shovel UI1 (l)	DE008 - Double shovel UI1 (r)	DE007/8 - Double shovel UI1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	3	3	33	(1)	(1)	1						
Abu Tabari 02/1-3	(3)	(3)	33	(2)	(2)	2						
Abu Tabari 02/1-5					(2)	2						
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(3)	(3)	33	1	1	1	(1)	(1)	1	1	1	1
Abu Tabari 02/28-2				2	2	2	3	3	3	0	0	0
Abu Tabari 02/28-3					2	2		(2)	2		2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	3	3	33	2	(2)	2	(1)	(1)	1	1		1
Abu Tabari 02/28-7					2	2		(2)	2		(1)	1
Abu Tabari 02/28-8	(3)	(3)	33	2	2	2	3	3	3	2	2	2
Abu Tabari 02/28-11				(1)		1				(0)		0
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	(3)	(3)	33	2	2	2	3	3	3	2	2	2
Abu Tabari 02/28-15	3	3	33	1	1	1	2	2	2	2	(1)	1.5
Abu Tabari 02/28-20					[(2)]	2		(1)	1		[(0)]	0
Abu Tabari 02/28-21	3	[(3)]	33	(2)	(2)	2	(1)		1	(1)	[(0)]	0.5
Abu Tabari 02/28-22				2	2	2	(1)		1	1	1	1
Abu Tabari 02/28-23	3		30	2		2	[(1)]		1	1		1
Abu Tabari 03/31												
Abu Tabari 03/34-1				2	2	2	2	2	2	1	1	1
Conical Hill 95/4	(3)		30	(1)		1	[(2)]		2	[(1)]		1
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(3)]	[(3)]	33	[(2)]	[(2)]	2	[(1)]		1	[(1)]	[(1)]	1
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE001	DE002	DE001/2	DE003	DE004	DE003/4	DE005	DE006	DE005/6	DE007	DE008	DE007/8
♂ No.	3	2	3	5	5	7	4	4	5	5	4	6
♂ Min.				1	1	1.0	1	1	1.0	0	0	0.0
♂ Max.				2	2	2.0	3	3	3.0	2	2	2.0
♂ Mode	3	3	33	1	2	2.0	3	1	1.0	1	0	0.0
♂ Median				1.00	2.00	2.00	2.50	2.00	2.00	1.00	0.50	0.50
♂ Mean				1.40	1.80	1.57	2.25	2.00	2.00	0.80	0.75	0.67
♂ Freq.	(3) 3:3, 100.0%	(3) 2:2, 100.0%	(30) 1:3, 33.3%; (33) 2:3, 66.7%	(1) 3:5, 60.0%; (2) 2:5, 40.0%	(1) 1:5, 20.0%; (2) 4:5, 80.0%	(1) 3:7, 42.9%; (2) 4:7, 57.1%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 2:4, 50.0%	(1) 2:4, 50.0%; (3) 2:4, 50.0%	(1) 2:5, 40.0%; (2) 1:5, 20.0%; (3) 2:5, 40.0%	(0) 2:5, 40.0%; (1) 2:5, 40.0%; (2) 1:5, 20.0%	(0) 2:4, 50.0%; (1) 1:4, 25.0%; (2) 1:4, 25.0%	(0) 3:6, 50.0%; (1) 2:6, 33.3%; (2) 1:6, 16.7%
♀ No.	8	7	8	10	11	12	8	6	10	8	8	10
♀ Min.				1	1	1.0	1	1	1.0	1	0	0.5
♀ Max.				2	2	2.0	3	3	3.0	2	2	2.0
♀ Mode	3	3	33	2	2	2.0	1	2	1.0	1	1	1.0
♀ Median				2.00	2.00	2.00	1.00	2.00	1.50	1.00	1.00	1.00
♀ Mean				1.80	1.82	1.83	1.50	2.00	1.60	1.25	1.13	1.20
♀ Freq.	(3) 8:8, 100.0%	(3) 7:7, 100.0%	(30) 1:8, 12.5%; (33) 7:8, 87.5%	(1) 2:10, 20.0%; (2) 8:10, 80.0%	(1) 2:11, 18.2%; (2) 9:11, 81.2%	(1) 2:12, 16.7%; (2) 10:12, 83.3%;	(1) 5:8, 62.5%; (2) 2:8, 25.0%; (3) 1:8, 12.5%	(1) 1:6, 16.7%; (2) 4:6, 66.7%; (3) 1:6, 16.7%	(1) 5:10, 50.0%; (2) 4:10, 40.0%; (3) 1:10, 10.0%	(1) 6:8, 75.0%; (2) 2:8, 25.0%	(0) 1:8, 12.5%; (1) 5:8, 62.5%; (2) 2:8, 25.0%	(0.5) 1:10, 10.0%; (1) 6:10, 60.0%; (1.5) 1:10, 10.0%; (2) 2:10, 20.0%
No.	11	9	11	15	16	19	12	10	15	13	12	16
Min.				1	1	1.0	1	1	1.0	0	0	0.0
Max.				2	2	2.0	3	3	3.0	2	2	2.0
Mode	3	3	33	2	2	2.0	1	2	1.0	1	1	1.0
Median				2.00	2.00	2.00	1.50	2.00	2.00	1.00	1.00	1.00
Mean				1.67	1.81	1.74	1.75	2.00	1.73	1.08	1.00	1.00
Freq.	(3) 11:11, 100.0%	(3) 9:9, 100.0%	(30) 2:11, 18.2%; (33) 9:11, 81.8%	(1) 5:15, 33.3%; (2) 10:15, 66.7%	(1) 3:16, 18.8%; (2) 13:16, 81.3%	(1) 5:19, 26.3%; (2) 14:19, 73.7%	(1) 6:12, 50.0%; (2) 3:12, 25.0%; (3) 3:12, 25.0%	(1) 3:10, 30.0%; (2) 4:10, 30.0%; (3) 3:10, 30.0%	(1) 7:15, 46.7%; (2) 5:15, 33.3%; (3) 3:15, 20.0%	(0) 2:13,15.4% ; (1) 8:13, 61.5%; (2) 3:13, 23.1%	(0) 3:12, 25.0%; (1) 6:12, 50.0%; (2) 3:12, 25.0%	(0) 3:16, 18.8%; (0.5) 1:16, 6.3%; (1) 8:16, 50.0%; (1.5) 1:16, 6.3%; (2) 3:16, 18.8%

	DE009 - Interruption groove UI2 (l)	DE010 - Interruption groove UI2 (r)	DE009/10 - Interruption groove UI2 (m)	DE011 - *Tuberculum dentale* UI2 (l)	DE012 - *Tuberculum dentale* UI2 (r)	DE011/12 - *Tuberculum dentale* UI2 (m)	DE013 - Canine mesial ridge (“*Bushman canine*”) UC (l)	DE014 - Canine mesial ridge (“*Bushman canine*”) UC (r)	DE013/14 - Canine mesial ridge (“*Bushman canine*”) UC (m)	DE015 - Distal accessory ridge UC (l)	DE016 - Distal accessory ridge UC (r)	DE015/16 - Distal accessory ridge UC (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(2)		20									
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	2	4	24	1	1	1	1	1	1	(4)	4	4
Abu Tabari 02/28-2		2	02		2	2						
Abu Tabari 02/28-3	(3)	3	33	5	4	4.5						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(0)	(0)	00	(2)	(1)	1.5						
Abu Tabari 02/28-7							2	2	2	(5)	(5)	5
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	(3)	3	33	(3)	3	3	3	(3)	3	4	4	4
Abu Tabari 02/28-15	(0)	(0)	00	(1)	(0)	0.5						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(4)		40	(5)		5						
Abu Tabari 02/28-22												
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1	(4)	4	44	[(2)]	3	2.5	2	2	2	4	[(4)]	4
Conical Hill 95/4	[(4)]	[(4)]	44	[(2)]	[(4)]	3	[(3)]	[(2)]	2.5		[(4)]	4
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1							[(0)]		0	[(5)]	[(5)]	5
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE009	DE010	DE009/10	DE011	DE012	DE011/12	DE013	DE014	DE013/14	DE015	DE016	DE015/16
♂ No.	3	4	4	3	4	4	3	3	3	2	3	3
♂ Min.				1	1	1.0	1	1	1.0	4	4	4.0
♂ Max.				3	4	3.0	3	3	3.0	4	4	4.0
♂ Mode		4				3.0	3			4	4	4.0
♂ Median				2.00	2.50	2.50	3.00	2.00	2.50	4.00	4.00	4.00
♂ Mean				2.00	2.50	2.25	2.33	2.00	2.17	4.00	4.00	4.00
♂ Freq.	(2) 1:3, 33.3%; (3) 1:3, 33.3%; (4) 1:3, 33.3%	(2) 1:4, 25.0%; (3) 1:4, 25.0%; (4) 2:4, 50.0%	(02) 1:4, 25.0%; (24) 1:4, 25.0%; (33) 1:4, 25.0%; (44) 1:4, 25.0%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 1:4, 25.0%; (4) 1:4, 25.0%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 2:4, 50.0%	(1) 1:3, 33.3%; (3) 2:3, 66.7%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 1:3, 33.3%; (2.5) 1:3, 33.3%; (3) 1:3, 33.3%	(4) 2:2, 100.0%	(4) 3:3, 100.0%	(4) 3:3, 100.0%
♀ No.	6	4	6	5	4	5	3	2	3	3	3	3
♀ Min.				1	0	0.5	0	2	0.0	4	4	4.0
♀ Max.				5	4	5.0	2	2	2.0	5	5	5.0
♀ Mode	0	0	0	5			2	2	2.0	5	5	5.0
♀ Median				2.00	2.00	2.50	2.00	2.00	2.00	5.00	5.00	5.00
♀ Mean				3.00	2.00	2.80	1.33	2.00	1.33	4.67	4.67	4.67
♀ Freq.	(0) 2:6, 33.3%; (2) 1:6, 16.7%; (3) 1:6, 16.7%; (4) 2:6, 33.3%	(0) 2:4, 50.0%; (3) 1:4, 25.0%; (4) 1:4, 25.0%	(00) 2:6, 33.3%; (20) 1:6, 16.7%; (33) 1:6, 16.7%; (40) 1:6, 16.7%; (44) 1:6, 16.7%	(1) 1:5, 20.0%; (2) 2:5, 40.0%; (5) 2:5, 40.0%	(0) 1:4, 25.0%; (1) 1:4, 25.0%; (3) 1:4, 25.0%; (4) 1:4, 25.0%	(0.5) 1:5, 20.0%; (1.5) 1:5, 20.0%; (2.5) 1:5, 20.0%; (4.5) 15:, 20.0%; (5) 1:5, 20.0%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 2:2, 100.0%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(4) 1:3, 33.3%; (5) 2:3, 66.7%	(4) 1:3, 33.3%; (5) 2:3, 66.7%	(4) 1:3, 33.3%; (5) 2:3, 66.7%
No.	9	8	10	8	8	9	6	5	6	5	6	6
Min.				1	0	0.5	0	1	0.0	4	4	4.0
Max.				5	4	5.0	3	3	3.0	5	5	5.0
Mode	4	4	33	2	1	3.0	2	2	2.0	4	4	4.0
Median				2.00	2.50	2.50	2.00	2.00	2.00	4.00	4.00	4.00
Mean				2.63	2.25	2.56	1.83	2.00	1.75	4.40	4.33	4.33
Freq.	(0) 2:9, 22.2%; (2) 2:9, 22.2%; (3) 2:9, 22.2%; (4) 3:9, 33.3%	(0) 2:8, 25.0%; (2) 1:8, 12.5%; (3) 2:8, 25.0%; (4) 3:8, 37.5%	(00) 2:10, 20.0%; (02) 1:10, 10.0%; (20) 1:10, 10.0%; (24) 1:10, 10.0%; (33) 2:10, 20.0%; (40) 1:10, 10.0%; (44) 2:10, 20.0%	(1) 2:8, 25.0%; (2) 3:8, 37.5%; (3) 1:8, 12.5%; (5) 2:8, 25.0%	(0) 1:8, 12.5%; (1) 2:8, 25.0%; (2) 1:8, 12.5%; (3) 2:8, 25.0%; (4) 2:8, 25.0%	(0.5) 1:9, 11.1%; (1) 1:9, 11.1%; (1.5) 1:9, 11.1%; (2) 1:9, 11.1%; (2.5) 1:9, 11.1%; (3) 2:9, 22.2%; (4.5) 1:9, 11.1%; (5) 1:9, 11.1%	(0) 1:6, 16.7%; (1) 1:6, 16.7%; (2) 2:6, 33.3%; (3) 2:6, 33.3%	(1) 1:5, 20.0%; (2) 3:5, 60.0%; (3) 1:5, 20.0%	(0) 1:6, 16.7%; (1) 1:6, 16.7%; (2) 2:6, 33.3%; (2.5) 1:6, 16.7%; (3) 1:3, 16.7%	(4) 3:5, 60.0%; (5) 2:5, 40.0%	(4) 4:6, 66.7%; (5) 2:6, 33.3%	(4) 4:6, 66.7%; (5) 2:6, 33.3%

	DE017 - Premol. mesial & distal access. cusps UP1 (l)	DE018 - Premol. mesial & distal access. cusps UP1 (r)	DE017/18 - Premol. mesial & distal access. cusps UP1 (m)	DE019 - Premol. mesial & distal access. cusps UP2 (l)	DE020 - Premol. mesial & distal access. cusps UP2 (r)	DE019/20 - Premol. mesial & distal access. cusps UP2 (m)	DE021 - Tricusped premolars UP1 (l)	DE022 - Tricusped premolars UP1 (r)	DE021/22 - Tricusped premolars UP1 (m)	DE023 - Distosagittal ridge UP1 (l)	DE024 - Distosagittal ridge UP1 (r)	DE023/24 - Distosagittal ridge UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2												
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	1	1	1	1	1	1	0	0	0	0	0	0
Abu Tabari 02/28-2		(1)	1									
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(1)	(1)	1	(0)	(0)	0	(0)	(0)	0
Abu Tabari 02/28-7	(1)		1				0	0	0	0	0	0
Abu Tabari 02/28-8										(0)	(0)	0
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	1	1	1	1	1	1	0	0	0	0	0	0
Abu Tabari 02/28-15				(1)	(1)	1						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22												
Abu Tabari 02/28-23	1	(1)	1	1	1	1	(0)	(0)	0	0	0	0
Abu Tabari 03/31												
Abu Tabari 03/34-1	1	1	1	1	1	1	0	0	0	0	0	0
Conical Hill 95/4												
Conical Hill 95/4-1	0		0				0		0	0		0
Conical Hill 02/3-4												
Djabarona 96/1-1	(1)		1				(0)		0			
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE017	DE018	DE017/18	DE019	DE020	DE019/20	DE021	DE022	DE021/22	DE023	DE024	DE023/24
♂ No.	2	3	3	2	2	2	2	2	2	2	2	2
♂ Min.												
♂ Max.												
♂ Mode	1	1	1	1	1	1	0	0	0	0	0	0
♂ Median												
♂ Mean												
♂ Freq.	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 2:2, 100.0%	(0) 2:2, 100.0%
♀ No.	5	2	5	4	4	4	6	4	6	6	5	6
♀ Min.												
♀ Max.												
♀ Mode	1	1	1	1	1	1	0	0	0	0	0	0
♀ Median												
♀ Mean												
♀ Freq.	(0) 1:5, 20.0%; (1) 4:5, 80.0%	(1) 2:2, 100.0%	(0) 1:5, 20.0%; (1) 4:5, 80.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%	(0) 6:6, 100.0%	(0) 4:4, 100.0%	(0) 6:6, 100.0%	(0) 6:6, 100.0%	(0) 5:5, 100.0%	(0) 6:6, 100.0%
No.	7	5	8	6	6	6	8	6	8	8	7	8
Min.												
Max.												
Mode	1	1	1	1	1	1	0	0	0	0	0	0
Median												
Mean												
Freq.	(0) 1:7, 14.3%; (1) 6:7, 85.7%	(1) 5:5, 100.0%	(0) 1:8, 12.5%; (1) 7:8, 87.5%	(1) 6:6, 100.0%	(1) 6:6, 100.0%	(1) 6:6, 100.0%	(0) 8:8, 100.0%	(0) 6:6, 100.0%	(0) 8:8, 100.0%	(0) 8:8, 100.0%	(0) 7:7, 100.0%	(0) 8:8, 100.0%

	DE025 - Metacone UM3 (l)	DE026 - Metacone UM3 (r)	DE025/26 - Metacone UM3 (m)	DE027 - Hypocone UM2 (l)	DE028 - Hypocone UM2 (r)	DE027/28 - Hypocone UM2 (m)	DE029 - Cusp 5 (metaconule) UM1 (l)	DE030 - Cusp 5 (metaconule) UM1 (r)	DE029/30 - Cusp 5 (metaconule) UM1 (m)	DE031 - Carabelli's trait UM1 (l)	DE032 - Carabelli's trait UM1 (r)	DE031/32 - Carabelli's trait UM1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		(4)	4	[(3.5)]	[(3.5)]	3.5						
Abu Tabari 02/1-3	(4)		4									
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	3.5	4	3.75	3.5	3.5	3.5	(4)	[(5)]	4.5	[(0)]	(0)	0
Abu Tabari 02/28-2	4	4	4	4	4	4	3	3	3	5	5	5
Abu Tabari 02/28-3				[(3.5)]		3.5						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	4	3.5	3.75	[(4)]	(5)	4.5				(3)		3
Abu Tabari 02/28-7	3.5	4	3.75		4	4		(5)	5	(5)	6	5.5
Abu Tabari 02/28-8	4	4	4	5	5	5	5	(5)	5			
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				4	4	4	4	5	4.5	(2)	(2)	2
Abu Tabari 02/28-15	4	4	4	4	(4)	4						
Abu Tabari 02/28-20	[(3.5)]	[(3.5)]	3.5									
Abu Tabari 02/28-21		(0)	0		[(3.5)]	3.5						
Abu Tabari 02/28-22	(3.5)	(3.5)	3.5									
Abu Tabari 02/28-23	4	4	4	3	3	3		(5)	5	[(5)]	(5)	5
Abu Tabari 03/31												
Abu Tabari 03/34-1	4	3.5	3.75	3	3.5	3.25				0	0	0
Conical Hill 95/4	4	4	4									
Conical Hill 95/4-1		3.5	3.5									
Conical Hill 02/3-4												
Djabarona 96/1-1	5	4	4.5	(3)		3	[(3)]		3			
Djabarona 96/1-2	(5)	(5)	5	(4)	(4)	4						
Djabarona 96-4				4	4	4						
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE025	DE026	DE025/26	DE027	DE028	DE027/28	DE029	DE030	DE029/30	DE031	DE032	DE031/32
♂ No.	3	4	4	4	4	4	3	3	3	3	3	3
♂ Min.	3.5	3.5	3.5	3.5	3.5	3.5	3	3	3.0	0	0	0.0
♂ Max.	4.0	4.0	4.0	4.0	4.0	4.0	4	5	4.5	5	5	5.0
♂ Mode	3.5	4.0	4.0	4.0	4.0	4.0	4	5	4.5			
♂ Median	3.50	4.00	3.88	4.00	4.00	4.00	4.00	5.00	4.50	2.00	2.00	2.00
♂ Mean	3.67	3.88	3.81	3.88	3.88	3.88	3.67	4.33	4.00	2.33	2.33	2.33
♂ Freq.	(3.5) 2:3, 66.7%; (4) 1:3, 33.3%	(3.5) 1:4, 25.0%; (4) 3:4, 75.0%	(3.5) 1:4, 25.0%; (3.75) 1:4, 25.0%; (4) 2:4, 50.0%	(3.5) 1:4, 25.0%; (4) 3:4, 75.0%	(3.5) 1:4, 25.0%; (4) 3:4, 75.0%	(3.5) 1:4, 25.0%; (4) 3:4, 75.0%	(3) 1:3, 33.3%; (4) 2:3, 66.7%	(3) 1:3, 33.3%; (5) 2:3, 66.7%	(3) 1:3, 33.3%; (4.5) 2:3, 66.7%	(0) 1:3, 33.3%; (2) 1:3, 33.3%; (5) 1:3, 33.3%	(0) 1:3, 33.3%; (2) 1:3, 33.3%; (5) 1:3, 33.3%	(0) 1:3, 33.3%; (2) 1:3, 33.3%; (5) 1:3, 33.3%
♀ No.	10	12	13	9	9	11	2	3	4	4	3	4
♀ Min.	3.5	0.0	0.0	3.0	3.0	3.0	3	5	3.0	0	0	0.0
♀ Max.	5.0	5.0	5.0	5.0	5.0	5.0	5	5	5.0	5	6	5.5
♀ Mode	4.0	4.0	4.0	4.0	3.5	3.5		5	5.0	5		
♀ Median	4.00	4.00	4.00	3.50	4.00	3.50	4.00	5.00	5.00	4.00	5.00	4.00
♀ Mean	4.10	3.58	3.67	3.67	3.94	3.75	4.00	5.00	4.50	3.25	3.67	3.38
♀ Freq.	(3.5) 2:10, 20.0%; (4) 6:10, 60.0%; (5) 2:10, 20.0%	(0) 1:12, 8.3%; (3.5) 4:12, 33.3%; (4) 6:12, 50.0%; (5) 1:12, 8.3%	(0) 1:13, 7.7%; (3.5) 2:13, 15.4%; (3.75) 3:13, 23.1%; (4) 5:13, 38.5%; (4.5) 1:13, 7.7%; (5) 1:13, 7.7%	(3) 3:9, 33.3%; (3.5) 2:9, 22.2%; (4) 3:9, 33.3%; (5) 1:9, 11.1%	(3) 1:9, 11.1%; (3.5) 3:9, 33.3%; (4) 3:9, 33.3%; (5) 2:9, 22.2%	(3) 2:11, 18.2%; (3.25) 1:11, 9.1%; (3.5) 3:11, 27.3%; (4) 3:11, 27.3%; (4.5) 1:11, 9.1%; (5) 1:11, 9.1%	(3) 1:2, 50.0%; (5) 1:2, 50.0%	(5) 3:3, 100.0%	(3) 1:4, 25.0%; (5) 3:4, 75.0%	(0) 1:4, 25.0%; (3) 1:4, 25.0%; (5) 2:4, 50.0%	(0) 1:3, 33.3%; (5) 1:3, 33.3%; (6) 1:3, 33.3%	(0) 1:4, 25.0%; (3) 1:4, 25.0%; (5) 1:4, 25.0%; (5.5) 1:4, 25.0%
No.	13	16	17	13	13	15	5	6	7	7	6	7
Min.	3.5	0.0	0.0	3.0	3.0	3.0	3	3	3.0	0	0	0.0
Max.	5.0	5.0	5.0	5.0	5.0	5.0	5	5	5.0	5	6	5.5
Mode	4.0	4.0	4.0	4.0	4.0	4.0	4	5	5.0	5	0	0.0
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	5.00	4.50	3.00	3.50	3.00
Mean	4.00	3.66	3.71	3.73	3.92	3.78	3.80	4.67	4.29	2.86	3.00	2.93
Freq.	(3.5) 4:13, 30.8%; (4) 7:13, 53.8%; (5) 2:13, 15.4%	(0) 1:16, 6.3%; (3.5) 5:16, 31.3%; (4) 9:16, 56.3%; (5) 1:16, 6.3%	(0) 1:17, 5.9%; (3.5) 3:17, 17.6%; (3.75) 4:17, 23.5%; (4) 7:17, 41.2%; (4.5) 1:17, 5.9%; (5) 1:17, 5.9%	(3) 3:13, 23.1%; (3.5) 3:13, 23.1%; (4) 6:13, 46.2%; (5) 1:13, 7.7%	(3) 1:13, 7.7%; (3.5) 4:13, 30.8%; (4) 6:13, 46.2%; (5) 2:13, 15.4%	(3) 2:15, 13.3%; (3.25) 1:15, 6.7%; (3.5) 4:15, 26.7%; (4) 6:15, 40.0%; (4.5) 1:15, 6.7%; (5) 1:15, 6.7%	(3) 2:5, 40.0%; (4) 2:5, 40.0%; (5) 1:5, 20.0%	(3) 1:6, 16.7%; (5) 5:6, 83.3%	(3) 2:7, 28.6%; (4.5) 2:7, 28.6%; (5) 3:7, 42.9%	(0) 2:7, 28.6%; (2) 1:7, 14.3%; (3) 1:7, 14.3%; (5) 3:7, 42.9%	(0) 2:6, 33.3%; (2) 1:6, 16.7%; (5) 2:6, 33.3%; (6) 1:6, 16.7%	(0) 2:7, 28.6%; (2) 1:7, 14.3%; (3) 1:7, 14.3%; (5) 2:7, 28.6%; (5.5) 1:7, 14.3%

	DE033 - Parastyle UM2 (l)	DE034 - Parastyle UM2 (r)	DE033/34 - Parastyle UM2 (m)	DE035 - Parastyle UM3 (l)	DE036 - Parastyle UM3 (r)	DE035/36 - Parastyle UM3 (m)	DE037 - Enamel extension UM1 (l)	DE038 - Enamel extension UM1 (r)	DE037/38 - Enamel extension UM1 (m)	DE039 - Premolar root number UP1 (l)	DE040 - Premolar root number UP1 (r)	DE039/40 - Premolar root number UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		0	0		0	0				1		1
Abu Tabari 02/1-3				0		0				(1)		1
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7										(1)	[(1)]	1
Abu Tabari 02/1-8	0	0	0	0	0	0	(1)	(1)	1	1	1	1
Abu Tabari 02/28-2	0	0	0				1	0	0.5			
Abu Tabari 02/28-3	5	0	2.5				(1)	1	1		(1)	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0	0	0	0	0	0	(0)		0	2	2	2
Abu Tabari 02/28-7		(0)	0	(0)	(0)	0	(0)	(0)	0			
Abu Tabari 02/28-8	0	0	0	0	0	0	(0)	(0)	0	(2)		2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0	0	0				0	0	0			
Abu Tabari 02/28-15	0	0	0	0	0	0	1	1	1	[(2)]	[(2)]	2
Abu Tabari 02/28-20				(0)	1	0.5						
Abu Tabari 02/28-21	0	0	0				(1)	(1)	1	(2)	(2)	2
Abu Tabari 02/28-22	0	0	0	(0)	(0)	0	(1)		1	1	1	1
Abu Tabari 02/28-23	0	0	0	0	0	0	1	1	1	2	[(2)]	2
Abu Tabari 03/31												
Abu Tabari 03/34-1	0	0	0	0	0	0	0	0	0			
Conical Hill 95/4	0	0	0	0	0	0	0		0	(1)		1
Conical Hill 95/4-1					[(1)]	1						
Conical Hill 02/3-4												
Djabarona 96/1-1	[(0)]		0	(0)	(0)	0						
Djabarona 96/1-2				0	0	0						
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE033	DE034	DE033/34	DE035	DE036	DE035/36	DE037	DE038	DE037/38	DE039	DE040	DE039/40
♂ No.	4	4	4	3	3	3	4	3	4	3	2	3
♂ Min.	0	0	0.0	0	0	0.0	0	0	0.0	1	1	1.0
♂ Max.	0	0	0.0	0	1	0.5	1	1	1.0	1	1	1.0
♂ Mode	0	0	0.0	0	0	0.0	1	0	0.0	1	1	1.0
♂ Median	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.25	1.00	1.00	1.00
♂ Mean	0.00	0.00	0.00	0.00	0.33	0.17	0.50	0.33	0.38	1.00	1.00	1.00
♂ Freq.	(0) 4:4, 100.0%	(0) 4:4, 100.0%	(0) 4:4, 100.0%	(0) 3:3, 100.0%	(0) 2:3, 66.7%; (1) 1:3, 33.3%	(0) 2:3, 66.7%; (0.5) 1:3, 33.3%	(0) 2:4, 50.0%; (1) 2:4, 50.0%	(0) 1:3, 33.3%; (1) 2:3, 66.7%	(0) 2:4, 50.0%; (0.5) 1:4, 25.0%; (1) 1:4, 25.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 3:3, 100.0%
♀ No.	9	10	11	10	11	12	9	7	9	8	6	9
♀ Min.	0	0	0.0	0	0	0.0	0	0	0.0	1	1	1.0
♀ Max.	5	0	2.5	0	1	1.0	1	1	1.0	2	2	2.0
♀ Mode	0	0	0.0	0	0	0.0	1	1	1.0	2	2	2.0
♀ Median	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	2.00	2.00	2.00
♀ Mean	0.56	0.00	0.23	0.00	0.09	0.08	0.56	0.57	0.56	1.63	1.67	1.56
♀ Freq.	(0) 8:9, 88.9%; (5) 1:9, 11.1%	(0) 10:10, 100.0%	(0) 10:11, 90.9%; (2.5) 1:11, 9.1%	(0) 10:10, 100.0%	(0) 10:11, 90.9%; (1) 1:11, 9.1%	(0) 11:12, 91.7%; (1) 1:12, 8.3%	(0) 4:9, 44.4%; (1) 5:9, 55.6%	(0) 3:7, 42.9%; (1) 4:7, 57.1%	(0) 4:9, 44.4%; (1) 5:9, 55.6%	(1) 3:8, 37.5%; (2) 5:8, 62.5%	(1) 2:6, 33.3%; (2) 4:6, 66.7%	(1) 4:9, 44.4%; (2) 5:9, 55.6%
No.	13	14	15	13	14	15	13	10	13	11	8	12
Min.	0	0	0.0	0	0	0.0	0	0	0.0	1	1	1.0
Max.	5	0	2.5	0	1	1.0	1	1	1.0	2	2	2.0
Mode	0	0	0.0	0	0	0.0	1	1	1.0	1	1	1.0
Median	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.50	0.50	1.00	1.50	1.00
Mean	0.38	0.00	0.17	0.00	0.14	0.10	0.54	0.50	0.50	1.45	1.50	1.42
Freq.	(0) 12:13, 92.3%; (5) 1:13, 7.7%	(0) 14:14, 100.0%	(0) 14:15, 93.3%; (2.5) 1:15, 6.7%	(0) 13:13, 100.0%	(0) 12:14, 85.7%; (1) 2:14, 14.3%	(0) 13:15, 86.7%; (0.5) 1:15, 6.7%; (1) 1:15, 6.7%	(0) 6:13, 46.2%; (1) 7:13, 53.8%	(0) 5:10, 50.0%; (1) 5:10, 50.0%	(0) 6:13, 46.2%; (0.5) 1:13, 7.7%; (1) 6:13, 46.2%	(1) 6:11, 54.5%; (2) 5:11, 45.5%	(1) 4:8, 50.0%; (2) 4:8, 50.0%	(1) 7:12, 58.3%; (2) 5:12, 41.7%

	DE041 - Upper molar root number UM2 (l)	DE042 - Upper molar root number UM2 (r)	DE041/42 - Upper molar root number UM2 (m)	DE043 - Peg-shaped incisor UI2 (l)	DE044 - Peg-shaped incisor UI2 (r)	DE043/44 - Peg-shaped incisor UI2 (m)	DE045 - Peg-shaped molar UM3 (l)	DE046 - Peg-shaped molar UM3 (r)	DE045/46 - Peg-shaped molar UM3 (m)	DE047 - Congenital absence UM3 (l)	DE048 - Congenital absence UM3 (r)	DE047/48 - Congenital absence UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	3	3	3	0	0	0		0	0			
Abu Tabari 02/1-3				0	0	0	0		0	0		0
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7				[(0)]		0						
Abu Tabari 02/1-8	3	3	3	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-2				0	0	0						
Abu Tabari 02/28-3	[(3)]		3	0	0	0						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	3	3	3	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-7							0	0	0	0	0	0
Abu Tabari 02/28-8	(3)		3				0	0	0	0	0	0
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				0	0	0						
Abu Tabari 02/28-15		3	3	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-20							0	0	0	0	0	0
Abu Tabari 02/28-21	2	2	2	0	(0)	0	2	1	1.5	0	0	0
Abu Tabari 02/28-22	3	3	3				0	0	0	0	0	0
Abu Tabari 02/28-23	3	[(3)]	3				0	0	0	0	0	0
Abu Tabari 03/31												
Abu Tabari 03/34-1				0	0	0	0	0	0	0	0	0
Conical Hill 95/4	3	3	3	0	0	0	0	0	0	0	0	0
Conical Hill 95/4-1								0	0		0	0
Conical Hill 02/3-4	[(3)]		3	[(0)]		0						
Djabarona 96/1-1							0	0	0	0	0	0
Djabarona 96/1-2							0	0	0	0	0	0
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE041	DE042	DE041/42	DE043	DE044	DE043/44	DE045	DE046	DE045/46	DE047	DE048	DE047/48
♂ No.	3	2	3	6	4	6	3	3	3	3	3	3
♂ Min.	3	3	3.0	0	0	0.0	0	0	0.0			
♂ Max.	3	3	3.0	0	0	0.0	0	0	0.0			
♂ Mode	3	3	3.0	0	0	0.0	0	0	0.0	0	0	0
♂ Median	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00			
♂ Mean	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00			
♂ Freq.	(3) 3:3, 100.0%	(3) 2:2, 100.0%	(3) 3:3, 100.0%	(0) 6:6, 100.0%	(0) 4:4, 100.0%	(0) 6:6, 100.0%	(0) 3:3, 100.0%	(0) 3:3, 100.0%	(0) 3:3, 100.0%	(0) 3:3, 100.0%	(0) 3:3, 100.0%	(0) 3:3, 100.0%
♀ No.	7	6	8	7	7	7	11	12	13	11	11	12
♀ Min.	2	2	2.0	0	0	0.0	0	0	0.0			
♀ Max.	3	3	3.0	0	0	0.0	2	1	1.5			
♀ Mode	3	3	3.0	0	0	0.0	0	0	0.0	0	0	0
♀ Median	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00			
♀ Mean	2.86	2.83	2.88	0.00	0.00	0.00	0.18	0.08	0.12			
♀ Freq.	(2) 1:7, 14.3%; (3) 6:7, 85.7%	(2) 1:6, 16.7%; (3) 5:6, 83.3%	(2) 1:8, 12.5%; (3) 7:8, 87.5%	(0) 7:7, 100.0%	(0) 7:7, 100.0%	(0) 7:7, 100.0%	(0) 10:11, 90.9%; (2) 1:11, 9.1%	(0) 11:12, 91.7%; (1) 1:12, 8.3%	(0) 12:13, 92.3%; (1.5) 1:13, 7.7%	(0) 11:11, 100.0%	(0) 11:11, 100.0%	(0) 12:12, 100.0%
No.	10	8	11	13	11	13	14	15	16	14	14	15
Min.	2	2	2.0	0	0	0.0	0	0	0.0			
Max.	3	3	3.0	0	0	0.0	2	1	1.5			
Mode	3	3	3.0	0	0	0.0	0	0	0.0	0	0	0
Median	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00			
Mean	2.90	2.88	2.91	0.00	0.00	0.00	0.14	0.07	0.09			
Freq.	(2) 1:10, 10.0%; (3) 9:10, 90.0%	(2) 1:8, 12.5%; (3) 7:8, 87.5%	(2) 1:11, 9.1%; (3) 10:11, 90.9%	(0) 13:13, 100.0%	(0) 11:11, 100.0%	(0) 13:13, 100.0%	(0) 13:14, 92.9%; (2) 1:14, 7.1%	(0) 14:15, 93.3%; (1) 1:15, 6.7%	(0) 15:16, 93.8%; (1.5) 1:16, 6.3%	(0) 14:14, 100.0%	(0) 14:14, 100.0%	(0) 15:15, 100.0%

	DE049 - Premol. lingual cusps LP2 (l)	DE050 - Premol. lingual cusps LP2 (r)	DE049/50 - Premol. lingual cusps LP2 (m)	DE051 - Anterior fovea LM1 (l)	DE052 - Anterior fovea LM1 (r)	DE051/52 - Anterior fovea LM1 (m)	DE053 - Groove pattern LM2 (l)	DE054 - Groove pattern LM2 (r)	DE053/54 - Groove pattern LM2 (m)	DE055 - Cusp number LM1 (l)	DE056 - Cusp number LM1 (r)	DE055/56 - Cusp number LM1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(3)]	(3)	3							[(5.5)]	(5.5)	5.5
Abu Tabari 02/1-3							1	1	11	(5.5)	(5.5)	5.5
Abu Tabari 02/1-5	(3)		3				(1)		10	[(5.5)]		5.5
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(2)	(2)	2				1	1	11	5.5	5.5	5.5
Abu Tabari 02/28-2				1	1	1	1	1	11	6	6	6
Abu Tabari 02/28-3							(1)	1	11			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5							3	(3)	33	5.5	5.5	5.5
Abu Tabari 02/28-7				(3)	(3)	3	3	3	33	5.5	(6)	5.75
Abu Tabari 02/28-8	4	[(2)]	3				1	1	11	[(5.5)]		5.5
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	0	0	0	3	3	3	3		30	5.5	5.5	5.5
Abu Tabari 02/28-15							1		10	5.5		5.5
Abu Tabari 02/28-20		[(2)]	2				[(1)]		10			
Abu Tabari 02/28-21								[(3)]	03			
Abu Tabari 02/28-22	[(4)]		4							[(5.5)]	[(5.5)]	5.5
Abu Tabari 02/28-23	[(7)]	[(2)]	4.5		[(2)]	2		1	01	5.5	5.5	5.5
Abu Tabari 03/31												
Abu Tabari 03/34-1	(3)	3	3				3	(3)	33	(5.5)	[(5.5)]	5.5
Conical Hill 95/4							3	3	33	(5.5)		5.5
Conical Hill 95/4-1												
Conical Hill 02/3-4								3	03		(5.5)	5.5
Djabarona 96/1-1	[(0)]		0				1	[(3)]	13	(6)	5.5	5.75
Djabarona 96/1-2								1	01	5.5		5.5
Djabarona 96-4							[(1)]		10		5.5	5.5
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE049	DE050	DE049/50	DE051	DE052	DE051/52	DE053	DE054	DE053/54	DE055	DE056	DE055/56
♂ No.	3	3	4	2	2	2	7	4	8	5	5	7
♂ Min.	0	0	0.0	1	1	1.0				5.5	5.5	5.5
♂ Max.	3	2	3.0	3	3	3.0				6.0	6.0	6.0
♂ Mode		2	2.0				1	1	10	5.5	5.5	5.5
♂ Median	2.00	2.00	2.00	2.00	2.00	2.00				5.50	5.50	5.50
♂ Mean	1.67	1.33	1.75	2.00	2.00	2.00				5.60	5.60	5.57
♂ Freq.	(0) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 1:4, 25.0%; (2) 2:4, 50.0%; (3) 1:4, 25.0%	(1) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 5:7, 71.4%; (3) 2:7, 28.6%	(1) 2:4, 50.0%; (3) 2:4, 50.0%	(10) 3:8, 37.5%; (11) 2:8, 25.0%; (03) 1:8, 12.5%; (30) 1:8, 12.5%; (33) 1:8, 12.5%	(5.5) 4:5, 80.0%; (6) 1:5, 20.0%	(5.5) 4:5, 80.0%; (6) 1:5, 20.0%	(5.5) 6:7, 85.7%; (6) 1:7, 14.3%
♀ No.	6	4	6	1	2	2	8	10	11	11	8	11
♀ Min.	0	2	0.0	3	2	2.0				5.5	5.5	5.5
♀ Max.	7	3	4.5	3	3	3.0				6.0	6.0	5.8
♀ Mode	3	3	3.0				1	1	11	5.5	5.5	5.5
♀ Median	3.50	2.50	3.00	3.00	2.50	2.50				5.50	5.50	5.50
♀ Mean	3.50	2.50	2.92	3.00	2.50	2.50				5.55	5.56	5.55
♀ Freq.	(0) 1:6, 16.7%; (3) 2:6, 33.3%; (4) 2:6, 33.3%; (7) 1:6, 16.7%	(2) 2:4, 50.0%; (3) 2:4, 50.0%	(0) 1:6, 16.7%; (3) 3:6, 50.0%; (4) 1:6, 16.7%; (4.5) 1:6, 16.7%	(3) 1:1, 100.0%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(1) 5:8, 62.5%; (3) 3:8, 37.5%	(1) 5:10, 50.0%; (3) 5:10, 50.0%	(01) 2:11, 18.2%; (10) 1:11, 9.1%; (11) 3:11, 27.3%; (03) 1:11, 9.1%; (13) 1:11, 9.1%; (33) 3:11, 27.3%	(5.5) 10:11, 90.9%; (6) 1:11, 9.1%	(5.5) 7:8, 87.5%; (6) 1:8, 12.5%	(5.5) 9:11, 81.8%; (5.75) 2:11, 18.2%
No.	9	7	10	3	4	4	15	14	19	16	13	18
Min.	0	0	0.0	1	1	1.0				5.5	5.5	5.5
Max.	7	3	4.5	3	3	3.0				6.0	6.0	6.0
Mode	3	2	3.0	3	3	3.0	1	1	11	5.5	5.5	5.5
Median	3.00	2.00	3.00	3.00	2.50	2.50				5.50	5.50	5.50
Mean	2.89	2.00	2.45	2.33	2.25	2.25				5.56	5.58	5.56
Freq.	(0) 2:9, 22.2%; (2) 1:9, 11.1%; (3) 3:9, 33.3%; (4) 2:9, 22.2%; (7) 1:9, 11.1%	(0) 1:7, 14.3%; (2) 4:7, 57.1%; (3) 2:7, 28.6%	(0) 2:10, 20.0%; (2) 2:10, 10.0%; (3) 4:10, 40.0%; (4) 1:10, 10.0%; (4.5) 1:10, 10.0%	(1) 1:3, 33.3%; (3) 2:3, 66.7%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 2:4, 25.0%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 2:4, 25.0%	(1) 10:15, 66.7%; (3) 5:15, 33.3%	(1) 7:14, 50.0%; (3) 7:14, 50.0%	(01) 2:19, 10.5%; (10) 4:19, 21.1%; (11) 5:19, 26.3%; (03) 2:19, 10.5%; (30) 1:19, 5.3%; (13) 1:19, 5.3%; (33) 4:19, 21.1%	(5.5) 14:16, 87.5%; (6) 2:16, 12.5%	(5.5) 11:13, 84.6%; (6) 2:13, 15.4%	(5.5) 15:18, 83.3%; (5.75) 2:18, 11.1%; (6) 1:18, 5.6%

	DE057 - Cusp number LM2 (l)	DE058 - Cusp number LM2 (r)	DE057/58 - Cusp number LM2 (m)	DE059 - Deflecting wrinkle LM1 (l)	DE060 - Deflecting wrinkle LM1 (r)	DE059/60 - Deflecting wrinkle LM1 (m)	DE061 - Distal trigonid crest LM1 (l)	DE062 - Distal trigonid crest LM1 (r)	DE061/62 - Distal trigonid crest LM1 (m)	DE063 - Protostylid LM1 (l)	DE064 - Protostylid LM1 (r)	DE063/64 - Protostylid LM1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2										(0)	0	0
Abu Tabari 02/1-3	(5.5)	5.5	5.5							0	0	0
Abu Tabari 02/1-5	[(5.5)]		5.5									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(5)	(5)	5							(0)	(0)	0
Abu Tabari 02/28-2	5.5	5.5	5.5	3	3	3	0	0	0	1	1	1
Abu Tabari 02/28-3	[(5.5)]	[(5.5)]	5.5									
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(5.5)	5.5	5.5							0	(0)	0
Abu Tabari 02/28-7	(6)	6	6							(0)		0
Abu Tabari 02/28-8	(6)	(5.5)	5.75							(5)		5
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	5		5	3	(2)	2.5	0	0	0	0	0	0
Abu Tabari 02/28-15	(5.5)		5.5							0		0
Abu Tabari 02/28-20	[(5.5)]		5.5									
Abu Tabari 02/28-21												
Abu Tabari 02/28-22	(5.5)	[(5.5)]	5.5									
Abu Tabari 02/28-23	5.5	5.5	5.5		(2)	2	0	0	0	0	0	0
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(5)]	[(5)]	5							(0)	(0)	0
Conical Hill 95/4	(5.5)	5.5	5.5									
Conical Hill 95/4-1												
Conical Hill 02/3-4		5.5	5.5					(0)	0			
Djabarona 96/1-1	5.5	(6)	5.75				0	(0)	0		(0)	0
Djabarona 96/1-2		(5.5)	5.5	[(3)]		3	0		0	(0)		0
Djabarona 96-4					[(3)]	3		0	0			
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DE057	DE058	DE057/58	DE059	DE060	DE059/60	DE061	DE062	DE061/62	DE063	DE064	DE063/64
♂ No.	6	4	7	2	3	3	2	4	4	3	3	3
♂ Min.	5.0	5.0	5.0	3	2	2.5				0	0	0.0
♂ Max.	5.5	5.5	5.5	3	3	3.0				1	1	1.0
♂ Mode	5.5	5.5	5.5	3	3	3.0	0	0	0	0	0	0.0
♂ Median	5.50	5.50	5.50	3.00	3.00	3.00				0.00	0.00	0.00
♂ Mean	5.33	5.38	5.36	3.00	2.67	2.83				0.33	0.33	0.33
♂ Freq.	(5) 2:6, 33.3%; (5.5) 4:6, 66.7%	(5) 1:4, 25.0%; (5.5) 3:4, 75.0%	(5) 2:7, 28.6%; (5.5) 5:7, 71.4%	(3) 2:2, 100.0%	(2) 1:3, 33.3%; (3) 2:3, 66.7%	(2.5) 1:3, 33.3%; (3) 2:3, 66.7%	(0) 2:2, 100.0%	(0) 4:4, 100.0%	(0) 4:4, 100.0%	(0) 2:3, 66.7%; (1) 1:3, 33.3%	(0) 2:3, 66.7%; (1) 1:3, 33.3%	(0) 2:3, 66.7%; (1) 1:3, 33.3%
♀ No.	10	10	11	1	1	2	3	2	3	9	6	10
♀ Min.	5.0	5.0	5.0	3	2	2.0				0	0	0.0
♀ Max.	6.0	6.0	6.0	3	2	3.0				5	0	5.0
♀ Mode	5.5	5.5	5.5				0	0	0	0	0	0.0
♀ Median	5.50	5.50	5.50	3.00	2.00	2.50				0.00	0.00	0.00
♀ Mean	5.55	5.55	5.55	3.00	2.00	2.50				0.56	0.00	0.50
♀ Freq.	(5) 1:10, 10.0%; (5.5) 7:10, 70.0%; (6) 2:10, 20.0%	(5) 1:10, 10.0%; (5.5) 7:10, 70.0%; (6) 2:10, 20.0%	(5) 1:11, 9.1%; (5.5) 7:11, 63.6%; (5.75) 2:11, 18.2%; (6) 1:11, 9.1%	(3) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(0) 3:3, 100.0%	(0) 2:2, 100.0%	(0) 3:3, 100.0%	(0) 8:9, 88.9%; (5) 1:9, 11.1%	(0) 6:6, 100.0%	(0) 9:10, 90.0%; (5) 1:10, 10.0%
No.	16	14	18	3	4	5	5	6	7	12	9	13
Min.	5.0	5.0	5.0	3	2	2.0				0	0	0.0
Max.	6.0	6.0	6.0	3	3	3.0				5	1	5.0
Mode	5.5	5.5	5.5	3	3	3.0	0	0	0	0	0	0.0
Median	5.50	5.50	5.50	3.00	2.50	3.00				0.00	0.00	0.00
Mean	5.47	5.50	5.47	3.00	2.50	2.70				0.50	0.11	0.46
Freq.	(5) 3:16, 18.8%; (5.5) 10:16, 62.5%; (6) 2:16, 12.5%	(5) 2:14, 14.3%; (5.5) 10:14, 71.4%; (6) 2:14, 14.3%	(5) 3:18, 16.7%; (5.5) 12:18, 66.7%; (5.75) 2:18, 11.1%; (6) 1:18, 5.6%	(3) 3:3, 100.0%	(2) 2:4, 50.0%; (3) 2:4, 50.0%	(2) 1:5, 20.0%; (2.5) 1:5, 20.0%; (3) 3:5, 60.0%	(0) 5:5, 100.0%	(0) 6:6, 100.0%	(0) 7:7, 100.0%	(0) 10:12, 83.3%; (1) 1:12, 8.3%; (5) 1:12,8.3 %	(0) 8:9, 88.9%; (1) 1:9, 11.1%	(0) 11:13, 84.6%; (1) 1:13, 7.7%; (5) 1:13, 7.7%

	DE065 - Cusp 7 LM1 (l)	DE066 - Cusp 7 LM1 (r)	DE065/66 - Cusp 7 LM1 (m)	DE067 - Tome's root LP1 (l)	DE068 - Tome's root LP1 (r)	DE067/68 - Tome's root LP1 (m)	DE069 - Canine root number LC (l)	DE070 - Canine root number LC (r)	DE069/70 - Canine root number LC (m)	DE071 - Lower molar root number LM1 (l)	DE072 - Lower molar root number LM1 (r)	DE071/72 - Lower molar root number LM1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(1.5)]	[(1.5)]	1.5				(1)	(1)	1	2	2	2
Abu Tabari 02/1-3							(1)	(1)	1	2	2	2
Abu Tabari 02/1-5	[(0)]		0				1	(1)	1			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7							(1)		1	(2)		2
Abu Tabari 02/1-8	(2)	(2)	2				1	1	1	2	2	2
Abu Tabari 02/28-2	2	2	2							(2)	(2)	2
Abu Tabari 02/28-3		[(0)]	0				(1)	(1)	1	2	2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		1.5	1.5				1	1	1	2	2	2
Abu Tabari 02/28-7										2		2
Abu Tabari 02/28-8	(2)	[(2)]	2				[(1)]	[(1)]	1			
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	3	3	3				(1)	(1)	1		2	2
Abu Tabari 02/28-15							1	1	1	(2)		2
Abu Tabari 02/28-20												
Abu Tabari 02/28-21							1	1	1	2	2	2
Abu Tabari 02/28-22							1	1	1	2	2	2
Abu Tabari 02/28-23	3	3	3				1	1	1	2	2	2
Abu Tabari 03/31												
Abu Tabari 03/34-1	1	1	1								2	2
Conical Hill 95/4	(1)	[(1)]	1				(1)	1	1	2	2	2
Conical Hill 95/4-1												
Conical Hill 02/3-4		[(1.5)]	1.5				1		1	2	2	2
Djabarona 96/1-1	[(3)]	(3)	3				(1)	1	1		2	2
Djabarona 96/1-2							(1)		1	2		2
Djabarona 96-4		4	4									
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5								(1)	1	2	2	2

	DE065	DE066	DE065/66	DE067	DE068	DE067/68	DE069	DE070	DE069/70	DE071	DE072	DE071/72
♂ No.	5	6	7	0	0	0	6	4	6	5	5	6
♂ Min.	0.0	1.0	0.0				1	1	1.0	2	2	2.0
♂ Max.	3.0	4.0	4.0				1	1	1.0	2	2	2.0
♂ Mode	2.0	2.0	2.0				1	1	1.0	2	2	2.0
♂ Median	2.00	2.00	2.00				1.00	1.00	1.00	2.00	2.00	2.00
♂ Mean	1.60	2.25	1.93				1.00	1.00	1.00	2.00	2.00	2.00
♂ Freq.	(0) 1:5, 20.0%; (1) 1:5, 20.0%; (2) 2:5, 40.0%; (3) 1:5, 20.0%	(1) 1:6, 16.7%; (1.5) 1:6, 16.7%; (2) 2:6, 33.3%; (3) 1:6, 16.7%; (4) 1:6, 16.7%	(0) 1:7, 14.3%; (1) 1:7, 14.3%; (1.5) 1:7, 14.3%; (2) 2:7, 28.6%; (3) 1:7, 14.3%; (4) 1:7, 14.3%				(1) 6:6, 100.0%	(1) 4:4, 100.0%	(1) 6:6, 100.0%	(2) 5:5, 100.0%	(2) 5:5, 100.0%	(2) 6:6, 100.0%
♀ No.	5	7	7	0	0	0	11	11	12	11	10	13
♀ Min.	1.0	0.0	0.0				1	1	1.0	2	2	2.0
♀ Max.	3.0	3.0	3.0				1	1	1.0	2	2	2.0
♀ Mode	3.0	1.5	1.5				1	1	1.0	2	2	2.0
♀ Median	2.00	1.50	1.50				1.00	1.00	1.00	2.00	2.00	2.00
♀ Mean	2.10	1.71	1.71				1.00	1.00	1.00	2.00	2.00	2.00
♀ Freq.	(1) 1:5, 20.0%; (1.5) 1:5, 20.0%; (2) 1:5, 20.0%; (3) 2:5, 40.0%	(0) 1:7, 14.3%; (1) 1:7, 14.3%; (1.5) 2:7, 28.6%; (2) 1:7, 14.3%; (3) 2:7, 28.6%	(0) 1:7, 14.3%; (1) 1:7, 14.3%; (1.5) 2:7, 28.6%; (2) 1:7, 14.3%; (3) 2:7, 28.6%				(1) 11:11, 100.0%	(1) 11:11, 100.0%	(1) 12:12, 100.0%	(2) 11:11, 100.0%	(2) 10:10, 100.0%	(2) 13:13, 100.0%
No.	10	13	14	0	0	0	17	15	18	16	15	19
Min.	0.0	0.0	0.0				1	1	1.0	2	2	2.0
Max.	3.0	4.0	4.0				1	1	1.0	2	2	2.0
Mode	2.0	1.5	1.5				1	1	1.0	2	2	2.0
Median	2.00	2.00	1.75				1.00	1.00	1.00	2.00	2.00	2.00
Mean	1.85	1.96	1.82				1.00	1.00	1.00	2.00	2.00	2.00
Freq.	(0) 1:10, 10.0%; (1) 2:10, 20.0%; (1.5) 1:10, 10.0%; (2) 3:10, 30.0%; (3) 3:10, 30.0%	(0) 1:13, 7.7%; (1) 2:, 15.4%; (1.5) 3:13, 23.1%; (2) 2:, 15.4%; (3) 4:, 30.8%; (4) 1:13, 7.7%	(0) 2:14, 14.3%; (1) 2:14, 14.3%; (1.5) 3:14, 21.4%; (2) 3:14, 21.4%; (3) 3:14, 21.4%; (4) 1:14, 7.1%				(1) 17:17, 100.0%	(1) 15:15, 100.0%	(1) 18:18, 100.0%	(2) 16:16, 100.0%	(2) 15:15, 100.0%	(2) 19:19, 100.0%

	DE073 - Lower molar root number LM2 (l)	DE074 - Lower molar root number LM2 (r)	DE073/74 - Lower molar root number LM2 (m)	DE075 - Torsomolar angle LM3 (l)	DE076 - Torsomolar angle LM3 (r)	DE075/76 - Torsomolar angle LM3 (m)	DE077 - Midline diastema	DE078 - Palatine torus	DE079 - Mandibular torus (l)	DE080 - Mandibular torus (r)	DE079/80 - Mandibular torus (m)	DE081 - Rocker jaw
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	2	2	2	0.0°	0.0°	0.0°	0	0	0	0	0	0
Abu Tabari 02/1-3	2	2	2	5.0° (ling)		5.0° (ling)	1	0	0	0	0	0
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7									[(0)]	(0)	0	
Abu Tabari 02/1-8	2	(2)	2		[(25.0°)] (ling)	25.0° (ling)	0		[(0)]		0	
Abu Tabari 02/28-2								(0)	0	0	0	0
Abu Tabari 02/28-3	2	2	2	(0.0°)	(0.0°)	0.0°						0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2	2	2	(5.0°) (vest)	(5.0°) (vest)	5.0° (vest)	(0)		(0)	0	0	0
Abu Tabari 02/28-7	2		2		(15.0°) (vest)	15.0° (vest)						(0)
Abu Tabari 02/28-8		(2)	2	20.0° (ling)	(0.0°)	10.0° (ling)						(0)
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												(0)
Abu Tabari 02/28-15	(2)		2	7.0° (ling)		7.0° (ling)	0	(0)	0		0	(1)
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2	2	2	18.0° (ling)	10.0° (ling)	14.0° (ling)	0	1	(0)	(0)	0	(1)
Abu Tabari 02/28-22	2	2	2	10.0° (ling)	13.0° (ling)	11.5° (ling)			1	1	1	0
Abu Tabari 02/28-23	[(2)]	(2)	2	7.0° (vest)	(0.0°)	3.5° (vest)	(0)	(2)	(1)	(1)	1	0
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(2)]		2									
Conical Hill 95/4	2	2	2	(0.0°)		0.0°	0	(1)	0	(0)	0	(0)
Conical Hill 95/4-1												
Conical Hill 02/3-4	2	2	2						(0)	(0)	0	
Djabarona 96/1-1	2		2	[(10.0°)] (vest)		10.0° (vest)	(0)		(0)	(0)	0	0
Djabarona 96/1-2				[(10.0°)] (vest)		10.0° (vest)			[(0)]		0	
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5	(2)	2	2									[(0)]

	DE073	DE074	DE073/74	DE075	DE076	DE075/76	DE077	DE078	DE079	DE080	DE079/80	DE081
♂ No.	3	3	3	1	1	2	2	2	5	4	5	3
♂ Min.	2	2	2.0	0.0°	25.0°	0.00°		0	0	0	0.0	0
♂ Max.	2	2	2.0	0.0°	25.0°	25.00°		1	0	0	0.0	0
♂ Mode	2	2	2.0				0		0	0	0.0	0
♂ Median	2.00	2.00	2.00	0.00°	25.00°	12.50°		0.50	0.00	0.00	0.00	0.00
♂ Mean	2.00	2.00	2.00	0.00°	25.00°	12.50°		0.50	0.00	0.00	0.00	0.00
♂ Freq.	(2) 3:3, 100.0%	(2) 3:3, 100.0%	(2) 3:3, 100.0%	(0°) 1:1, 100.0%	(21°-30°) 1:1, 100.0%	(0°) 1:2, 50.0%; (21°-30°) 1:2, 50.0%	(0) 2:2, 100.0%	(0) 1:2, 50.0%; (1) 1:2, 50.0%	(0) 5:5, 100.0%	(0) 4:4, 100.0%	(0) 5:5, 100.0%	(0) 3:3, 100.0%
♀ No.	12	9	13	11	8	12	7	5	9	7	9	12
♀ Min.	2	2	2.0	0.0°	0.0°	0.00°		0	0	0	0.0	0
♀ Max.	2	2	2.0	20.0°	15.0°	15.00°		2	1	1	1.0	1
♀ Mode	2	2	2.0	10.0°	0.0°	10.00°	0	0	0	0	0.0	0
♀ Median	2.00	2.00	2.00	7.00°	2.50°	8.50°		0.00	0.00	0.00	0.00	0.00
♀ Mean	2.00	2.00	2.00	8.36°	5.38°	7.58°		0.60	0.22	0.29	0.22	0.17
♀ Freq.	(2) 12:12, 100.0%	(2) 9:9, 100.0%	(2) 13:13, 100.0%	(0°) 2:11, 18.2%; (1°-10°) 7:11, 63.6%; (11°-20°) 2:11, 18.2%	(0°) 4:8, 50.0%; (1°-10°) 2:8, 25.0%; (11°-20°) 2:8, 25.0%	(0°) 2:12, 16.7%; (1°-10°) 7:12, 58.3%; (11°-20°) 3:12, 25.0%	(0) 6:7, 85.7%; (1) 1:7, 14.3%	(0) 3:5, 60.0%; (1) 1:5, 20.0%; (2) 1:5, 20.0%	(0) 7:9, 77.8%; (1) 2:9, 22.2%	(0) 5:7, 71.4%; (1) 2:7, 28.6%	(0) 7:9, 77.8%; (1) 2:9, 22.2%	(0) 10:12, 83.3%; (1) 2:12, 16.7%
No.	15	12	16	12	9	14	9	7	14	11	14	15
Min.	2	2	2.0	0.0°	0.0°	0.00°		0	0	0	0.0	0
Max.	2	2	2.0	20.0°	25.0°	25.00°		2	1	1	1.0	1
Mode	2	2	2.0	0.0°	0.0°	0.00°	0	0	0	0	0.0	0
Median	2.00	2.00	2.00	7.00°	5.00°	8.50°		0.00	0.00	0.00	0.00	0.00
Mean	2.00	2.00	2.00	7.67°	7.56°	8.29°		0.57	0.14	0.18	0.14	0.13
Freq.	(2) 15:15, 100.0%	(2) 12:12, 100.0%	(2) 16:16, 100.0%	(0°) 3:12, 25.0%; (1°-10°) 7:12, 58.3%; (11°-20°) 2:12, 16.7%	(0°) 4:9, 44.4%; (1°-10°) 2:9, 22.2%; (11°-20°) 2:9, 22.2%; (21°-30°) 1:9, 11.1%	(0°) 3:14, 21.4%; (1°-10°) 7:14, 50.0%; (11°-20°) 3:14, 21.4%; (21°-30°) 1:14, 7.1%	(0) 8:9, 88.9%; (1) 1:9, 11.1%	(0) 4:7, 51.7%; (1) 2:7, 28.6%; (2) 1:7, 14.3%	(0) 12:14, 85.7%; (1) 2:14, 14.3%	(0) 9:11, 81.8%; (1) 2:11, 18.2%	(0) 12:14, 85.7%; (1) 2:14, 14.3%	(0) 13:15, 86.7%; (1) 2:15, 13.3%

Appendix XVIII.C. Postcranial epigenetic traits

	PE001 - Allen's fossa (l)	PE002 - Allen's fossa (r)	PE001/2 - Allen's fossa (m)	PE001a - Allen's fossa (l) - presence	PE002a - Allen's fossa (r) - presence	PE001a/2a - Allen's fossa (m) - presence	PE001b - Allen's fossa (l) - degree	PE002b - Allen's fossa (r) - degree	PE001b/2b - Allen's fossa (m) - degree	PE003 - Poirier's facet (l)	PE004 - Poirier's facet (r)	PE003/4 - Poirier's facet (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	22		22	2		2	2		2	(1)		10
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(1)		10	1		1	0		0	[(21)]		21
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22												
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE001	PE002	PE001/2	PE001a	PE002a	PE001a/2a	PE001b	PE002b	PE001b/2b	PE003	PE004	PE003/4
♂ No.	0	0	0	0	0	0	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ Freq.												
♀ No.	2	0	2	2	0	2	2	0	2	2	0	2
♀ Min.							0		0.0			
♀ Max.							2		2.0			
♀ Mode												
♀ Median							1.00		1.00			
♀ Mean							1.00		1.00			
♀ Freq.	(10) 1:2, 50.0%; (22) 1:2, 50.0%		(10) 1:2, 50.0%; (22) 1:2, 50.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:2, 50.0%; (2) 1:2, 50.0%		(0) 1:2, 50.0%; (2) 1:2, 50.0%	(10) 1:2, 50.0%; (21) 1:2, 50.0%		(10) 1:2, 50.0%; (21) 1:2, 50.0%
No.	2	0	2	2	0	2	2	0	2	2	0	2
Min.							0		0.0			
Max.							2		2.0			
Mode												
Median							1.00		1.00			
Mean							1.00		1.00			
Freq.	(10) 1:2, 50.0%; (22) 1:2, 50.0%		(10) 1:2, 50.0%; (22) 1:2, 50.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:2, 50.0%; (2) 1:2, 50.0%		(0) 1:2, 50.0%; (2) 1:2, 50.0%	(10) 1:2, 50.0%; (21) 1:2, 50.0%		(10) 1:2, 50.0%; (21) 1:2, 50.0%

	PE003a - Poirier's facet (l) - presence	PE004a - Poirier's facet (r) - presence	PE003a/4a - Poirier's facet (m) - presence	PE003b - Poirier's facet (l) - degree	PE004b - Poirier's facet (r) - degree	PE003b/4b - Poirier's facet (m) - degree	PE005 - Plaque (*Femur*) (l)	PE006 - Plaque (*Femur*) (r)	PE005/6 - Plaque (*Femur*) (m)	PE007 - *Fossa hypotrochanterica* (l)	PE008 - *Fossa hypotrochanterica* (r)	PE007/8 - *Fossa hypotrochanterica* (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1		1	0		0	(1)		1	(1)	(1)	10
Abu Tabari 02/1-3										(1)		10
Abu Tabari 02/1-5										(1)	(1)	10
Abu Tabari 02/1-6												
Abu Tabari 02/1-7										(1)		10
Abu Tabari 02/1-8											(21)	21
Abu Tabari 02/28-2										21	21	21
Abu Tabari 02/28-3										(1)	(1)	10
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2		2	1		1	(1)		1	(1)		10
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11											(1)	10
Abu Tabari 02/28-13												
Abu Tabari 02/28-14										(1)	(1)	10
Abu Tabari 02/28-15										22		22
Abu Tabari 02/28-20												
Abu Tabari 02/28-21											[(22)]	22
Abu Tabari 02/28-22										(1)	(1)	10
Abu Tabari 02/28-23												
Abu Tabari 03/31										22		22
Abu Tabari 03/34-1										[(22)]	23	22.5
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4										[(1)]	[(1)]	10
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE003a	PE004a	PE003a/4a	PE003b	PE004b	PE003b/4b	PE005	PE006	PE005/6	PE007	PE008	PE007/8
♂ No.	0	0	0	0	0	0	0	0	0	4	3	5
♂ Min.												
♂ Max.												
♂ Mode										10	10	10
♂ Median												
♂ Mean												
♂ Freq.										(10) 3:4, 75.0%; (22) 1:4, 25.0%	(10) 3:3, 100.0%	(10) 4:5, 80.0%; (22) 1:5, 20.0%
♀ No.	2	0	2	2	0	2	2	0	2	7	5	8
♀ Min.				0		0.0						
♀ Max.				1		1.0						
♀ Mode							1		1	10	10	10
♀ Median				0.50		0.50						
♀ Mean				0.50		0.50						
♀ Freq.	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:2, 50.0%; (1) 1:2, 50.0%		(0) 1:2, 50.0%; (1) 1:2, 50.0%	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(10) 5:7, 71.4%; (22) 2:7, 28.6%	(10) 3:6, 60.0%; (22) 1:5, 20.0%; (23) 1:5, 20.0%	(10) 5:8, 62.5%; (22) 2:8, 25.0%; (22.5) 1:8, 12.5%
No.	2	0	2	2	0	2	2	0	2	11	8	13
Min.				0		0.0						
Max.				1		1.0						
Mode							1		1	10	10	10
Median				0.50		0.50						
Mean				0.50		0.50						
Freq.	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:2, 50.0%; (1) 1:2, 50.0%		(0) 1:2, 50.0%; (1) 1:2, 50.0%	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(10) 8:11, 72.7%; (22) 3:11, 27.3%	(10) 6:8, 75.0%; (22) 1:8, 12.5%; (23) 1:8, 12.5%	(10) 9:13, 69.2%; (22) 3:13, 23.1%; (22.5) 1:13, 7.7%

	PE007a - *Fossa hypotrochanterica* (l) - presence	PE008a - *Fossa hypotrochanterica* (r) - presence	PE007a/8a - *Fossa hypotrochanterica* (m) - presence	PE007b - *Fossa hypotrochanterica* (l) - degree	PE008b - *Fossa hypotrochanterica* (r) - degree	PE007b/8b - *Fossa hypotrochanterica* (m) - degree	PE009 - *Tuberculum fossae trochantericae* (l)	PE010 - *Tuberculum fossae trochantericae* (r)	PE009/10 - *Tuberculum fossae trochantericae* (m)	PE009a - *Tuberculum fossae trochantericae* (l) - presence	PE010a - *Tuberculum fossae trochantericae* (r) - presence	PE009a/10a - *Tuberculum fossae trochantericae* (m) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1	1	0	0	0	(1)		10	1		1
Abu Tabari 02/1-3	1		1	0		0						
Abu Tabari 02/1-5	1	1	1	0	0	0						
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	1		1	0		0						
Abu Tabari 02/1-8		2	2		1	1						
Abu Tabari 02/28-2	2	2	2	1	1	1						
Abu Tabari 02/28-3	1	1	1	0	0	0						
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1		1	0		0	(1)		10	1		1
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		1	1		0	0		(21)	21		2	2
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	1	1	1	0	0	0						
Abu Tabari 02/28-15	2		2	2		2						
Abu Tabari 02/28-20												
Abu Tabari 02/28-21		2	2		2	2						
Abu Tabari 02/28-22	1	1	1	0	0	0						
Abu Tabari 02/28-23												
Abu Tabari 03/31	2		2	2		2						
Abu Tabari 03/34-1	2	2	2	2	3	2.5						
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4	1	1	1	0	0	0						
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE007a	PE008a	PE007a/8a	PE007b	PE008b	PE007b/8b	PE009	PE010	PE009/10	PE009a	PE010a	PE009a/10a
♂ No.	4	3	5	4	3	5	0	1	1	0	1	1
♂ Min.				0	0	0.0						
♂ Max.				2	0	2.0						
♂ Mode	1	1	1	0	0	0.0						
♂ Median				0.00	0.00	0.00						
♂ Mean				0.50	0.00	0.40						
♂ Freq.	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 3:3, 100.0%	(1) 4:5, 80.0%; (2) 1:5, 20.0%	(0) 3:4, 75.0%; (2) 1:4, 25.0%	(0) 3:3, 100.0%	(0) 4:5, 80.0%; (2) 1:5, 20.0%		(21) 1:1, 100.0%	(21) 1:1, 100.0%		(2) 1:1, 100.0%	(2) 1:1, 100.0%
♀ No.	7	5	8	7	5	8	2	0	2	2	0	2
♀ Min.				0	0	0.0						
♀ Max.				2	3	2.5						
♀ Mode	1	1	1	0	0	0.0	10		10	1		1
♀ Median				0.00	0.00	0.00						
♀ Mean				0.57	1.00	0.81						
♀ Freq.	(1) 5:7, 71.4%; (2) 2:7, 28.6%	(1) 3:6, 60.0%; (2) 2:5, 40.0%	(1) 5:8, 62.5%; (2) 3:8, 37.5%	(0) 5:7, 71.4%; (2) 2:7, 28.6%	(0) 3:6, 60.0%; (2) 1:5, 20.0%; (3) 1:5, 20.0%	(0) 5:8, 62.5%; (2) 2:8, 25.0%; (2.5) 1:8, 12.5%	(10) 2:2, 100.0%		(10) 2:2, 100.0%	(1) 2:2, 100.0%		(1) 2:2, 100.0%
No.	11	8	13	11	8	13	2	1	3	2	1	3
Min.				0	0	0.0						
Max.				2	3	2.5						
Mode	1	1	1	0	0	0.0	10		10	1		1
Median				0.00	0.00	0.00						
Mean				0.55	0.63	0.65						
Freq.	(1) 8:11, 72.7%; (2) 3:11, 27.3%	(1) 6:8, 75.0%; (2) 2:8, 25.0%	(1) 9:13, 69.2%; (2) 4:13, 30.8%	(0) 8:11, 72.7%; (2) 3:11, 27.3%	(0) 6:8, 75.0%; (2) 1:8, 12.5%; (3) 1:8, 12.5%	(0) 9:13, 69.2%; (2) 3:13, 23.1%; (2.5) 1:13, 7.7%	(10) 2:2, 100.0%	(21) 1:1, 100.0%	(10) 2:3, 66.7%; (21) 1:3, 33.3%	(1) 2:2, 100.0%	(2) 1:1, 100.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%

	PE009b - *Tuberculum fossae trochantericae* (l) - degree	PE010b - *Tuberculum fossae trochantericae* (r) - degree	PE009b/10 b - *Tuberculum fossae trochantericae* (m) - degree	PE011 - *Trochanter tertius* (l)	PE012 - *Trochanter tertius* (r)	PE011/12 - *Trochanter tertius* (m)	PE013 - Medial squatting facet (l)	PE014 - Medial squatting facet (r)	PE013/14 - Medial squatting facet (m)	PE015 - Lateral squatting facet (l)	PE016 - Lateral squatting facet (r)	PE015/16 - Lateral squatting facet (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	0		0	(1)	(1)	1		[(2)]	2			
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	0		0					(2)	2	2		2
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		1	1		(1)	1						
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15				(1)		1	(2)		2	(2)		2
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22				(1)	[(1)]	1						
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE009b	PE010b	PE009b/10b	PE011	PE012	PE011/12	PE013	PE014	PE013/14	PE015	PE016	PE015/16
♂ No.	0	1	1	0	1	1	0	0	0	0	0	0
♂ Min.		1	1.0									
♂ Max.		1	1.0									
♂ Mode												
♂ Median		1.00	1.00									
♂ Mean		1.00	1.00									
♂ Freq.		(1) 1:1, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%						
♀ No.	2	0	2	3	2	3	1	2	3	2	0	2
♀ Min.	0		0.0									
♀ Max.	0		0.0									
♀ Mode	0		0.0	1	1	1		2	2	2		2
♀ Median	0.00		0.00									
♀ Mean	0.00		0.00									
♀ Freq.	(0) 2:2, 100.0%		(0) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(2) 1:1, 100.0%	(2) 2:2, 100.0%	(2) 3:3, 100.0%	(2) 2:2, 100.0%		(2) 2:2, 100.0%
No.	2	1	3	3	3	4	1	2	3	2	0	2
Min.	0	1	0.0									
Max.	0	1	1.0									
Mode	0		0.0	1	1	1		2	2	2		2
Median	0.00	1.00	0.00									
Mean	0.00	1.00	0.33									
Freq.	(0) 2:2, 100.0%	(1) 1:1, 100.0%	(0) 2:3, 66.7%; (1) 1:3, 33.3%	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(1) 4:4, 100.0%	(2) 1:1, 100.0%	(2) 2:2, 100.0%	(2) 3:3, 100.0%	(2) 2:2, 100.0%		(2) 2:2, 100.0%

	PE017 - *Processus supracondylaris* (l)	PE018 - *Processus supracondylaris* (r)	PE017/18 - *Processus supracondylaris* (m)	PE019 - *Foramen supratrochleare* (l)	PE020 - *Foramen supratrochleare* (r)	PE019/20 - *Foramen supratrochleare* (m)	PE019a - *Foramen supratrochleare* (l) - presence	PE020a - *Foramen supratrochleare* (r) - presence	PE019a/20a - *Foramen supratrochleare* (m) - presence	PE019b - *Foramen supratrochleare* (l) - degree	PE020b - *Foramen supratrochleare* (r) - degree	PE019b/20b - *Foramen supratrochleare* (m) - degree
Abu Tabari 95/2-3	(1)		1									
Abu Tabari 02/1-2	1	1	1	22		22	2		2	2		2
Abu Tabari 02/1-3	1	1	1		23	23		2	2		3	3
Abu Tabari 02/1-5	(1)	(1)	1									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	(1)		1									
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	1	1	1	(1)	(1)	10	1	1	1	0	0	0
Abu Tabari 02/28-3	1	(1)	1									
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1	1	1									
Abu Tabari 02/28-7	(1)		1									
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		(1)	1		[(1)]	10		1	1		0	0
Abu Tabari 02/28-13												
Abu Tabari 02/28-14		(1)	1									
Abu Tabari 02/28-15												
Abu Tabari 02/28-20	[(1)]		1									
Abu Tabari 02/28-21	1		1									
Abu Tabari 02/28-22	1	1	1	20		20	2		2	0		0
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1		(1)	1		[(1)]	10		1	1		0	0
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4		[(1)]	1									
Djabarona 96/1-1	1	1	1		[(22)]	22		2	2		2	2
Djabarona 96/1-2		(1)	1									
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4	(1)	1	1									
Djabarona 96/120-5												

	PE017	PE018	PE017/18	PE019	PE020	PE019/20	PE019a	PE020a	PE019a/20a	PE019b	PE020b	PE019b/20b
♂ No.	5	4	7	0	1	1	0	1	1	0	1	1
♂ Min.											0	0.0
♂ Max.											0	0.0
♂ Mode	1	1	1									
♂ Median											0.00	0.00
♂ Mean											0.00	0.00
♂ Freq.	(1) 5:5, 100.0%	(1) 4:4, 100.0%	(1) 7:7, 100.0%		(10) 1:1, 100.0%	(10) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%		(0) 1:1, 100.0%	(0) 1:1, 100.0%
♀ No.	8	8	10	2	3	5	2	3	5	2	3	5
♀ Min.										0	0	0.0
♀ Max.										2	3	3.0
♀ Mode	1	1	1			22	2	2	2			2.0
♀ Median										1.00	2.00	2.00
♀ Mean										1.00	1.67	1.40
♀ Freq.	(1) 8:8, 100.0%	(1) 8:8, 100.0%	(1) 10:10, 100.0%	(20) 1:2, 50.0%; (22) 1:2, 50.0%	(10) 1:3, 33.3%; (22) 1:3, 33.3%; (23) 1:3, 33.3%	(10) 1:5, 20.0%; (20) 1:5, 20.0%; (22) 2:5, 40.0%; (23) 1:5, 20.0%	(2) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 1:5, 20.0%; (2) 4:5, 80.0%	(0) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(0) 2:5, 40.0%; (2) 2:5, 40.0%; (3) 1:5, 20.0%
No.	13	12	17	2	4	6	2	4	6	2	4	6
Min.										0	0	0.0
Max.										2	3	3.0
Mode	1	1	1		10	22	2	2	2		0	0.0
Median										1.00	1.00	1.00
Mean										1.00	1.25	1.17
Freq.	(1) 13:13, 100.0%	(1) 12:12, 100.0%	(1) 17:17, 100.0%	(20) 1:2, 50.0%; (22) 1:2, 50.0%	(10) 2:4, 50.0%; (22) 1:4, 25.0%; (23) 1:4, 25.0%	(10) 2:6, 33.3%; (20) 1:6, 16.7%; (22) 2:6, 33.3%; (23) 1:6, 16.7%	(2) 2:2, 100.0%	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(1) 2:6, 33.3%; (2) 4:6, 66.7%	(0) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 2:4, 50.0%; (2) 1:4, 25.0%; (3) 1:4, 25.0%	(0) 3:6, 50.0%; (2) 2:6, 33.3%; (3) 1:6, 16.7%

	PE021 - **Foramen intertrochleare* (l)	PE022 - **Foramen intertrochleare* (r)	PE021/22 - **Foramen intertrochleare* (m)	PE021a - **Foramen intertrochleare* (l) - presence	PE022a - **Foramen intertrochleare* (r) - presence	PE021a/22a - **Foramen intertrochleare* (m) - presence	PE021b - **Foramen intertrochleare* (l) - degree	PE022b - **Foramen intertrochleare* (r) - degree	PE021b/22b - **Foramen intertrochleare* (m) - degree	PE023 - Acetabular crease (l)	PE024 - Acetabular crease (r)	PE023/24 - Acetabular crease (m)
Abu Tabari 95/2-3											[(1)]	1
Abu Tabari 02/1-2	23	23	23	2	2	2	3	3	3			
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5												
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11										[(1)]		1
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(1)		10	1		1	0		0			
Abu Tabari 02/28-22	[(20)]	22	21	2	2	2	0	2	1			
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE021	PE022	PE021/22	PE021a	PE022a	PE021a/22a	PE021b	PE022b	PE021b/22b	PE023	PE024	PE023/24
♂ No.	0	0	0	0	0	0	0	0	0	1	1	2
♂ Min.												
♂ Max.												
♂ Mode												1
♂ Median												
♂ Mean												
♂ Freq.										(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 2:2, 100.0%
♀ No.	3	2	3	3	2	3	3	2	3	0	0	0
♀ Min.							0	2	0.0			
♀ Max.							3	3	3.0			
♀ Mode				2	2	2	0					
♀ Median							0.00	2.50	1.00			
♀ Mean							1.00	2.50	1.33			
♀ Freq.	(10) 1:3, 33.3%; (20) 1:3, 33.3%; (23) 1:3, 33.3%	(22) 1:2, 50.0%; (23) 1:2, 50.0%	(10) 1:3, 33.3%; (21) 1:3, 33.3%; (23) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 2:3, 66.7%; (3) 1:3, 33.3%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (3) 1:3, 33.3%			
No.	3	2	3	3	2	3	3	2	3	1	1	2
Min.							0	2	0.0			
Max.							3	3	3.0			
Mode				2	2	2	0					1
Median							0.00	2.50	1.00			
Mean							1.00	2.50	1.33			
Freq.	(10) 1:3, 33.3%; (20) 1:3, 33.3%; (23) 1:3, 33.3%	(22) 1:2, 50.0%; (23) 1:2, 50.0%	(10) 1:3, 33.3%; (21) 1:3, 33.3%; (23) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 2:3, 66.7%; (3) 1:3, 33.3%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 2:2, 100.0%

	PE025 - *Sulcus praearicularis* (l)	PE026 - *Sulcus praearicularis* (r)	PE025/26 - *Sulcus praearicularis* (m)	PE025a - *Sulcus praearicularis* (l) - presence	PE026a - *Sulcus praearicularis* (r) - presence	PE025a/26a -*Sulcus praearicularis* (m) - presence	PE025b - *Sulcus praearicularis* (l) - degree	PE026b - *Sulcus praearicularis* (r) - degree	PE025b/26b -*Sulcus praearicularis* (m) - degree	PE027 - Accessory sacral facets (l)	PE028 - Accessory sacral facets (r)	PE027/28 - Accessory sacral facets (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	23	23	23	2	2	2	3	3	3			
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(1)		10	1		1	0		0			
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5												
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		21	21		2	2		1	1		(1)	1
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(22)]	[(22)]	22	2	2	2	2	2	2			
Abu Tabari 02/28-22												
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE025	PE026	PE025/26	PE025a	PE026a	PE025a/26a	PE025b	PE026b	PE025b/26b	PE027	PE028	PE027/28
♂ No.	0	1	1	0	1	1	0	1	1	0	1	1
♂ Min.								1	1.0			
♂ Max.								1	1.0			
♂ Mode												
♂ Median								1.00	1.00			
♂ Mean								1.00	1.00			
♂ Freq.		(21) 1:1, 100.0%	(21) 1:1, 100.0%		(2) 1:1, 100.0%	(2) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%
♀ No.	2	2	2	2	2	2	2	2	2	0	0	0
♀ Min.							2	2	2.0			
♀ Max.							3	3	3.0			
♀ Mode				2	2	2						
♀ Median							2.50	2.50	2.50			
♀ Mean							2.50	2.50	2.50			
♀ Freq.	(22) 1:2, 50.%; (23) 1:2, 50.0%	(22) 1:2, 50.%; (23) 1:2, 50.0%	(22) 1:2, 50.%; (23) 1:2, 50.0%	(2) 2:2, 100.0%	(2) 2:2, 100.0%	(2) 2:2, 100.0%	(2) 1:2, 50.%; (3) 1:2, 50.0%	(2) 1:2, 50.%; (3) 1:2, 50.0%	(2) 1:2, 50.%; (3) 1:2, 50.0%			
No.	2	3	3	2	3	3	2	3	3	0	1	1
Min.							2	1	1.0			
Max.							3	3	3.0			
Mode				2	2	2						
Median							2.50	2.00	2.00			
Mean							2.50	2.00	2.00			
Freq.	(22) 1:2, 50.%; (23) 1:2, 50.0%	(21) 1:3, 33.3%; (22) 1:3, 33.3%; (23) 1:3, 33.3%	(21) 1:3, 33.3%; (22) 1:3, 33.3%; (23) 1:3, 33.3%	(2) 2:2, 100.0%	(2) 3:3, 100.0%	(2) 3:3, 100.0%	(2) 1:2, 50.%; (3) 1:2, 50.0%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%		(1) 1:1, 100.0%	(1) 1:1, 100.0%

	PE029 - *Acromion (Facies articularis inferior)* (l)	PE030 - *Acromion (Facies articularis inferior)* (r)	PE029/30 - *Acromion (Facies articularis inferior)* (m)	PE029a - *Acromion (Facies articularis inferior)* (l) - presence	PE030a - *Acromion (Facies articularis inferior)* (r) - presence	PE029a/30a - *Acromion (Facies articularis inferior)* (m) - presence	PE029b - *Acromion (Facies articularis inferior)* (l) - degree	PE030b - *Acromion (Facies articularis inferior)* (r) - degree	PE029b/30b - *Acromion (Facies articularis inferior)* (m) - degree	PE031 - *Foramen supraspinale* (l)	PE032 - *Foramen supraspinale* (r)	PE031/32 - *Foramen supraspinale* (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		21	21		2	2		1	1			
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1		10	1		1	0		0			
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22												
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE029	PE030	PE029/30	PE029a	PE030a	PE029a/30a	PE029b	PE030b	PE029b/30b	PE031	PE032	PE031/32
♂ No.	0	0	0	0	0	0	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ Freq.												
♀ No.	1	1	2	1	1	2	1	1	2	0	0	0
♀ Min.							0	1	0.0			
♀ Max.							0	1	1.0			
♀ Mode												
♀ Median							0.00	1.00	0.50			
♀ Mean							0.00	1.00	0.50			
♀ Freq.	(10) 1:1, 100.0%	(21) 1:1, 100.0%	(10) 1:2, 50.0%; (21) 1:2, 50.0%	(1) 1:1, 100.0%	(2) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:1, 100.0%	(1) 1:1, 100.0%	(0) 1:2, 50.0%; (1) 1:2, 50.0%			
No.	1	1	2	1	1	2	1	1	2	0	0	0
Min.							0	1	0.0			
Max.							0	1	1.0			
Mode												
Median							0.00	1.00	0.50			
Mean							0.00	1.00	0.50			
Freq.	(10) 1:1, 100.0%	(21) 1:1, 100.0%	(10) 1:2, 50.0%; (21) 1:2, 50.0%	(1) 1:1, 100.0%	(2) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:1, 100.0%	(1) 1:1, 100.0%	(0) 1:2, 50.0%; (1) 1:2, 50.0%			

	PE033 - *Sulcus circumflexus* (l)	PE034 - *Sulcus circumflexus* (r)	PE033/34 - *Sulcus circumflexus* (m)	PE035 - *Incisura vasta* (l)	PE036 - *Incisura vasta* (r)	PE035/36 - *Incisura vasta* (m)	PE035a - *Incisura vasta* (l) - presence	PE036a - *Incisura vasta* (r) - presence	PE035a/36a - *Incisura vasta* (m) - presence	PE035b - *Incisura vasta* (l) - degree	PE036b - *Incisura vasta* (r) - degree	PE035b/36b - *Incisura vasta* (m) - degree
Abu Tabari 95/2-3	[(1)]		1									
Abu Tabari 02/1-2												
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2				(1)	(1)	10	1	1	1	0	0	0
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				(1)		10	1		1	0		0
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20					1	10		1	1		0	0
Abu Tabari 02/28-21				(21)	[(21)]	21	2	2	2	1	1	1
Abu Tabari 02/28-22	(1)		1	22	22	22	2	2	2	2	2	2
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4					[(1)]	10		1	1		0	0
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE033	PE034	PE033/34	PE035	PE036	PE035/36	PE035a	PE036a	PE035a/36a	PE035b	PE036b	PE035b/36b
♂ No.	1	0	1	0	2	2	0	2	2	0	2	2
♂ Min.											0	0.0
♂ Max.											0	0.0
♂ Mode					10	10		1	1		0	0.0
♂ Median											0.00	0.00
♂ Mean											0.00	0.00
♂ Freq.	(1) 1:1, 100.0%		(1) 1:1, 100.0%		(10) 2:2, 100.0%	(10) 2:2, 100.0%		(1) 2:2, 100.0%	(1) 2:2, 100.0%		(0) 2:2, 100.0%	(0) 2:2, 100.0%
♀ No.	1	0	1	3	2	3	3	2	3	3	2	3
♀ Min.										0	1	0.0
♀ Max.										2	2	2.0
♀ Mode							2	2	2			
♀ Median										1.00	1.50	1.00
♀ Mean										1.00	1.50	1.00
♀ Freq.	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(10) 1:3, 33.3%; (21) 1:3, 33.3%; (22) 1:3, 33.3%	(21) 1:2, 50.0%; (22) 1:2, 50.0%	(10) 1:3, 33.3%; (21) 1:3, 33.3%; (22) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%
No.	2	0	2	3	4	5	3	4	5	3	4	5
Min.										0	0	0.0
Max.										2	2	2.0
Mode	1		1		10	10	2	1	1		0	0.0
Median										1.00	0.50	0.00
Mean										1.00	0.75	0.60
Freq.	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(10) 1:3, 33.3%; (21) 1:3, 33.3%; (22) 1:3, 33.3%	(10) 2:4, 50.0%; (21) 1:4, 25.0%; (22) 1:4, 25.0%	(10) 3:5, 60.0%; (21) 1:5, 20.0%; (22) 1:5, 20.0%	(1) 1:3, 33.3%; (2) 2:3, 66.73%	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(1) 3:5, 60.0%; (2) 2:5, 40.0%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(0) 2:4, 50.0%; (1) 1:4, 25.0%; (2) 1:4, 25.0%	(0) 3:5, 60.0%; (1) 1:5, 20.0%; (2) 1:5, 20.0%

	PE037 - *Fossa vasta* (l)	PE038 - *Fossa vasta* (r)	PE037/38 - *Fossa vasta* (m)	PE039 - *Patella bipartita* (l)	PE040 - *Patella bipartita* (r)	PE039/40 - *Patella bipartita* (m)	PE041 - *Os trigonum* (l)	PE042 - *Os trigonum* (r)	PE041/42 - *Os trigonum* (m)	PE043 - *Facies articularis media* (l)	PE044 - *Facies articularis media* (r)	PE043/44 - *Facies articularis media* (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2												
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(1)	(1)	1	(1)	(1)	1						
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5				1		1				1	(1)	1
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15										[(2)]		2
Abu Tabari 02/28-20		1	1		1	1						
Abu Tabari 02/28-21	[(2)]		2	2	2	2						
Abu Tabari 02/28-22		(1)	1	(1)	(1)	1						
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4		[(1)]	1		(1)	1						
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE037	PE038	PE037/38	PE039	PE040	PE039/40	PE041	PE042	PE041/42	PE043	PE044	PE043/44
♂ No.	0	2	2	0	2	2	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode		1	1		1	1						
♂ Median												
♂ Mean												
♂ Freq.		(1) 2:2, 100.0%	(1) 2:2, 100.0%		(1) 2:2, 100.0%	(1) 2:2, 100.0%						
♀ No.	1	1	2	3	2	3	0	0	0	2	1	2
♀ Min.												
♀ Max.												
♀ Mode				1		1						
♀ Median												
♀ Mean												
♀ Freq.	(2) 1:1, 100.0%	(1) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%				(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%
No.	1	3	4	3	4	5	0	0	0	2	1	2
Min.												
Max.												
Mode		1	1	1	1	1						
Median												
Mean												
Freq.	(2) 1:1, 100.0%	(1) 3:3, 100.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 4:5, 80.0%; (2) 1:5, 20.0%				(1) 1:2, 50.0%; (2) 1:2, 50.0%	(1) 1:1, 100.0%	(1) 1:2, 50.0%; (2) 1:2, 50.0%

	PE045 - Lateral talar extension (l)	PE046 - Lateral talar extension (r)	PE045/46 - Lateral talar extension (m)	PE047 - *Facies articularis inferior* (l)	PE048 - *Facies articularis inferior* (r)	PE047/48 - *Facies articularis inferior* (m)	PE049 - *Facies articularis navicularis bipartita* (l)	PE050 - *Facies articularis navicularis bipartita* (r)	PE049/50 - *Facies articularis navicularis bipartita* (m)	PE051 - Anterior calcaneal facet double (l)	PE052 - Anterior calcaneal facet double (r)	PE051/52 - Anterior calcaneal facet double (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2										1	1	1
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2		2				(1)	(1)	1	1		1
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11	(2)		2	2		2	1		1	1		1
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(1)		1				1		1	(2)		2
Abu Tabari 02/28-20												
Abu Tabari 02/28-21												
Abu Tabari 02/28-22					2	2		(1)	1		1	1
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE045	PE046	PE045/46	PE047	PE048	PE047/48	PE049	PE050	PE049/50	PE051	PE052	PE051/52
♂ No.	1	0	1	1	0	1	1	0	1	1	0	1
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ Freq.	(2) 1:1, 100.0%		(2) 1:1, 100.0%	(2) 1:1, 100.0%		(2) 1:1, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%
♀ No.	2	0	2	0	1	1	2	2	3	3	2	4
♀ Min.												
♀ Max.												
♀ Mode							1	1	1	1	1	1
♀ Median												
♀ Mean												
♀ Freq.	(1) 1:2, 50.0%; (2) 1:2, 50.0%		(1) 1:2, 50.0%; (2) 1:2, 50.0%		(2) 1:1, 100.0%	(2) 1:1, 100.0%	(1) 2:2, 100.0%	(1) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 2:2, 100.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%
No.	3	0	3	1	1	2	3	2	4	4	2	5
Min.												
Max.												
Mode	2		2			2	1	1	1	1	1	1
Median												
Mean												
Freq.	(1) 1:3, 33.3%; (2) 2:3, 66.7%		(1) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 1:1, 100.0%	(2) 1:1, 100.0%	(2) 2:2, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 4:4, 100.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 2:2, 100.0%	(1) 4:5, 80.0%; (2) 1:5, 20.0%

	PE053 - Anterior calcaneal facet absent (l)	PE054 - Anterior calcaneal facet absent (r)	PE053/54 - Anterior calcaneal facet absent (m)	PE055 - *Tuberculum peroneale* (l)	PE056 - *Tuberculum peroneale* (r)	PE055/56 - *Tuberculum peroneale* (m)	PE057 - *Fovea articularis superior bipartita*	PE058 - *Ponticulus posterior*	PE059 - Lateral bridging	PE060 - *Foramen transversum bipartitum*	PE061 - *Processus spinosus bipartitus*	PE062 - *Hiatus sacralis caudalis*
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	1	1								(1)	
Abu Tabari 02/1-3												
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2												
Abu Tabari 02/28-3											(1)	
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	1		1									
Abu Tabari 02/28-7												
Abu Tabari 02/28-8							(1)					
Abu Tabari 02/28-11	1		1	(1)		1						
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15	(1)		1				1	[(1)]	[(1)]	[(1)]	[(1)]	
Abu Tabari 02/28-20												
Abu Tabari 02/28-21							1	1	(1)			
Abu Tabari 02/28-22		1	1					(1)			[(1)]	
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PE053	PE054	PE053/54	PE055	PE056	PE055/56	PE057	PE058	PE059	PE060	PE061	PE062
♂ No.	1	0	1	1	0	1	0	0	0	0	0	0
♂ Min.												
♂ Max.												
♂ Mode												
♂ Median												
♂ Mean												
♂ Freq.	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%						
♀ No.	3	2	4	0	0	0	3	3	2	1	4	0
♀ Min.												
♀ Max.												
♀ Mode	1	1	1				1	1	1		1	
♀ Median												
♀ Mean												
♀ Freq.	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 4:4, 100.0%				(1) 3:3, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 1:1, 100.0%	(1) 4:4, 100.0%	
No.	4	2	5	1	0	1	3	3	2	1	4	0
Min.												
Max.												
Mode	1	1	1				1	1	1		1	
Median												
Mean												
Freq.	(1) 4:4, 100.0%	(1) 2:2, 100.0%	(1) 5:5, 100.0%	(1) 1:1, 100.0%		(1) 1:1, 100.0%	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(1) 2:2, 100.0%	(1) 1:1, 100.0%	(1) 4:4, 100.0%	

Appendix XIX. Robusticity traits

Appendix XIX.A. Cranial robusticity traits

	CR001 - Relief of the *Planum nuchale*	CR002 - Inion (*Protuberantia occipitalis externa*)	CR003 - *Processus mastoideus*	CR004 - *Crista supramastoidea*	CR005 - *Tubera frontalia et parietalia*	CR006 - *Arcus superciliaris*	CR007 - *Glabella*	CR008 - *Forma orbitae*	CR009 - *Os zygomaticum*	CR010 - *Trigonum mandibulae /Mentum osseum*	CR011 - Corpus thickness	CR012 - *Angulus mandibulae* (gonial eversion)
Abu Tabari 95/2-3					[(4)]							
Abu Tabari 02/1-2			2	3				5	(3)	2	4	4
Abu Tabari 02/1-3	[(5)]	7	2			(2)	2		(3)	4	3	[(5)]
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7										[(7)]		
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	[(1)]	3	[(3)]	(1)	6			[(7)]	(5)	(5)	(7)	7
Abu Tabari 02/28-3								[(2)]	[(3)]	[(5)]	[(6)]	[(4)]
Abu Tabari 02/28-4												
Abu Tabari 02/28-5			8	(5)	(6)	1	(2)	6	3	4	4	5
Abu Tabari 02/28-7		[(2)]			[(6)]	[(3)]	[(1)]		[(4)]			[(6)]
Abu Tabari 02/28-8		(1)	3		7	[(7)]	7		[(3)]	[(6)]		3
Abu Tabari 02/28-11						7	6	[(4)]				
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												[(7)]
Abu Tabari 02/28-15	4	4								4	5	3
Abu Tabari 02/28-20										[(7)]	[(7)]	
Abu Tabari 02/28-21									[(5)]	[(5)]	8	[(3)]
Abu Tabari 02/28-22	(5)	2	1	4	(5)	4	3	4	3	4	5	6
Abu Tabari 02/28-23	(2)	(1)			2		[(1)]	[(2)]	4	4	5	6
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4	(7)	[(6)]	[(9)]		[(8)]					[(8)]	9	[(7)]
Conical Hill 95/4-1												
Conical Hill 02/3-4	[(8)]	[(7)]	[(8)]			[(8)]	[(8)]			[(8)]	[(7)]	
Djabarona 96/1-1	(5)	5			(5)	[(5)]		(3)	(3)	6	4	(7)
Djabarona 96/1-2	[(4)]	[(5)]										
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4						(6)	[(5)]					
Djabarona 96/120-5			[(1)]							[(5)]	(1)	

	CR001	CR002	CR003	CR004	CR005	CR006	CR007	CR008	CR009	CR010	CR011	CR012
♂ No.	2	2	2	0	2	3	3	1	0	4	3	1
♂ Min.	7	6	8		4	6	5	4		7	7	7
♂ Max.	8	7	9		8	8	8	4		8	9	7
♂ Mode										7	7	
♂ Median	7.50	6.50	8.50		6.00	7.00	6.00	4.00		7.50	7.00	7.00
♂ Mean	7.50	6.50	8.50		6.00	7.00	6.33	4.00		7.50	7.67	7.00
♂ Freq.	(7) 1:2, 50.0%; (8) 1:2, 50.0%	(6) 1:2, 50.0%; (7) 1:2, 50.0%	(8) 1:2, 50.0%; (9) 1:2, 50.0%		(4) 1:2, 50.0%; (8) 1:2, 50.0%	(6) 1:3, 33.3%; (7) 1:3, 33.3%; (8) 1:3, 33.3%	(5) 1:3, 33.3%; (6) 1:3, 33.3%; (8) 1:3, 33.3%	(4) 1:1, 100.0%		(7) 2:4, 50.0%; (8) 2:4, 50.0%	(7) 2:3, 66.7%; (9) 1:3, 33.3%	(7) 1:1, 100.0%
♀ No.	6	8	6	3	6	6	6	6	10	11	10	11
♀ Min.	2	1	1	3	2	1	1	2	3	2	1	3
♀ Max.	5	7	8	5	7	7	7	6	5	6	8	7
♀ Mode	5	2	2		6		2	2	3	4	4	6
♀ Median	4.50	3.00	2.00	4.00	5.50	3.50	2.00	3.50	3.00	4.00	4.50	5.00
♀ Mean	4.17	3.38	2.83	4.00	5.17	3.67	2.67	3.67	3.40	4.45	4.50	4.73
♀ Freq.	(2) 1:6, 16.7%; (4) 2:6, 33.3%; (5) 3:6, 50.0%	(1) 2:8, 25.0%; (2) 2:8, 25.0%; (4) 1:8, 12.5%; (5) 2:8, 25.0%; (7) 1:8, 12.5%	(1) 2:6, 33.3%; (2) 2:6, 33.3%; (3) 1:6, 16.7%; (8) 1:6, 16.7%	(3) 1:3, 33.3%; (4) 1:3, 33.3%; (5) 1:3, 33.3%	(2) 1:6, 16.7%; (5) 2:6, 33.3%; (6) 2:6, 33.3%; (7) 1:6, 16.7%	(1) 1:6, 16.7%; (2) 1:6, 16.7%; (3) 1:6, 16.7%; (4) 1:6, 16.7%; (5) 1:6, 16.7%; (7) 1:6, 16.7%	(1) 2:6, 33.3%; (2) 2:6, 33.3%; (3) 1:6, 16.7%; (7) 1:6, 16.7%	(2) 2:6, 33.3%; (3) 1:6, 16.7%; (4) 1:6, 16.7%; (5) 1:6, 16.7%; (6) 1:6, 16.7%	(3) 7:10, 70.0%; (4) 2:10, 20.0%; (5) 1:10, 10.0%	(2) 1:11, 9.1%; (4) 5:11, 45.5%; (5) 3:11, 27.3%; (6) 2:11, 18.2%	(1) 1:10, 10.0%; (3) 1:10, 10.0%; (4) 3:10, 30.0%; (5) 3:10, 30.0%; (6) 1:10, 10.0%; (8) 1:10, 10.0%	(3) 3:11, 27.3%; (4) 2:11, 18.2%; (5) 2:11, 18.2%; (6) 3:11, 27.3%; (7) 1:11, 9.1%
No.	8	10	8	3	8	9	9	7	10	15	13	12
Min.	2	1	1	3	2	1	1	2	3	2	1	3
Max.	8	7	9	5	8	8	8	6	5	8	9	7
Mode	5	7	2		6	7	2	2	3	4	4	6
Median	5.00	4.50	2.50	4.00	5.50	5.00	3.00	4.00	3.00	5.00	5.00	5.00
Mean	5.00	4.00	4.25	4.00	5.38	4.78	3.89	3.71	3.40	5.27	5.23	4.92
Freq.	(2) 1:8, 12.5%; (4) 2:8, 25.0%; (5) 3:8, 37.5%; (7) 1:8, 12.5%; (8) 1:8, 12.5%	(1) 2:10, 20.0%; (2) 2:10, 20.0%; (4) 1:10, 10.0%; (5) 2:10, 20.0%; (6) 1:10, 10.0%; (7) 2:10, 20.0%	(1) 2:8, 25.0%; (2) 2:8, 25.0%; (3) 1:8, 12.5%; (8) 2:8, 25.0%; (9) 1:8, 12.5%	(3) 1:3, 33.3%; (4) 1:3, 33.3%; (5) 1:3, 33.3%	(2) 1:8, 12.5%; (4) 1:8, 12.5%; (5) 2:8, 25.0%; (6) 2:8, 25.0%; (7) 1:8, 12.5%; (8) 1:8, 12.5%	(1) 1:9, 11.1%; (2) 1:9, 11.1%; (3) 1:9, 11.1%; (4) 1:9, 11.1%; (5) 1:9, 11.1%; (6) 1:9, 11.1%; (7) 2:9, 22.2%; (8) 1:9, 11.1%	(1) 2:9, 22.2%; (2) 2:9, 22.2%; (3) 1:9, 11.1%; (6) 1:9, 11.1%; (5) 1:9, 11.1%; (7) 1:9, 11.1%; (8) 1:9, 11.1%	(2) 2:7, 28.3%; (3) 1:7, 14.3%; (4) 2:7, 28.6%; (5) 1:7, 14.3%; (6) 1:7, 14.3%	(3) 7:10, 70.0%; (4) 2:10, 20.0%; (5) 1:10, 10.0%	(2) 1:15, 6.7%; (4) 5:15, 33.3%; (5) 3:15, 20.0%; (6) 2:15, 13.3%; (7) 2:15, 13.3%; (8) 2:15, 13.3%	(1) 1:13, 7.7%; (3) 1:13, 7.7%; (4) 3:13, 23.1%; (5) 3:13, 23.1%; (6) 1:13, 7.7%; (7) 2:13, 15.4%; (8) 1:13, 7.7%; (9) 1:13, 7.7%	(3) 3:12, 25.0%; (4) 2:12, 16.7%; (5) 2:12, 16.7%; (6) 3:12, 25.0%; (7) 2:12, 16.7%

All descriptive statistics were calculated without sub-adult values.

Appendix XIX.B. Postcranial robusticity traits

	PR001 - Humeral shaft bowing (l)	PR002 - Humeral shaft bowing (r)	PR001/2 - Humeral shaft bowing (m)	PR003 - Radial shaft bowing (l)	PR004 - Radial shaft bowing (r)	PR003/4 - Radial shaft bowing (m)	PR005 - Radial *Margo interosseus* size (l)	PR006 - Radial *Margo interosseus* size (r)	PR005/6 - Radial *Margo interosseus* size (m)	PR007 - Ulnar shaft bowing (l)	PR008 - Ulnar shaft bowing (r)	PR007/8 - Ulnar shaft bowing (m)
Abu Tabari 95/2-3	[(6)]		6					[(7)]	7			
Abu Tabari 02/1-2	7	9	8	7		7	6		6	8	7	7.5
Abu Tabari 02/1-3	5	5	5	(1)		1	7		7	7		7
Abu Tabari 02/1-5	5	9	7	(4)		4	(7)		7	5	5	5
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	[(5)]	(4)	4.5									
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	3	3	3	(6)	3	4.5	(4)	4	4	2	(4)	3
Abu Tabari 02/28-3	5	6	5.5	(8)	(5)	6.5				(6)	(5)	5.5
Abu Tabari 02/28-4				[(6)]		6				[(6)]		6
Abu Tabari 02/28-5	5	7	6	4	6	5	6	5	5.5	3	4	3.5
Abu Tabari 02/28-7	(3)		3	[(5)]		5				[(3)]		3
Abu Tabari 02/28-8				(7)	(4)	5.5		(6)	6	[(3)]	(2)	2.5
Abu Tabari 02/28-11		[(5)]	5	[(4)]	[(4)]	4	(5)	[(5)]	5	3	4	3.5
Abu Tabari 02/28-13												
Abu Tabari 02/28-14		[(6)]	6		[(2)]	2		[(4)]	4		[(2)]	2
Abu Tabari 02/28-15					(2)	2		(5)	5		[(5)]	5
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	4		4	[(6)]		6				[(4)]		4
Abu Tabari 02/28-22	4	5	4.5	5	5	5	6	6	6	6	5	5.5
Abu Tabari 02/28-23								[(5)]	5			
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(4)]		4									
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	[(3)]	[(5)]	4	(7)		7	[(3)]		3		[(5)]	5
Djabarona 96/1-2		[(5)]	5									
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		6	6		7	7		[(4)]	4		5	5
Djabarona 96/120-5												

	PR001	PR002	PR001/2	PR003	PR004	PR003/4	PR005	PR006	PR005/6	PR007	PR008	PR007/8
♂ No.	3	4	5	3	2	4	2	3	4	3	3	4
♂ Min.	5	4	4.5	4	4	4.0	5	4	4.0	3	4	3.5
♂ Max.	6	9	7.0	6	7	7.0	7	7	7.0	6	5	6.0
♂ Mode	5		6.0	4		4.0			7.0		5	5.0
♂ Median	5.00	5.50	6.00	4.00	5.50	5.00	6.00	5.00	6.00	5.00	5.00	5.00
♂ Mean	5.33	6.00	5.70	4.67	5.50	5.25	6.00	5.33	5.75	4.67	4.67	4.88
♂ Freq.	(5) 2:3, 66.7%; (6) 1:3, 33.3%	(4) 1:4, 25.0%; (5) 1:4, 25.0%; (6) 1:4, 25.0%; (9) 1:4, 25.0%	(4.5) 1:5, 20.0%; (5) 1:5, 20.0%; (6) 2:5, 40.0%; (7) 1:5, 20.0%	(4) 2:3, 66.7%; (6) 1:3, 33.3%	(4) 1:2, 50.0%; (7) 1:2, 50.0%	(4) 2:4, 50.0%; (6) 1:4, 25.0%; (7) 1:4, 25.0%	(5) 1:2, 50.0%; (7) 1:2, 50.0%	(4) 1:3, 33.3%; (5) 1:3, 33.3%; (7) 1:3, 33.3%	(4) 1:4, 25.0%; (5) 1:4, 25.0%; (7) 2:4, 50.0%	(3) 1:3, 33.3%; (5) 1:3, 33.3%; (6) 1:3, 33.3%	(4) 1:3, 33.3%; (5) 2:3, 66.7%	(3.5) 1:4, 25.0%; (5) 2:4, 50.0%; (6) 1:4, 25.0%
♀ No.	9	7	10	9	5	10	5	5	8	8	7	10
♀ Min.	3	5	3.0	1	2	1.0	3	5	3.0	3	2	2.5
♀ Max.	7	9	8.0	8	6	7.0	7	6	7.0	8	7	7.5
♀ Mode	5	5	4.0	7	5	5.0	6	5	6.0	3	5	5.5
♀ Median	4.00	5.00	4.75	6.00	5.00	5.25	6.00	5.00	5.75	5.00	5.00	5.00
♀ Mean	4.44	6.00	4.90	5.56	4.40	5.00	5.60	5.40	5.44	5.00	4.71	4.85
♀ Freq.	(3) 2:9, 22.2%; (4) 3:9, 33.3%; (5) 3:9, 33.3%; (7) 1:9, 11.1%	(5) 4:7, 57.1%; (6) 1:7, 14.3%; (7) 1:7, 14.3%; (9) 1:7, 14.3%	(3) 1:10, 10.0%; (4) 3:10, 30.0%; (4.5) 1:10, 10.0%; (5) 2:10, 20.0%; (5.5) 1:10, 10.0%; (6) 1:10, 10.0%; (8) 1:10, 10.0%	(1) 1:9, 11.1%; (4) 1:9, 11.1%; (5) 2:9, 22.2%; (6) 1:9, 11.1%; (7) 3:9, 33.3%; (8) 1:9, 11.1%	(2) 1:5, 20.0%; (4) 1:5, 20.0%; (5) 2:5, 40.0%; (6) 1:5, 20.0%	(1) 1:10, 10.0%; (2) 1:10, 10.0%; (5) 3:10, 30.0%; (5.5) 1:10, 10.0%; (6) 1:10, 10.0%; (6.5) 1:10, 10.0%; (7) 2:10, 20.0%	(3) 1:5, 20.0%; (6) 3:5, 60.0%; (7) 1:5, 20.0%	(5) 3:5, 60.0%; (6) 2:5, 40.0%	(3) 1:8, 12.5%; (5) 2:8, 25.0%; (5.5) 1:8, 12.5%; (6) 3:8, 37.5%; (7) 1:8, 12.5%	(3) 3:8, 37.5%; (4) 1:8, 12.5%; (6) 2:8, 25.0%; (7) 1:8, 12.5%; (8) 1:8, 12.5%	(2) 1:7, 14.3%; (4) 1:7, 14.3%; (5) 4:7, 57.1%; (7) 1:7, 14.3%	(2.5) 1:10, 10.0%; (3) 1:10, 10.0%; (3.5) 1:10, 10.0%; (4) 1:10, 10.0%; (5) 2:10, 20.0%; (5.5) 2:10, 20.0%; (7) 1:10, 10.0%; (7.5) 1:10, 10.0%
No.	12	11	15	12	7	14	7	8	12	11	10	14
Min.	3	4	3.0	1	2	1.0	3	4	3.0	3	2	2.5
Max.	7	9	8.0	8	7	7.0	7	7	7.0	8	7	7.5
Mode	5	5	6.0	7	5	7.0	6	5	7.0	3	5	5.0
Median	5.00	5.00	5.00	5.50	5.00	5.25	6.00	5.00	5.75	5.00	5.00	5.00
Mean	4.67	6.00	5.17	5.33	4.71	5.07	5.71	5.38	5.54	4.91	4.70	4.86
Freq.	(3) 2:12, 16.7%; (4) 3:12, 25.0%; (5) 5:12, 41.7%; (6) 1:12, 8.3%; (7) 1:12, 8.3%	(4) 1:11, 9.1%; (5) 5:11, 45.5%; (6) 2:11, 18.2%; (7) 1:11, 9.1%; (9) 2:11, 18.2%	(3) 1:15, 6.7%; (4) 3:15, 20.0%; (4.5) 2:15, 13.3%; (5) 3:15, 20.0%; (5.5) 1:15, 6.7%; (6) 3:15, 20.0%; (7) 1:15, 6.7%; (8) 1:15, 6.7%	(1) 1:12, 8.3%; (4) 3:12, 25.0%; (5) 2:12, 16.7%; (6) 2:12, 16.7%; (7) 3:12, 25.0%; (8) 1:12, 8.3%	(2) 1:7, 14.3%; (4) 2:7, 28.6%; (5) 2:7, 28.6%; (6) 1:7, 14.3%; (7) 1:7, 14.3%	(1) 1:14, 7.1%; (2) 1:14, 7.1%; (4) 2:14, 14.3%; (5) 3:14, 21.4%; (5.5) 1:14, 7.1%; (6) 2:14, 14.3%; (6.5) 1:14, 7.1%; (7) 3:14, 21.4%	(3) 1:7, 14.3%; (5) 1:7, 14.3%; (6) 3:7, 42.9%; (7) 2:7, 28.6%	(4) 1:8, 12.5%; (5) 4:8, 50.0%; (6) 2:8, 25.0%; (7) 1:8, 12.5%	(3) 1:12, 8.3%; (4) 1:12, 8.3%; (5) 3:12, 25.0%; (5.5) 1:12, 8.3%; (6) 3:12, 25.0%; (7) 3:12, 25.0%	(3) 4:11, 36.4%; (4) 1:11, 9.1%; (5) 1:11, 9.1%; (6) 3:11, 27.3%; (7) 1:11, 9.1%; (8) 1:11, 9.1%	(2) 1:10, 10.0%; (4) 2:10, 20.0%; (5) 6:10, 60.0%; (7) 1:10, 10.0%	(2.5) 1:14, 7.1%; (3) 1:14, 7.1%; (3.5) 2:14, 14.3%; (4) 1:14, 7.1%; (5) 4:14, 28.6%; (5.5) 2:14, 14.3%; (6) 1:14, 7.1%; (7) 1:14, 7.1%; (7.5) 1:14, 7.1%

All descriptive statistics were calculated without sub-adult values.

	PR009 - Ulnar *Margo interosseus* size (l)	PR010 - Ulnar *Margo interosseus* size (r)	PR009/10 - Ulnar *Margo interosseus* size (m)	PR011 - Femoral shaft bowing (l)	PR012 - Femoral shaft bowing (r)	PR011/12 - Femoral shaft bowing (m) - overall combined score	PR011a - Femoral shaft bowing (l) - shape	PR012a - Femoral shaft bowing (r) - shape	PR011a/12 a - Femoral shaft bowing (m) - combined shape score	PR011b - Femoral shaft bowing (l) - degree	PR012b - Femoral shaft bowing (r) - degree	PR011b/12 b - Femoral shaft bowing (m) – degree
Abu Tabari 95/2-3				[(10)]	[(10)]	10	1	1	1	0	0	0
Abu Tabari 02/1-2	9	(8)	8.5	54	54	54	5	5	5	4	4	4
Abu Tabari 02/1-3	6		6	(54)	54	54	5	5	5	4	4	4
Abu Tabari 02/1-5	(7)	7	7	55	55	55	5	5	5	5	5	5
Abu Tabari 02/1-6												
Abu Tabari 02/1-7				54	[(54)]	54	5	5	5	4	4	4
Abu Tabari 02/1-8				43		43	4		4	3		3
Abu Tabari 02/28-2	(5)	5	5	31	32	31.5	3	3	3	1	2	1.5
Abu Tabari 02/28-3				(54)	54	54	5	5	5	4	4	4
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	7	7	7	54	54	54	5	5	5	4	4	4
Abu Tabari 02/28-7												
Abu Tabari 02/28-8		(5)	5	(45)		45	4		4	5		5
Abu Tabari 02/28-11	5	(5)	5		(53)	53		5	5		3	3
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				[(32)]	[(32)]	32	3	3	3	2	2	2
Abu Tabari 02/28-15		(8)	8		[(53)]	53		5	5		3	3
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(5)]		5	[(53)]	[(53)]	53	5	5	5	3	3	3
Abu Tabari 02/28-22	4	5	4.5	45	45	45	4	4	4	5	5	5
Abu Tabari 02/28-23		[(4)]	4		[(32)]	32		3	3		2	2
Abu Tabari 03/31				[(54)]		54	5		5	4		4
Abu Tabari 03/34-1					10	10		1	1		0	0
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4					[(53)]	53		5	5		3	3
Djabarona 96/1-1		[(2)]	2	[(53)]	(44)	53.5	5	4	4.5	3	4	3.5
Djabarona 96/1-2												
Djabarona 96-4					(53)	53		5	5		3	3
Djabarona 96/120-3												
Djabarona 96/120-4		(3)	3	[(53)]		53	5		5	3		3
Djabarona 96/120-5												

	PR009	PR010	PR009/10	PR011	PR012	PR011/12	PR011a	PR012a	PR011a/12a	PR011b	PR012b	PR011b/12b
♂ No.	2	3	3	5	6	8	5	6	8	5	6	8
♂ Min.	5	3	3.0							0	0	0.0
♂ Max.	7	7	7.0							5	5	5.0
♂ Mode				54	53	53	5	5	5	4	3	3.0
♂ Median	6.00	5.00	5.00							4.00	3.00	3.00
♂ Mean	6.00	5.00	5.00							3.20	3.00	3.13
♂ Freq.	(5) 1:2, 50.0%; (7) 1:2, 50.0%	(3) 1:3, 33.3%; (5) 1:3, 33.3%; (7) 1:3, 33.3%	(3) 1:3, 33.3%; (5) 1:3, 33.3%; (7) 1:3, 33.3%	(10) 1:5, 20.0%; (53) 1:5, 20.0%; (54) 2:5, 40.0%; (55) 1:5, 20.0%	(10) 1:6, 16.7%; (53) 3:6, 50.0%; (54) 1:6, 16.7%; (55) 1:6, 16.7%	(10) 1:8, 12.5%; (53) 4:8, 50.0%; (54) 2:8, 25.0%; (55) 1:8, 12.5%	(1) 1:5, 20.0%; (5) 4:5, 80.0%	(1) 1:6, 16.7%; (5) 4:6, 66.7%	(1) 1:8, 12.5%; (5) 7:8, 87.5%	(0) 1:5, 20.0%; (3) 1:5, 20.0%; (4) 2:5, 40.0%; (5) 1:5, 20.0%	(0) 1:6, 16.7%; (3) 3:6, 50.0%; (4) 1:6, 16.7%; (5) 1:6, 16.7%	(0) 1:8, 12.5%; (3) 4:8, 50.0%; (4) 2:8, 25.0%; (5) 1:8, 12.5%
♀ No.	5	7	9	8	10	11	8	10	11	8	10	11
♀ Min.	4	2	2.0							3	0	0.0
♀ Max.	9	8	8.5							5	5	5.0
♀ Mode		8	5.0	54	54	54	5	5	5	4	4	4.0
♀ Median	6.00	5.00	5.00							4.00	4.00	4.00
♀ Mean	6.20	5.57	5.56							4.00	3.30	3.41
♀ Freq.	(4) 1:5, 20.0%; (5) 1:5, 20.0%; (6) 1:5, 20.0%; (7) 1:5, 20.0%; (9) 1:5, 20.0%	(2) 1:7, 14.3%; (4) 1:7, 14.3%; (5) 2:7, 28.6%; (7) 1:7, 14.3%; (8) 2:7, 28.6%	(2) 1:9, 11.1%; (4) 1:9, 11.1%; (4.5) 1:9, 11.1%; (5) 2:9, 22.2%; (6) 1:9, 11.1%; (7) 1:9, 11.1%; (8) 1:9, 11.1%; (8.5) 1:9, 11.1%	(45) 2:8, 25.0%; (53) 2:8, 25.0%; (54) 4:8, 50.0%	(10) 1:10, 10.0%; (32) 1:10, 10.0%; (44) 1:10, 10.0%; (45) 1:10, 10.0%; (53) 2:10, 20.0%; (54) 4:10, 40.0%	(10) 1:11, 9.1%; (32) 1:11, 9.1%; (45) 2:11, 18.2%; (53) 2:11, 18.2%; (53.5) 1:11, 9.1%; (54) 4:11, 36.4%	(4) 2:8, 25.0%; (5) 6:8, 75.0%	(1) 1:10, 10.0%; (3) 1:10, 10.0%; (4) 2:10, 20.0%; (5) 6:10, 60.0%	(1) 1:11, 9.1%; (3) 1:11, 9.1%; (4) 2:11, 18.2%; (5) 7:11, 63.6%	(3) 2:8, 25.0%; (4) 4:8, 50.0%; (5) 2:8, 25.0%	(0) 1:10, 10.0%; (2) 1:10, 10.0%; (3) 2:10, 20.0%; (4) 5:10, 50.0%; (5) 1:10, 10.0%	(0) 1:11, 9.1%; (2) 1:11, 9.1%; (3) 2:11, 18.2%; (3.5) 1:11, 9.1%; (4) 4:11, 36.4%; (5) 2:11, 18.2%
No.	7	10	12	13	16	19	13	16	19	13	16	19
Min.	4	2	2.0							0	0	0.0
Max.	9	8	8.5							5	5	5.0
Mode	7	5	5.0	54	54	54	5	5	5	4	4	4.0
Median	6.00	5.00	5.00							4.00	3.50	3.50
Mean	6.14	5.40	5.42							3.69	3.19	3.29
Freq.	(4) 1:7, 14.3%; (5) 2:7, 28.6%; (6) 1:7, 14.3%; (7) 2:7, 28.6%; (9) 1:7, 14.3%	(2) 1:10, 10.0%; (3) 1:10, 10.0%; (4) 1:10, 10.0%; (5) 3:10, 30.0%; (7) 2:10, 20.0%; (8) 2:10, 20.0%	(2) 1:12, 8.3%; (3) 1:12, 8.3%; (4) 1:12, 8.3%; (4.5) 1:12, 8.3%; (5) 3:12, 25.0%; (6) 1:12, 8.3%; (7) 2:12, 16.7%; (8) 1:12, 8.3%; (8.5) 1:12, 8.3%	(10) 1:13, 7.7%; (45) 2:13, 15.4%; (53) 3:13, 23.1%; (54) 6:13, 46.2%; (55) 1:13, 7.7%	(10) 2:16, 12.5%; (32) 1:16, 6.3%; (44) 1:16, 6.3%; (45) 1:16, 6.3%; (53) 5:16, 31.3%; (54) 5:16, 31.3%; (55) 1:16, 6.3%	(10) 2:19, 10.5%; (32) 1:19, 5.3%; (45) 2:19, 10.5%; (53) 6:19, 31.6%; (53.5) 1:19, 5.3%; (54) 6:19, 31.6%; (55) 1:19, 5.3%	(1) 1:13, 7.7%; (4) 2:13, 15.4%; (5) 10:13, 76.9%	(1) 2:16, 12.5%; (3) 1:16, 6.3%; (4) 2:16, 12.5%; (5) 11:16, 68.8%	(1) 2:19, 10.5%; (3) 1:19, 5.3%; (4) 2:19, 10.5%; (5) 14:19, 73.4%	(0) 1:13, 7.7%; (3) 3:13, 23.1%; (4) 6:13, 46.2%; (5) 3:13, 23.1%	(0) 2:16, 12.5%; (2) 1:16, 6.3%; (3) 5:16, 31.3%; (4) 6:16, 37.5%; (5) 2:16, 12.5%	(0) 2:19, 10.5%; (2) 1:19, 5.3%; (3) 6:19, 31.6%; (3.5) 1:19, 5.3%; (4) 6:19, 31.6%; (5) 3:19, 15.8%

	PR013 - Pilasterism (l)	PR014 - Pilasterism (r)	PR013/14 - Pilasterism (m)	PR015 - Tibial retroversion (l)	PR016 - Tibial retroversion (r)	PR015/16 - Tibial retroversion (m)
Abu Tabari 95/2-3	[(4)]		4			
Abu Tabari 02/1-2	7	7	7	[(7)]	[(7)]	7
Abu Tabari 02/1-3	5	(6)	5.5			
Abu Tabari 02/1-5	6	6	6			
Abu Tabari 02/1-6						
Abu Tabari 02/1-7	(6)	[(6)]	6			
Abu Tabari 02/1-8	2		2			
Abu Tabari 02/28-2	1	1	1	8	8	8
Abu Tabari 02/28-3	(7)	(7)	7	[(1)]		1
Abu Tabari 02/28-4	[(3)]		3			
Abu Tabari 02/28-5	8	8	8	(5)		5
Abu Tabari 02/28-7						
Abu Tabari 02/28-8	(3)		3			
Abu Tabari 02/28-11		(4)	4			
Abu Tabari 02/28-13						
Abu Tabari 02/28-14		[(1)]	1			
Abu Tabari 02/28-15		(5)	5		[(7)]	7
Abu Tabari 02/28-20						
Abu Tabari 02/28-21	[(6)]	[(6)]	6			
Abu Tabari 02/28-22	(5)	9	7	(7)	[(7)]	7
Abu Tabari 02/28-23						
Abu Tabari 03/31	[(5)]		5			
Abu Tabari 03/34-1		4	4			
Conical Hill 95/4						
Conical Hill 95/4-1						
Conical Hill 02/3-4		[(6)]	6			
Djabarona 96/1-1	[(6)]	(6)	6		[(5)]	5
Djabarona 96/1-2						
Djabarona 96-4		(8)	8	[(6)]		6
Djabarona 96/120-3						
Djabarona 96/120-4	[(6)]		6			
Djabarona 96/120-5						

	PR013	PR014	PR013/14	PR015	PR016	PR015/16
♂ No.	6	5	9	1	0	1
♂ Min.	3	4	3.0	6		6.0
♂ Max.	6	8	8.0	6		6.0
♂ Mode	6	6	6.0			
♂ Median	5.50	6.00	6.00	6.00		6.00
♂ Mean	5.00	6.00	5.33	6.00		6.00
♂ Freq.	(3) 1:6, 16.7%; (4) 1:6, 16.7%; (5) 1:6, 16.7%; (6) 3:6, 50.0%	(4) 1:5, 20.0%; (6) 3:5, 60.0%; (8) 1:5, 20.0%	(3) 1:9, 11.1%; (4) 2:9, 22.2%; (5) 1:9, 11.1%; (6) 4:9, 44.4%; (8) 1:9, 11.1%	(6) 1:1, 100.0%		(6) 1:1, 100.0%
♀ No.	8	9	10	4	4	6
♀ Min.	3	4	3.0	1	5	1.0
♀ Max.	8	9	8.0	7	7	7.0
♀ Mode	7	6	7.0	7	7	7.0
♀ Median	6.00	6.00	6.00	6.00	7.00	6.00
♀ Mean	5.88	6.44	5.85	5.00	6.50	5.33
♀ Freq.	(3) 1:8, 12.5%; (5) 2:8, 25.0%; (6) 2:8, 25.0%; (7) 2:8, 25.0%; (8) 1:8, 12.5%	(4) 1:9, 11.1%; (5) 1:9, 11.1%; (6) 3:9, 33.3%; (7) 2:9, 22.2%; (8) 1:9, 11.1%; (9) 1:9, 11.1%	(3) 1:10, 10.0%; (4) 1:10, 10.0%; (5) 1:10, 10.0%; (5.5) 1:10, 10.0%; (6) 2:10, 20.0%; (7) 3:10, 30.0%; (8) 1:10, 10.0%	(1) 1:4, 25.0%; (5) 1:4, 25.0%; (7) 2:4, 50.0%	(5) 1:4, 25.0%; (7) 3:4, 75.0%	(1) 1:6, 16.7%; (5) 2:6, 33.3%; (7) 3:6, 50.0%
No.	14	14	19	5	4	7
Min.	3	4	3.0	1	5	1.0
Max.	8	9	8.0	7	7	7.0
Mode	6	6	6.0	7	7	7.0
Median	6.00	6.00	6.00	6.00	7.00	6.00
Mean	5.50	6.29	5.61	5.20	6.50	5.43
Freq.	(3) 2:14, 14.3%; (4) 1:14, 7.1%; (5) 3:14, 21.4%; (6) 5:14, 35.7%; (7) 2:14, 14.3%; (8) 1:14, 7.1%	(4) 2:14, 14.3%; (5) 1:14, 7.1%; (6) 6:14, 42.9%; (7) 2:14, 14.3%; (8) 2:14, 14.3%; (9) 1:14, 7.1%	(3) 2:19, 10.5%; (4) 3:19, 15.8%; (5) 2:19, 10.5%; (5.5) 1:19, 5.3%; (6) 6:19, 31.6%; (7) 3:19, 15.8%; (8) 2:19, 10.5%	(1) 1:5, 20.0%; (5) 1:5, 20.0%; (6) 1:5, 20.0%; (7) 2:5, 40.0%	(5) 1:4, 25.0%; (7) 3:4, 75.0%	(1) 1:7, 14.3%; (5) 2:7, 28.6%; (6) 1:7, 14.3%; (7) 3:7, 42.9%

Appendix XX. Occupational stress

Appendix XX.A. Musculoskeletal stress traits

Appendix XX.A.1. Cranial musculoskeletal stress traits

	CS001 - *Calvarium*; *Musculus trapezius* (*Origo*)	CS002 - *Calvarium*; *Musculus masseter* (*Origo*) (l)	CS003 - *Calvarium*; *Musculus masseter* (*Origo*) (r)	CS002/3 - *Calvarium*; *Musculus masseter* (*Origo*) (m)	CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)	CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)	CS004/5 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (m)	CS006 - *Calvarium*; *Musculus temporalis* (*Origo*) (l)	CS007 - *Calvarium*; *Musculus temporalis* (*Origo*) (r)	CS006/7 - *Calvarium*; *Musculus temporalis* (*Origo*) (m)	CS008 - *Mandibula*; *Musculus temporalis* (*Insertio*) (l)	CS009 - *Mandibula*; *Musculus temporalis* (*Insertio*) (r)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2						8	8					(5)
Abu Tabari 02/1-3	8				(8)		8					
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(3)				5		5	2		2		
Abu Tabari 02/28-3												
Abu Tabari 02/28-4												
Abu Tabari 02/28-5					9	(8)	8.5	8	8	8		
Abu Tabari 02/28-7												
Abu Tabari 02/28-8					(7)		7					
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21											7	
Abu Tabari 02/28-22	5				(5)		5	[(5)]		5		
Abu Tabari 02/28-23	2							[(3)]		3		7
Abu Tabari 03/31												
Abu Tabari 03/34-1									[(7)]	7		
Conical Hill 95/4	7											
Conical Hill 95/4-1												
Conical Hill 02/3-4	9				[(8)]	[(8)]	8					
Djabarona 96/1-1	(6)										7	
Djabarona 96/1-2	[(5)]											
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												(8)
Djabarona 96/120-5												

	CS001	CS002	CS003	CS002/3	CS004	CS005	CS004/5	CS006	CS007	CS006/7	CS008	CS009
♂ No.	2	0	0	0	1	1	1	0	0	0	0	1
♂ Min.	7				8	8	8.0					8
♂ Max.	9				8	8	8.0					8
♂ Mode												
♂ Median	8.00				8.00	8.00	8.00					8.00
♂ Mean	8.00				8.00	8.00	8.00					8.00
♂ Freq.	(7) 1:2, 50.0%; (9) 1:2, 50.0%				(8) 1:1, 100.0%	(8) 1:1, 100.0%	(8) 1:1, 100.0%					(8) 1:1, 100.0%
♀ No.	5	0	0	0	4	2	5	3	2	4	2	2
♀ Min.	2				5	8	5.0	3	7	3.0	7	5
♀ Max.	8				9	8	8.5	8	8	8.0	7	7
♀ Mode	5					8	8.0				7	
♀ Median	5.00				7.50	8.00	8.00	5.00	7.50	6.00	7.00	6.00
♀ Mean	5.20				7.25	8.00	7.30	5.33	7.50	5.75	7.00	6.00
♀ Freq.	(2) 1:5, 20.0%; (5) 2:5, 40.0%; (6) 1:5, 20.0%; (8) 1:5, 20.0%				(5) 1:4, 25.0%; (7) 1:4, 25.0%; (8) 1:4, 25.0%; (9) 1:4, 25.0%	(8) 2:2, 100.0%	(5) 1:5, 20.0%; (7) 1:5, 20.0%; (8) 2:5, 40.0%; (8.5) 1:5, 20.0%	(3) 1:3, 33.3%; (5) 1:3, 33.3%; (8) 1:3, 33.3%	(7) 1:2, 50.0%; (8) 1:2, 50.0%	(3) 1:4, 25.0%; (5) 1:4, 25.0%; (7) 1:4, 25.0%; (8) 1:4, 25.0%	(7) 2:2, 100.0%	(5) 1:2, 50.0%; (7) 1:2, 50.0%
No.	7	0	0	0	5	3	6	3	2	4	2	3
Min.	2				5	8	5.0	3	7	3.0	7	5
Max.	9				9	8	8.5	8	8	8.0	7	8
Mode	5				8	8	8.0				7	
Median	6.00				8.00	8.00	8.00	5.00	7.50	6.00	7.00	7.00
Mean	6.00				7.40	8.00	7.42	5.33	7.50	5.75	7.00	6.67
Freq.	(2) 1:7, 14.3%; (5) 2:7, 28.6%; (6) 1:7, 14.3%; (7) 1:7, 14.3%; (8) 1:7, 14.3%; (9) 1:7, 14.3%				(5) 1:5, 20.0%; (7) 1:5, 20.0%; (8) 2:5, 40.0%; (9) 1:5, 20.0%	(8) 3:3, 100.0%	(5) 1:6, 16.7%; (7) 1:6, 16.7%; (8) 3:6, 50.0%; (8.5) 1:6, 16.7%	(3) 1:3, 33.3%; (5) 1:, 33.3%; (8) 1:3, 33.3%	(7) 1:2, 50.0%; (8) 1:2, 50.0%	(3) 1:4, 25.0%; (5) 1:4, 25.0%; (7) 1:4, 25.0%; (8) 1:4, 25.0%	(7) 2:2, 100.0%	(5) 1:3, 33.3%; (7) 1:3, 33.3%; (8) 1:3, 33.3%

All descriptive statistics were calculated without sub-adult values.

	CS008/9 - *Mandibula*; *Musculus temporalis* (*Insertio*) (m)	CS010 - *Mandibula*; *Musculus masseter* (*Insertio*) (l)	CS011 - *Mandibula*; *Musculus masseter* (*Insertio*) (r)	CS010/11 - *Mandibula*; *Musculus masseter* (*Insertio*) (m)	CS012 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (l)	CS013 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (r)	CS012/13 - *Mandibula*; *Musculus pterygoideus medialis* (*Insertio*) (m)
Abu Tabari 95/2-3							
Abu Tabari 02/1-2	5		5	5		7	7
Abu Tabari 02/1-3			(6)	6			
Abu Tabari 02/1-5							
Abu Tabari 02/1-6							
Abu Tabari 02/1-7							
Abu Tabari 02/1-8							
Abu Tabari 02/28-2							
Abu Tabari 02/28-3							
Abu Tabari 02/28-4							
Abu Tabari 02/28-5		(6)	(6)	6			
Abu Tabari 02/28-7							
Abu Tabari 02/28-8		[(3)]		3			
Abu Tabari 02/28-11							
Abu Tabari 02/28-13							
Abu Tabari 02/28-14							
Abu Tabari 02/28-15		(4)		4	5		5
Abu Tabari 02/28-20							
Abu Tabari 02/28-21	7	[(4)]	[(4)]	4		[(5)]	5
Abu Tabari 02/28-22		5	(5)	5	5	6	5.5
Abu Tabari 02/28-23	7		[(5)]	5		5	5
Abu Tabari 03/31							
Abu Tabari 03/34-1							
Conical Hill 95/4					6		6
Conical Hill 95/4-1							
Conical Hill 02/3-4							
Djabarona 96/1-1	7						
Djabarona 96/1-2							
Djabarona 96-4							
Djabarona 96/120-3							
Djabarona 96/120-4	8						
Djabarona 96/120-5							

	CS008/9	CS010	CS011	CS010/11	CS012	CS013	CS012/13
♂ No.	1	0	0	0	1	0	1
♂ Min.	8.0				6		6.0
♂ Max.	8.0				6		6.0
♂ Mode							
♂ Median	8.00				6.00		6.00
♂ Mean	8.00				6.00		6.00
♂ Freq.	(8) 1:1, 100.0%				(6) 1:1, 100.0%		(6) 1:1, 100.0%
♀ No.	4	5	6	8	2	4	5
♀ Min.	5.0	3	4	3.0	5	5	5.0
♀ Max.	7.0	6	6	6.0	5	7	7.0
♀ Mode	7.0	4	5	5.0	5	5	5.0
♀ Median	7.00	4.00	5.00	5.00	5.00	5.50	5.00
♀ Mean	6.50	4.40	5.17	4.75	5.00	5.75	5.50
♀ Freq.	(5) 1:4, 25.0%; (7) 3:4, 75.0%	(3) 1:5, 20.0%; (4) 2:5, 40.0%; (5) 1:5, 20.0%; (6) 1:5, 20.0%	(4) 1:6, 16.7%; (5) 3:6, 50.0%; (6) 2:6, 33.3%	(3) 1:8, 12.5%; (4) 2:8, 25.0%; (5) 3:8, 37.5%; (6) 2:8, 25.0%	(5) 2:2, 100.0%	(5) 2:4, 50.0%; (6) 1:4, 25.0%; (7) 1:4, 25.0%	(5) 3:5, 60.0%; (5.5) 1:5, 20.0%; (7) 1:5, 20.0%
No.	5	5	6	8	3	4	6
Min.	5.0	3	4	3.0	5	5	5.0
Max.	8.0	6	6	6.0	6	7	7.0
Mode	7.0	4	5	5.0	5	5	5.0
Median	7.00	4.00	5.00	5.00	5.00	5.50	5.25
Mean	6.80	4.40	5.17	4.75	5.33	5.75	5.58
Freq.	(5) 1:5, 20.0%; (7) 3:5, 60.0%; (8) 1:5, 20.0%	(3) 1:5, 20.0%; (4) 2:5, 40.0%; (5) 1:5, 20.0%; (6) 1:5, 20.0%	(4) 1:6, 16.7%; (5) 3:6, 50.0%; (6) 2:6, 33.3%	(3) 1:8, 12.5%; (4) 2:8, 25.0%; (5) 3:8, 37.5%; (6) 2:8, 25.0%	(5) 2:3, 66.7%; (6) 1:3, 33.3%	(5) 2:4, 50.0%; (6) 1:4, 25.0%; (7) 1:4, 25.0%	(5) 3:6, 50.0%; (5.5) 1:6, 16.7%; (6) 1:6, 16.7%; (7) 1:6, 16.7%

Appendix XX.A.2. Postcranial musculoskeletal stress traits

	PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)	PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)	PS001/2 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (m)	PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)	PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)	PS003/4 - *Humerus*; *Musculus deltoideus* (*Insertio*) (m)	PS005 - *Radius*; *Musculus biceps brachii* (*Insertio*) (l)	PS006 - *Radius*; *Musculus biceps brachii* (*Insertio*) (r)	PS005/6 - *Radius*; *Musculus biceps brachii* (*Insertio*) (m)	PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)	PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)	PS007/8 - *Ulna; Musculus brachialis* (*Insertio*) (m)
Abu Tabari 95/2-3	[(7)]		7	[(4)]		4		[(5)]	5			
Abu Tabari 02/1-2	6	5	5.5	6	5	5.5	5		5	6	6	6
Abu Tabari 02/1-3	8	[(6)]	7	4	3	3.5				7	(5)	6
Abu Tabari 02/1-5	7		7	(5)	(5)	5	(6)	(7)	6.5	9	(6)	7.5
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8												
Abu Tabari 02/28-2	(3)	(3)	3	(7)	(4)	5.5	(3)	(2)	2.5	(5)		5
Abu Tabari 02/28-3				[(6)]		6					(6)	6
Abu Tabari 02/28-4							[(7)]		7			
Abu Tabari 02/28-5	9	6	7.5	9	8	8.5	6	(5)	5.5	4	7	5.5
Abu Tabari 02/28-7				[(5)]		5						
Abu Tabari 02/28-8										[(6)]	[(6)]	6
Abu Tabari 02/28-11							4		4	5	6	5.5
Abu Tabari 02/28-13												
Abu Tabari 02/28-14												
Abu Tabari 02/28-15												
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(7)		7	(7)		7				8		8
Abu Tabari 02/28-22	8	(7)	7.5	7	[(6)]	6.5	(6)	6	6	[(5)]	(6)	5.5
Abu Tabari 02/28-23	[(6)]		6									
Abu Tabari 03/31												
Abu Tabari 03/34-1												
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1				[(5)]		5	[(5)]		5			
Djabarona 96/1-2					[(4)]	4						
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4		(4)	4		(6)	6		[(4)]	4		[(6)]	6
Djabarona 96/120-5												

	PS001	PS002	PS001/2	PS003	PS004	PS003/4	PS005	PS006	PS005/6	PS007	PS008	PS007/8
♂ No.	2	1	3	2	2	3	3	3	5	2	3	3
♂ Min.	7	4	4.0	4	5	4.0	4	4	4.0	5	6	5.5
♂ Max.	7	4	7.0	5	6	6.0	7	7	7.0	9	6	7.5
♂ Mode	7		7.0						4.0		6	
♂ Median	7.00	4.00	7.00	4.50	5.50	5.00	6.00	5.00	5.00	7.00	6.00	6.00
♂ Mean	7.00	4.00	6.00	4.50	5.50	5.00	5.67	5.33	5.30	7.00	6.00	6.33
♂ Freq.	(7) 2:2, 100.0%	(4) 1:1, 100.0%	(4) 1:3, 33.3%; (7) 2:3, 66.7%	(4) 1:2, 50.0%; (5) 1:2, 50.0%	(5) 1:2, 50.0%; (6) 1:2, 50.0%	(4) 1:3, 33.3%; (5) 1:3, 33.3%; (6) 1:3, 33.3%	(4) 1:3, 33.3%; (6) 1:3, 33.3%; (7) 1:3, 33.3%	(4) 1:3, 33.3%; (5) 1:3, 33.3%; (7) 1:3, 33.3%	(4) 2:5, 40.0%; (5) 1:5, 20.0%; (6.5) 1:5, 20.0%; (7) 1:5, 20.0%	(5) 1:2, 50.0%; (9) 1:2, 50.0%	(6) 3:3, 100.0%	(5.5) 1:3, 33.3%; (6) 1:3, 33.3%; (7.5) 1:3, 33.3%
♀ No.	6	4	6	8	5	9	4	2	4	6	6	7
♀ Min.	6	5	5.5	4	3	3.5	5	5	5.0	4	5	5.5
♀ Max.	9	7	7.5	9	8	8.5	6	6	6.0	8	7	8.0
♀ Mode	6	6	7.0	6		5.0	5		5.0	6	6	6.0
♀ Median	7.50	6.00	7.00	6.00	5.00	5.50	5.50	5.50	5.25	6.00	6.00	6.00
♀ Mean	7.33	6.00	6.75	6.13	5.20	5.67	5.50	5.50	5.38	6.00	6.00	6.14
♀ Freq.	(6) 2:6, 33.3%; (7) 1:6, 16.7%; (8) 2:6, 33.3%; (9) 1:6, 16.7%	(5) 1:4, 25.0%; (6) 2:4, 50.0%; (7) 1:4, 25.0%	(5.5) 1:6, 16.7%; (6) 1:6, 16.7%; (7) 2:6, 33.3%; (7.5) 2:6, 33.3%	(4) 1:8, 12.5%; (5) 2:8, 25.0%; (6) 2:8, 25.0%; (7) 2:8, 25.0%; (9) 1:8, 12.5%	(3) 1:5, 20.0%; (4) 1:5, 20.0%; (5) 1:5, 20.0%; (6) 1:5, 20.0%; (8) 1:5, 20.0%	(3.5) 1:9, 11.1%; (4) 1:9, 11.1%; (5) 2:9, 22.2%; (5.5) 1:9, 11.1%; (6) 1:9, 11.1%; (6.5) 1:9, 11.1%; (7) 1:9, 11.1%; (8.5) 1:9, 11.1%	(5) 2:4, 50.0%; (6) 2:4, 50.0%	(5) 1:2, 50.0%; (6) 1:2, 50.0%	(5) 2:4, 50.0%; (5.5) 1:4, 25.0%; (6) 1:4, 25.0%	(4) 1:6, 16.7%; (5) 1:6, 16.7%; (6) 2:6, 33.3%; (7) 1:6, 16.7%; (8) 1:6, 16.7%	(5) 1:6, 16.7%; (6) 4:6, 66.7%; (7) 1:6, 16.7%	(5.5) 2:7, 28.6%; (6) 4:7, 57.1%; (8) 1:7, 14.3%
No.	8	5	9	10	7	12	7	5	9	8	9	10
Min.	6	4	4.0	4	3	3.5	4	4	4.0	4	5	5.5
Max.	9	7	7.5	9	8	8.5	7	7	7.0	9	7	8.0
Mode	7	6	7.0	5	5	5.0	6	5	5.0	6	6	6.0
Median	7.00	6.00	7.00	5.50	5.00	5.25	6.00	5.00	5.00	6.00	6.00	6.00
Mean	7.25	5.60	6.50	5.80	5.29	5.50	5.57	5.40	5.33	6.25	6.00	6.20
Freq.	(6) 2:8, 25.0%; (7) 3:8, 37.5%; (8) 2:8, 25.0%; (9) 1:8, 12.5%	(4) 1:5, 20.0%; (5) 1:5, 20.0%; (6) 2:5, 40.0%; (7) 1:5, 40.0%	(4) 1:9, 11.1%; (5.5) 1:9, 11.1%; (6) 1:9, 11.1%; (7) 4:9, 44.4%; (7.5) 2:9, 22.2%	(4) 2:10, 20.0%; (5) 3:10, 30.0%; (6) 2:10, 20.0%; (7) 2:10, 20.0%; (9) 1:10, 10.0%	(3) 1:7, 14.3%; (4) 1:7, 14.3%; (5) 2:7, 28.6%; (6) 2:7, 28.6%; (8) 1:7, 14.3%	(3.5) 1:12, 8.3%; (4) 2:12, 16.7%; (5) 3:12, 25.0%; (5.5) 1:12, 8.3%; (6) 2:12, 16.7%; (6.5) 1:12, 8.3%; (7) 1:12, 8.3%; (8.5) 1:12, 8.3%	(4) 1:7, 14.3%; (5) 2:7, 28.6%; (6) 3:7, 42.9%; (7) 1:7, 14.3%	(4) 1:5, 20.0%; (5) 2:5, 40.0%; (6) 1:5, 20.0%; (7) 1:5, 20.0%	(4) 2:9, 22.2%; (5) 3:9, 33.3%; (5.5) 1:9, 11.1%; (6) 1:9, 11.1%; (6.5) 1:9, 11.1%; (7) 1:9, 11.1%	(4) 1:8, 12.5%; (5) 2:8, 25.0%; (6) 2:8, 25.0%; (7) 1:8, 12.5%; (8) 1:8, 12.5%; (9) 1:8, 12.5%	(5) 1:9, 11.1%; (6) 7:9, 77.8%; (7) 1:9, 11.1%	(5.5) 3:10, 30.0%; (6) 5:10, 50.0%; (7.5) 1:10, 10.0%; (8) 1:10, 10.0%

All descriptive statistics were calculated without sub-adult values.

	PS009 - *Femur*; *Musculus iliopsoas* (*Insertio*) (l)	PS010 - *Femur*; *Musculus iliopsoas* (*Insertio*) (r)	PS009/10 - *Femur*; *Musculus iliopsoas* (*Insertio*) (m)	PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)	PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)	PS011/12 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (m)	PS013 - *Tibia*; *Ligamentu m patellae* (*Musculus quadriceps femoris*) (*Insertio*) (l)	PS014 - *Tibia*; *Ligamentu m patellae* (*Musculus quadriceps femoris*) (*Insertio*) (r)	PS013/14 - *Tibia*; *Ligamentu m patellae* (*Musculus quadriceps femoris*) (*Insertio*) (m)	PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)	PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)	PS015/16 - *Tibia*; *Musculus soleus* (*Origo*) (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	7		7	7	(6)	6.5				8		8
Abu Tabari 02/1-3				(7)		7				5		5
Abu Tabari 02/1-5				[(6)]	[(6)]	6						
Abu Tabari 02/1-6												
Abu Tabari 02/1-7				[(6)]		6						
Abu Tabari 02/1-8					7	7	[(3)]		3			
Abu Tabari 02/28-2				3	3	3	3	3	3	2	2	2
Abu Tabari 02/28-3											(3)	3
Abu Tabari 02/28-4												
Abu Tabari 02/28-5		9	9	[(4)]		4	5		5	(6)		6
Abu Tabari 02/28-7												
Abu Tabari 02/28-8												
Abu Tabari 02/28-11		[(6)]	6		[(6)]	6						
Abu Tabari 02/28-13												
Abu Tabari 02/28-14				(4)	[(3)]	3.5						
Abu Tabari 02/28-15	7		7	9		9	[(4)]		4		4	4
Abu Tabari 02/28-20							[(6)]	[(6)]	6			
Abu Tabari 02/28-21												
Abu Tabari 02/28-22				[(6)]		6	[(5)]	[(5)]	5	[(4)]	[(5)]	4.5
Abu Tabari 02/28-23												
Abu Tabari 03/31				(8)		8						
Abu Tabari 03/34-1					(7)	7						
Conical Hill 95/4												
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	PS009	PS010	PS009/10	PS011	PS012	PS011/12	PS013	PS014	PS013/14	PS015	PS016	PS015/16
♂ No.	0	1	1	3	2	4	1	1	1	0	0	0
♂ Min.		6	6.0	6	6	6.0	6	6	6.0			
♂ Max.		6	6.0	8	6	8.0	6	6	6.0			
♂ Mode				6	6	6.0						
♂ Median		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00			
♂ Mean		6.00	6.00	6.67	6.00	6.50	6.00	6.00	6.00			
♂ Freq.		(6) 1:1, 100.0%	(6) 1:1, 100.0%	(6) 2:3, 66.7%; (8) 1:3, 33.3%	(6) 2:2, 100.0%	(6) 3:4, 75.0%; (8) 1:4, 25.0%	(6) 1:1, 100.0%	(6) 1:1, 100.0%	(6) 1:1, 100.0%			
♀ No.	2	1	3	5	2	6	3	1	3	4	3	6
♀ Min.	7	9	7.0	4	6	4.0	4	5	4.0	4	3	3.0
♀ Max.	7	9	9.0	9	7	9.0	5	5	5.0	8	5	8.0
♀ Mode	7		7.0	7		7.0	5		5.0			
♀ Median	7.00	9.00	7.00	7.00	6.50	6.75	5.00	5.00	5.00	5.50	4.00	4.75
♀ Mean	7.00	9.00	7.67	6.60	6.50	6.58	4.67	5.00	4.67	5.75	4.00	5.08
♀ Freq.	(7) 2:2, 100.0%	(9) 1:1, 100.0%	(7) 2:3, 66.7%; (9) 1:3, 33.3%	(4) 1:5, 20.0%; (6) 1:5, 20.0%; (7) 2:5, 40.0%; (9) 1:5, 20.0%	(6) 1:2, 50.0%; (7) 1:2, 50.0%	(4) 1:6, 16.7%; (6) 1:6, 16.7%; (6.5) 1:6, 16.7%; (7) 2:6, 33.3%; (9) 1:6, 16.7%	(4) 1:3, 33.3%; (5) 2:3, 66.7%	(5) 1:1, 100.0%	(4) 1:3, 33.3%; (5) 2:3, 66.7%	(4) 1:4, 25.0%; (5) 1:4, 25.0%; (6) 1:4, 25.0%; (8) 1:4, 25.0%	(3) 1:3, 33.3%; (4) 1:3, 33.3%; (5) 1:3, 33.3%	(3) 1:6, 16.7%; (4) 1:6, 16.7%; (4.5) 1:6, 16.7%; (5) 1:6, 16.7%; (6) 1:6, 16.7%; (8) 1:6, 16.7%
No.	2	2	4	8	4	10	4	2	4	4	3	6
Min.	7	6	6.0	4	6	4.0	4	5	4.0	4	3	3.0
Max.	7	9	9.0	9	7	9.0	6	6	6.0	8	5	8.0
Mode	7		7.0	6	6	6.0	5		5.0			
Median	7.00	7.50	7.00	6.50	6.00	6.25	5.00	5.50	5.00	5.50	4.00	4.75
Mean	7.00	7.50	7.25	6.63	6.25	6.55	5.00	5.50	5.00	5.75	4.00	5.08
Freq.	(7) 2:2, 100.0%	(6) 1:2, 50.0%; (9) 1:2, 50.0%	(6) 1:4, 25.0%; (7) 2:4, 50.0%; (9) 1:4, 25.0%	(4) 1:8, 12.5%; (6) 3:8, 37.5%; (7) 2:8, 25.0%; (8) 1:8, 25.0%; (9) 1:8, 12.5%	(6) 3:4, 75.0%; (7) 1:4, 25.0%	(4) 1:10, 10.0%; (6) 4:10, 40.0%; (6.5) 1:10, 10.0%; (7) 2:10, 20.0%; (8) 1:10, 10.0%; (9) 1:10, 10.0%	(4) 1:4, 25.0%; (5) 2:4, 50.0%; (6) 1:4, 25.0%	(5) 1:2, 50.0%; (6) 1:2, 50.0%	(4) 1:4, 25.0%; (5) 2:4, 50.0%; (6) 1:4, 25.0%	(4) 1:4, 25.0%; (5) 1:4, 25.0%; (6) 1:4, 25.0%; (8) 1:4, 25.0%	(3) 1:3, 33.3%; (4) 1:3, 33.3%; (5) 1:3, 33.3%	(3) 1:6, 16.7%; (4) 1:6, 16.7%; (4.5) 1:6, 16.7%; (5) 1:6, 16.7%; (7) 1:6, 16.7%; (8) 1:6, 16.7%

Appendix XX.B. Dental abrasion

Appendix XX.B.1. Variable by variable

	DA001 - Abrasion UI1 (l)	DA002 - Abrasion UI1 (r)	DA001/2 - Abrasion UI1 (m)	DA003 - Abrasion UI2 (l)	DA004 - Abrasion UI2 (r)	DA003/4 - Abrasion UI2 (m)	DA005 - Abrasion UC (l)	DA006 - Abrasion UC (r)	DA005/6 - Abrasion UC (m)	DA007 - Abrasion UP1 (l)	DA008 - Abrasion UP1 (r)	DA007/8 - Abrasion UP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	50	45	47.5	30	35	32.5	30	35	32.5	55	58	56.5
Abu Tabari 02/1-3	58	58	58.0	55	55	55.0	55	55	55.0	60		60.0
Abu Tabari 02/1-5		55	55.0									
Abu Tabari 02/1-6												
Abu Tabari 02/1-7											45	45.0
Abu Tabari 02/1-8	50	50	50.0	40	20	30.0	20	20	20.0	25	20	22.5
Abu Tabari 02/28-2	10	10	10.0	10	10	10.0		10	10.0		10	10.0
02/28-2 (*Dentes decidui*)	50		50.0	45	50	47.5	45	40	42.5	40	40	40.0
Abu Tabari 02/28-3		25	25.0	20	20	20.0	50	55	52.5	40	40	40.0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	25	28	26.5	25	30	27.5	28	30	29.0	40	40	40.0
Abu Tabari 02/28-7		20	20.0				25	28	26.5	25	25	25.0
Abu Tabari 02/28-8	25	25	25.0				35	30	32.5	40	40	40.0
Abu Tabari 02/28-11		20	20.0									
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	10.0	10	10	10.0	10	10	10.0	10	10	10.0
02/28-14 (*Dentes decidui*)							50	40	45.0	40	35	37.5
Abu Tabari 02/28-15	40	40	40.0	35	35	35.0	40	40	40.0	45	45	45.0
Abu Tabari 02/28-20		(20)	20.0									
Abu Tabari 02/28-21	35		35.0	30		30.0	40	35	37.5	55	55	55.0
Abu Tabari 02/28-22	40	(40)	40.0				45	45	45.0	40	40	40.0
Abu Tabari 02/28-23	25		25.0							25	25	25.0
Abu Tabari 03/31												
Abu Tabari 03/34-1	25	(25)	25.0	20	20	20.0	20	20	20.0	20	30	25.0
Conical Hill 95/4	40		40.0	45	(25)	35.0	40	(28)	34.0	(40)	(40)	40.0
Conical Hill 95/4-1										(10)		10.0
Conical Hill 02/3-4												
Djabarona 96/1-1	35	(35)	35.0				(25)	(25)	25.0	[(25)]		25.0
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DA001	DA002	DA001/2	DA003	DA004	DA003/4	DA005	DA006	DA005/6	DA007	DA008	DA007/8
♂ No.	1	3	4	1	1	1	1	1	1	1	2	2
♂ Min.	40	20	20.0	45	25	35.0	40	28	34.0	40	40	40.0
♂ Max.	40	55	55.0	45	25	35.0	40	28	34.0	40	45	45.0
♂ Mode		20	20.0									
♂ Median	40.00	20.00	30.00	45.00	25.00	35.00	40.00	28.00	34.00	40.00	42.50	42.50
♂ Mean	40.00	31.67	33.75	45.00	25.00	35.00	40.00	28.00	34.00	40.00	42.50	42.50
♀ No.	10	10	12	7	6	7	11	11	11	12	10	12
♀ Min.	25	20	20.0	20	20	20.0	20	20	20.0	20	25	25.0
♀ Max.	58	58	58.0	55	55	55.0	55	55	55.0	60	58	60.0
♀ Mode	25	25	25.0	30	35	20.0	25	35	32.5	40	40	40.0
♀ Median	35.00	31.50	30.75	30.00	32.50	30.00	35.00	35.00	32.50	40.00	40.00	40.00
♀ Mean	35.80	34.10	33.50	30.71	32.50	31.43	35.73	36.18	35.95	39.17	39.80	39.71
No.	11	13	16	8	7	8	12	12	12	13	12	14
Min.	25	20	20.0	20	20	20.0	20	20	20.0	20	25	25.0
Max.	58	58	58.0	55	55	55.0	55	55	55.0	60	58	60.0
Mode	25	25	25.0	30	35	20.0	40	35	32.5	40	40	40.0
Median	35.00	28.00	30.75	30.00	30.00	31.25	37.50	32.50	33.25	40.00	40.00	40.00
Mean	36.18	33.54	33.56	32.50	31.43	31.88	36.08	35.50	35.79	39.23	40.25	40.11

All descriptive statistics were calculated without sub-adult values.

	DA009 - Abrasion UP2 (l)	DA010 - Abrasion UP2 (r)	DA009/10 - Abrasion UP2 (m)	DA011 - Abrasion UM1 (l)	DA012 - Abrasion UM1 (r)	DA011/12 - Abrasion UM1 (m)	DA013 - Abrasion UM2 (l)	DA014 - Abrasion UM2 (r)	DA013/14 - Abrasion UM2 (m)	DA015 - Abrasion UM3 (l)	DA016 - Abrasion UM3 (r)	DA015/16 - Abrasion UM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	55		55.0	55		55.0	40	40	40.0		40	40.0
Abu Tabari 02/1-3		58	58.0							40		40.0
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	55		55.0									
Abu Tabari 02/1-8	20	25	22.5	40	35	37.5	20	20	20.0	10	10	10.0
Abu Tabari 02/28-2				20	20	20.0	10	10	10.0			
02/28-2 (*Dentes decidui*)	35	35	35.0									
Abu Tabari 02/28-3	50	(50)	50.0	40	40	40.0	40	40	40.0			
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	35	35	35.0	40	40	40.0	40	35	37.5	20	20	20.0
Abu Tabari 02/28-7	28	30	29.0	35	35	35.0		25	25.0	20	20	20.0
Abu Tabari 02/28-8	35	35	35.0	40	40	40.0	25	25	25.0	20	20	20.0
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	10.0	20	20	20.0	10	10	10.0			
02/28-14 (*Dentes decidui*)	28	28	28.0									
Abu Tabari 02/28-15	40	40	40.0	40	40	40.0	35	35	35.0	20	25	22.5
Abu Tabari 02/28-20							[(20)]		20.0	(20)	[(10)]	15.0
Abu Tabari 02/28-21	50	50	50.0	45	45	45.0	45	45	45.0	28	(55)	41.5
Abu Tabari 02/28-22	(55)	[(55)]	55.0	55	55	55.0	40	40	40.0	28	25	26.5
Abu Tabari 02/28-23	25	25	25.0	28	28	28.0	20	20	20.0	10	10	10.0
Abu Tabari 03/31												
Abu Tabari 03/34-1	20	28	24.0	(25)	(30)	27.5	20	20	20.0	(10)	(10)	10.0
Conical Hill 95/4	(40)		40.0	40	40	40.0	(40)	(45)	42.5	20	20	20.0
Conical Hill 95/4-1											(10)	10.0
Conical Hill 02/3-4												
Djabarona 96/1-1				35		35.0	20		20.0	[(20)]	[(10)]	15.0
Djabarona 96/1-2							[(25)]	[(20)]	22.5	(20)	(20)	20.0
Djabarona 96-4							[(20)]	[(20)]	20.0			
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DA009	DA010	DA009/10	DA011	DA012	DA011/12	DA013	DA014	DA013/14	DA015	DA016	DA015/16
♂ No.	2	0	2	1	1	1	3	2	3	2	2	2
♂ Min.	40		40.0	40	40	40.0	20	20	20.0	20	10	15.0
♂ Max.	55		55.0	40	40	40.0	40	45	42.5	20	20	20.0
♂ Mode							20		20.0	20		
♂ Median	47.50		47.50	40.00	40.00	40.00	20.00	32.50	20.00	20.00	15.00	17.50
♂ Mean	47.50		47.50	40.00	40.00	40.00	26.67	32.50	27.50	20.00	15.00	17.50
♀ No.	10	10	11	11	9	11	11	11	12	11	11	12
♀ Min.	20	25	24.0	25	28	27.5	20	20	20.0	10	10	10.0
♀ Max.	55	58	58.0	55	55	55.0	45	45	45.0	40	55	41.5
♀ Mode	55	50	55.0	40	40	40.0	40	40	40.0	20	20	20.0
♀ Median	37.50	37.50	40.00	40.00	40.00	40.00	35.00	35.00	30.00	20.00	20.00	20.00
♀ Mean	39.30	40.60	41.45	39.82	39.22	40.05	31.82	31.36	30.83	21.45	23.18	23.79
No.	12	10	13	12	10	12	14	13	15	13	13	14
Min.	20	25	24.0	25	28	27.5	20	20	20.0	10	10	10.0
Max.	55	58	58.0	55	55	55.0	45	45	45.0	40	55	41.5
Mode	55	50	55.0	40	40	40.0	40	20	20.0	20	20	20.0
Median	40.00	37.50	40.00	40.00	40.00	40.00	30.00	35.00	25.00	20.00	20.00	20.00
Mean	40.67	40.60	42.38	39.83	39.30	40.04	30.71	31.54	30.17	21.23	21.92	22.89

	DA017 - Abrasion LI1 (l)	DA018 - Abrasion LI1 (r)	DA017/18 - Abrasion LI1 (m)	DA019 - Abrasion LI2 (l)	DA020 - Abrasion LI2 (r)	DA019/20 - Abrasion LI2 (m)	DA021 - Abrasion LC (l)	DA022 - Abrasion LC (r)	DA021/22 - Abrasion LC (m)	DA023 - Abrasion LP1 (l)	DA024 - Abrasion LP1 (r)	DA023/24 - Abrasion LP1 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	55	55	55.0	50	50	50.0	45	45	45.0	40	40	40.0
Abu Tabari 02/1-3	58	58	58.0	58	58	58.0	50	50	50.0	55	58	56.5
Abu Tabari 02/1-5							55		55.0			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7										(40)		40.0
Abu Tabari 02/1-8	55	50	52.5	50	25	37.5	35	20	27.5	20	20	20.0
Abu Tabari 02/28-2	10	10	10.0	10	10	10.0	10	10	10.0			
02/28-2 (*Dentes decidui*)				45	40	42.5	45	45	45.0	35	35	35.0
Abu Tabari 02/28-3	40	35	37.5	25	30	27.5	45	50	47.5	55		55.0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(35)	(30)	32.5	(28)	(35)	31.5	35	30	32.5	35	40	37.5
Abu Tabari 02/28-7				20	20	20.0	20	20	20.0	20	20	20.0
Abu Tabari 02/28-8				20	20	20.0	35	30	32.5	45	45	45.0
Abu Tabari 02/28-11	20		20.0		20	20.0						
Abu Tabari 02/28-13				(20)		20.0						
Abu Tabari 02/28-14	10	10	10.0	10	10	10.0	10	10	10.0	10	10	10.0
02/28-14 (*Dentes decidui*)		30	30.0	(40)	(40)	40.0	35	25	30.0	40	40	40.0
Abu Tabari 02/28-15	40	40	40.0	35	35	35.0	40	35	37.5	35		35.0
Abu Tabari 02/28-20				25		25.0		[(20)]	20.0			
Abu Tabari 02/28-21	40	40	40.0	35	35	35.0	40	40	40.0	45		45.0
Abu Tabari 02/28-22		(35)	35.0				50	45	47.5	(55)	(55)	55.0
Abu Tabari 02/28-23	28	30	29.0	25		25.0	25		25.0	25		25.0
Abu Tabari 03/31												
Abu Tabari 03/34-1	25	(25)	25.0	20	20	20.0	(20)	20	20.0	25	25	25.0
Conical Hill 95/4								(28)	28.0		(25)	25.0
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1		[(35)]	35.0				(25)	(35)	30.0	(20)	[(25)]	22.5
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DA017	DA018	DA017/18	DA019	DA020	DA019/20	DA021	DA022	DA021/22	DA023	DA024	DA023/24
♂ No.	1	0	1	1	1	2	1	2	3	1	1	2
♂ Min.	20		20.0	25	20	20.0	55	20	20.0	40	25	25.0
♂ Max.	20		20.0	25	20	25.0	55	28	55.0	40	25	40.0
♂ Mode												
♂ Median	20.00		20.00	25.00	20.00	22.50	55.00	24.00	28.00	40.00	25.00	32.50
♂ Mean	20.00		20.00	25.00	20.00	22.50	55.00	24.00	34.33	40.00	25.00	32.50
♀ No.	8	10	10	10	9	10	12	11	12	12	8	12
♀ Min.	25	25	25.0	20	20	20.0	20	20	20.0	20	20	20.0
♀ Max.	58	58	58.0	58	58	58.0	50	50	50.0	55	58	56.5
♀ Mode	40	35	40.0	20	35	20.0	45	45	47.5	55	40	55.0
♀ Median	40.00	35.00	36.25	26.50	35.00	29.50	37.50	35.00	35.00	37.50	40.00	38.75
♀ Mean	40.13	38.30	38.70	31.60	33.67	32.20	35.83	36.36	35.63	37.92	38.50	38.46
No.	9	10	11	12	10	13	13	13	15	13	9	14
Min.	20	25	20.0	20	20	20.0	20	20	20.0	20	20	20.0
Max.	58	58	58.0	58	58	58.0	55	50	55.0	55	58	56.5
Mode	40	35	40.0	20	20	20.0	45	20	20.0	55	25	25.0
Median	40.00	35.00	35.00	25.00	32.50	25.00	40.00	35.00	32.50	40.00	40.00	38.75
Mean	37.89	38.30	37.00	30.08	32.30	29.77	37.31	34.46	35.37	38.08	37.00	37.61

	DA025 - Abrasion LP2 (l)	DA026 - Abrasion LP2 (r)	DA025/26 - Abrasion LP2 (m)	DA027 - Abrasion LM1 (l)	DA028 - Abrasion LM1 (r)	DA027/28 - Abrasion LM1 (m)	DA029 - Abrasion LM2 (l)	DA030 - Abrasion LM2 (r)	DA029/30 - Abrasion LM2 (m)	DA031 - Abrasion LM3 (l)	DA032 - Abrasion LM3 (r)	DA031/32 - Abrasion LM3 (m)
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	40	40	40.0	45	45	45.0	45	45	45.0	40	40	40.0
Abu Tabari 02/1-3	55	50	52.5	50	50	50.0	40	35	37.5	50		50.0
Abu Tabari 02/1-5	35		35.0	40		40.0	40		40.0			
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	20	20	20.0	35	35	35.0	20	20	20.0		10	10.0
Abu Tabari 02/28-2				20	20	20.0	10	10	10.0			
02/28-2 (*Dentes decidui*)	30	30	30.0									
Abu Tabari 02/28-3	50	50	50.0	50	50	50.0	40	40	40.0	40	40	40.0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	35	35	35.0	40	40	40.0	40	20	30.0	20	20	20.0
Abu Tabari 02/28-7	38	38	38.0	30	(35)	32.5	20	20	20.0		20	20.0
Abu Tabari 02/28-8	40	40	40.0	40	40	40.0	20	28	24.0	20	20	20.0
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	10.0	20	20	20.0	10		10.0			
02/28-14 (*Dentes decidui*)	35	35	35.0									
Abu Tabari 02/28-15	28		28.0	40		40.0	35		35.0	20		20.0
Abu Tabari 02/28-20		(28)	28.0				[(30)]		30.0	20	20	20.0
Abu Tabari 02/28-21	(55)	50	52.5		[(50)]	50.0	45	45	45.0	28	35	31.5
Abu Tabari 02/28-22	40	45	42.5	50	50	50.0	40	40	40.0	30	28	29.0
Abu Tabari 02/28-23	(20)	25	22.5	30	30	30.0	20	20	20.0	10	10	10.0
Abu Tabari 03/31												
Abu Tabari 03/34-1	20	20	20.0	(35)	35	35.0	20	20	20.0	(10)	(10)	10.0
Conical Hill 95/4		(28)	28.0	40	(40)	40.0	35	(35)	35.0	25	25	25.0
Conical Hill 95/4-1												
Conical Hill 02/3-4					[(30)]	30.0		[(30)]	30.0		[(10)]	10.0
Djabarona 96/1-1	(20)		20.0	[(35)]	35	35.0	[(20)]	25	22.5	10	10	10.0
Djabarona 96/1-2				[(30)]		30.0		[(28)]	28.0	(20)	(20)	20.0
Djabarona 96-4					[(25)]	25.0	[(20)]		20.0			
Djabarona 96/120-3											[(20)]	20.0
Djabarona 96/120-4										[(30)]	[(25)]	27.5
Djabarona 96/120-5	[(35)]	[(35)]	35.0									

	DA025	DA026	DA025/26	DA027	DA028	DA027/28	DA029	DA030	DA029/30	DA031	DA032	DA031/32
♂ No.	1	2	3	2	3	4	4	2	5	3	4	4
♂ Min.	35	28	28.0	40	25	25.0	20	30	20.0	20	10	10.0
♂ Max.	35	28	35.0	40	40	40.0	40	35	40.0	30	25	27.5
♂ Mode		28	28.0	40		40.0			30.0		25	
♂ Median	35.00	28.00	28.00	40.00	30.00	35.00	32.50	32.50	30.00	25.00	22.50	22.50
♂ Mean	35.00	28.00	30.33	40.00	31.67	33.75	31.25	32.50	31.00	25.00	20.00	20.63
♀ No.	13	11	13	12	11	13	12	12	13	12	12	14
♀ Min.	20	20	20.0	30	30	30.0	20	20	20.0	10	10	10.0
♀ Max.	55	50	52.5	50	50	50.0	45	45	45.0	50	40	50.0
♀ Mode	40	50	40.0	50	50	50.0	20	20	20.0	20	20	20.0
♀ Median	38.00	40.00	38.00	40.00	40.00	40.00	37.50	28.00	30.00	20.00	20.00	20.00
♀ Mean	36.62	38.91	36.62	39.58	41.82	40.58	32.08	30.50	31.31	24.83	22.75	24.32
No.	14	13	16	14	14	17	16	14	18	15	16	18
Min.	20	20	20.0	30	25	25.0	20	20	20.0	10	10	10.0
Max.	55	50	52.5	50	50	50.0	45	45	45.0	50	40	50.0
Mode	40	50	35.0	40	50	40.0	20	20	20.0	20	20	20.0
Median	36.50	38.00	35.00	40.00	40.00	40.00	35.00	29.00	30.00	20.00	20.00	20.00
Mean	36.50	37.23	35.44	39.64	39.64	38.97	31.88	30.79	31.22	24.87	22.06	23.50

Appendix XX.B.2. Individual by individual

	All individuals (without sub-adults)	Abu Tabari 95/2-3	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-6	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-2 (*Dentes decidui*)	Abu Tabari 02/28-3	Abu Tabari 02/28-4
No. (*Dentes incisivi et canini*)	130	0	12	12	2	0	0	12	11	9	11	0
Min. (*Dentes incisivi et canini*)	20		30	50	55			20	10	40	20	
Max. (*Dentes incisivi et canini*)	58		55	58	55			55	10	50	55	
Mode (*Dentes incisivi et canini*)	20		50	58	55			50	10	45	25	
Median (*Dentes incisivi et canini*)	35.00		45.00	56.50	55.00			37.50	10.00	45.00	35.00	
Mean (*Dentes incisivi et canini*)	34.72		43.75	55.67	55.00			36.25	10.00	45.00	35.91	
No. (*Dentes molares*)	164	0	10	6	2	0	0	11	8	0	10	0
Min. (*Dentes molares*)	10		40	35	40			10	10		40	
Max. (*Dentes molares*)	55		55	50	40			40	20		50	
Mode (*Dentes molares*)	20		40	50	40			20	20		40	
Median (*Dentes molares*)	30.00		42.50	45.00	40.00			20.00	15.00		40.00	
Mean (*Dentes molares*)	30.79		43.50	44.17	40.00			23.18	15.00		42.00	
No. (all teeth)	390	0	29	24	5	0	3	31	20	17	28	0
Min. (all teeth)	10		30	35	35		40	10	10	30	20	
Max. (all teeth)	60		58	60	55		55	55	20	50	55	
Mode (all teeth)	40		40	58	55			20	10	45	40	
Median (all teeth)	35.00		45.00	55.00	40.00		45.00	20.00	10.00	40.00	40.00	
Mean (all teeth)	34.03		44.41	52.88	45.00		46.67	27.74	12.00	40.29	41.07	

	Abu Tabari 02/28-5	Abu Tabari 02/28-7	Abu Tabari 02/28-8	Abu Tabari 02/28-11	Abu Tabari 02/28-13	Abu Tabari 02/28-14	Abu Tabari 02/28-14 (*Dentes decidui*)	Abu Tabari 02/28-15	Abu Tabari 02/28-20	Abu Tabari 02/28-21	Abu Tabari 02/28-22	Abu Tabari 02/28-23
No. (*Dentes incisivi et canini*)	12	7	8	3	1	12	7	12	3	10	7	5
Min. (*Dentes incisivi et canini*)	25	20	20	20	20	10	25	35	20	30	35	25
Max. (*Dentes incisivi et canini*)	35	28	35	20	20	10	50	40	25	40	50	30
Mode (*Dentes incisivi et canini*)	30	20	25	20		10	40	40	20	40	45	25
Median (*Dentes incisivi et canini*)	30.00	20.00	27.50	20.00	20.00	10.00	40.00	40.00	20.00	37.50	45.00	25.00
Mean (*Dentes incisivi et canini*)	29.92	21.86	27.50	20.00	20.00	10.00	37.14	37.92	21.67	37.00	42.86	26.60
No. (*Dentes molares*)	12	10	12	0	0	7	0	9	6	11	12	12
Min. (*Dentes molares*)	20	20	20			10		20	10	28	25	10
Max. (*Dentes molares*)	40	35	40			20		40	30	55	55	30
Mode (*Dentes molares*)	40	20	20			20		40	20	45	40	20
Median (*Dentes molares*)	37.50	22.50	25.00			20.00		35.00	20.00	45.00	40.00	20.00
Mean (*Dentes molares*)	31.25	26.00	28.17			15.71		32.22	20.00	42.36	40.08	19.67
No. (all teeth)	32	25	28	3	1	27	15	27	10	28	27	24
Min. (all teeth)	20	20	20	20	20	10	25	20	10	28	25	10
Max. (all teeth)	40	38	45	20	20	20	50	45	30	55	55	30
Mode (all teeth)	40	20	40	20		10	40	40	20	45	40	25
Median (all teeth)	35.00	25.00	32.50	20.00	20.00	10.00	35.00	40.00	20.00	45.00	40.00	25.00
Mean (all teeth)	32.16	25.48	31.36	20.00	20.00	11.48	36.07	36.22	21.30	42.71	43.19	22.46

	Abu Tabari 03/31	Abu Tabari 03/34-1	Conical Hill 95/4	Conical Hill 95/4-1	Conical Hill 02/3-4	Djabarona 96/1-1	Djabarona 96/1-2	Djabarona 96-4	Djabarona 96/120-3	Djabarona 96/120-4	Djabarona 96/120-5
No. (*Dentes incisivi et canini*)	0	12	6	0	0	7	0	0	0	0	0
Min. (*Dentes incisivi et canini*)		20	25			25					
Max. (*Dentes incisivi et canini*)		25	45			35					
Mode (*Dentes incisivi et canini*)		20	40			35					
Median (*Dentes incisivi et canini*)		20.00	34.00			35.00					
Mean (*Dentes incisivi et canini*)		21.67	34.33			30.71					
No. (*Dentes molares*)	0	12	12	1	3	10	8	4	1	2	0
Min. (*Dentes molares*)		10	20	10	10	10	20	20	20	25	
Max. (*Dentes molares*)		35	45	10	30	35	30	25	20	30	
Mode (*Dentes molares*)		20	40		30	35	20	20			
Median (*Dentes molares*)		20.00	37.50	10.00	30.00	20.00	20.00	20.00	20.00	27.50	
Mean (*Dentes molares*)		20.42	33.75	10.00	23.33	22.00	22.88	21.25	20.00	27.50	
No. (all teeth)	0	32	23	2	3	21	8	4	1	2	2
Min. (all teeth)		10	20	10	10	10	20	20	20	25	35
Max. (all teeth)		35	45	10	30	35	30	25	20	30	35
Mode (all teeth)		20	40	10	30	35	20	20			35
Median (all teeth)		20.00	40.00	10.00	30.00	25.00	20.00	20.00	20.00	27.50	35.00
Mean (all teeth)		21.66	34.09	10.00	23.33	25.00	22.88	21.25	20.00	27.50	35.00

Appendix XXI. Health

Appendix XXI.A. Tooth loss

	DL001 - Tooth loss UI1 (l)	DL002 - Tooth loss UI1 (r)	DL001a - Tooth loss UI1 (l) - presence	DL002a - Tooth loss UI1 (r) - presence	DL003 - Tooth loss UI2 (l)	DL004 - Tooth loss UI2 (r)	DL003a - Tooth loss UI2 (l) - presence	DL004a - Tooth loss UI2 (r) - presence	DL005 - Tooth loss UC (l)	DL006 - Tooth loss UC (r)	DL005a - Tooth loss UC (l) - presence	DL006a - Tooth loss UC (r) - presence
Abu Tabari 95/2-3	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-3	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-5	34	15	3	1	34	34	3	3	34	34	3	3
Abu Tabari 02/1-6	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-7	21	34	2	3	23	34	2	3	23	34	2	3
Abu Tabari 02/1-8	15	15	1	1	15	15	1	1	10	15	1	1
Abu Tabari 02/28-2	15	15	1	1	10	10	1	1	50	10	5	1
02/28-2 (*Dentes decidui*)	15	34	1	3	15	15	1	1	10	15	1	1
Abu Tabari 02/28-3	34	15	3	1	15	15	1	1	15	10	1	1
Abu Tabari 02/28-4	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-5	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-7	34	15	3	1	34	34	3	3	15	15	1	1
Abu Tabari 02/28-8	15	15	1	1	34	34	3	3	15	15	1	1
Abu Tabari 02/28-11	34	15	3	1	34	34	3	3	34	34	3	3
Abu Tabari 02/28-13	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-14	15	15	1	1	15	15	1	1	15	15	1	1
02/28-14 (*Dentes decidui*)	34	34	3	3	34	34	3	3	15	15	1	1
Abu Tabari 02/28-15	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-20	34	15	3	1	34	34	3	3	34	34	3	3
Abu Tabari 02/28-21	10	15	1	1	10	23	1	2	10	10	1	1
Abu Tabari 02/28-22	15	15	1	1	34	34	3	3	15	15	1	1
Abu Tabari 02/28-23	10	21	1	2	21	21	2	2	21	21	2	2
Abu Tabari 03/31	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1	15	15	1	1	15	15	1	1
Conical Hill 95/4	10	(21)	1	2	10	10	1	1	10	10	1	1
Conical Hill 95/4-1	34	34	3	3	34	34	3	3	34	34	3	3
Conical Hill 02/3-4	(23)	34	2	3	(23)	34	2	3	(21)	34	2	3
Djabarona 96/1-1	15	15	1	1	(23)	34	2	3	15	15	1	1
Djabarona 96/1-2	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-3	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-5	34	34	3	3	34	(23)	3	2	34	(21)	3	2

	DL001	DL002	DL001a	DL002a	DL003	DL004	DL003a	DL004a	DL005	DL006	DL005a	DL006a
♂ No.	14	14	14	14	14	14	14	14	14	14	14	14
♂ Mode	34	34	3	3	34	34	3	3	34	34	3	3
♂ Freq.	(10) 1:14, 7.1%; (15) 3:14, 21.4%; (21) 1:14, 7.1%; (23) 1:14, 7.1%; (34) 8:14, 57.1%	(15) 6:14, 42.9%; (21) 1:14, 7.1%; (34) 7:14, 50.0%	(1) 4:14, 28.6%; (2) 2:14, 14.3%; (3) 8:14, 57.1%	(1) 6:14, 42.9%; (2) 1:14, 7.1%; (3) 7:14, 50.0%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (23) 2:14, 14.3%; (34) 8:14, 57.1%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (34) 10:14, 71.4%	(1) 4:14, 28.6%; (2) 2:14, 14.3%; (3) 8:14, 57.1%	(1) 4:14, 28.6%; (3) 10:14, 71.4%	(10) 2:14, 14.3%; (15) 1:14, 7.1%; (21) 1:14, 7.1%; (23) 1:14, 7.1%; (34) 8:14, 57.1%; (50) 1:14, 7.1%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (34) 10:14, 71.4%	(1) 3:14, 21.4%; (2) 2:14, 14.3%; (3) 8:14, 57.1%; (5) 1:14, 7.1%	(1) 4:14, 28.6%; (3) 10:14, 71.4%
♀ No.	16	16	16	16	16	16	16	16	16	16	16	16
♀ Mode	10	15	1	1	34	34	1	3	15	10	1	1
♀ Freq.	(10) 6:16, 37.5%; (15) 4:16, 25.0%; (34) 6:16, 37.5%	(10) 4:16, 25.0%; (15) 7:16, 43.8%; (21) 1:16, 6.3%; (34) 4:16, 25.0%	(1) 10:16, 62.5%; (3) 6:16, 37.5%	(1) 11:16, 68.8%; (2) 1:16, 6.3%; (3) 4:16, 25.0%	(10) 5:16, 31.3%; (15) 2:16, 12.5%; (21) 1:16, 6.3%; (23) 1:16, 6.3%; (34) 7:16, 43.8%	(10) 4:16, 25.0%; (15) 2:16, 12.5%; (21) 1:16, 6.3%; (23) 2:16, 12.5%; (34) 7:16, 43.8%	(1) 7:16, 43.8%; (2) 2:16, 12.5%; (3) 7:16, 43.8%	(1) 6:16, 37.5%; (2) 3:16, 18.8%; (3) 7:16, 43.8%	(10) 5:16, 31.3%; (15) 6:16, 37.5%; (21) 1:16, 6.3%; (34) 4:16, 25.0%	(10) 6:16, 37.5%; (15) 5:16, 31.3%; (21) 2:16, 12.5%; (34) 3:16, 18.8%	(1) 11:16, 68.8%; (2) 1:16, 6.3%; (3) 4:16, 25.0%	(1) 11:16, 68.8%; (2) 2:16, 12.5%; (3) 3:16, 18.8%
No.	32	32	32	32	32	32	32	32	32	32	32	32
Mode	34	34	3	1	34	34	3	3	34	34	3	3
Freq.	(10) 7:32, 21.9%; (15) 7:32, 21.9%; (21) 1:32, 3.1%; (23) 1:32, 3.1%; (34) 16:32, 50.0%	(10) 4:32, 12.5%; (15) 13:32, 40.6%; (21) 2:32, 6.3%; (34) 13:32, 40.6%;	(1) 14:32, 43.8%; (2) 2:32, 6.3%; (3) 16:32, 50.0%	(1) 17:32, 53.1%; (2) 2:32, 6.3%; (3) 13:32, 40.6%;	(10) 7:32, 21.9%; (15) 4:32, 12.5%; (21) 1:32, 3.1%; (23) 3:32, 9.4%; (34) 17:32, 53.1%	(10) 6:32, 18.8%; (15) 4:32, 12.5%; (21) 1:32, 3.1%; (23) 2:32, 6.3%; (34) 19:32, 59.4%	(1) 11:32, 34.4%; (2) 4:32, 12.5%; (3) 17:32, 53.1%	(1) 10:32, 31.3%; (2) 3:32, 9.4%; (3) 19:32, 59.4%	(10) 7:32, 21.9%; (15) 7:32, 21.9%; (21) 2:32, 6.3%; (23) 1:32, 3.1%; (34) 14:32, 43.8%; (50) 1:32, 3.1%	(10) 8:32, 25.0%; (15) 7:32,21.9%; (21) 2:32, 6.3%; (34) 15:32, 46.9%	(1) 14:32, 43.8%; (2) 3:32, 9.4%; (3) 14:32, 43.8%; (5) 1:32, 3.1%	(1) 15:32, 46.9%; (2) 2:32, 6.3%; (3) 15:32, 46.9%

All descriptive statistics were calculated without milk tooth (*Dens deciduus*) values.

	DL007 - Tooth loss UP1 (l)	DL008 - Tooth loss UP1 (r)	DL007a - Tooth loss UP1 (l) - presence	DL008a - Tooth loss UP1 (r) - presence	DL009 - Tooth loss UP2 (l)	DL010 - Tooth loss UP2 (r)	DL009a - Tooth loss UP2 (l) - presence	DL010a - Tooth loss UP2 (r) - presence	DL011 - Tooth loss UM1 (l)	DL012 - Tooth loss UM1 (r)	DL011a - Tooth loss UM1 (l) - presence	DL012a - Tooth loss UM1 (r) - presence
Abu Tabari 95/2-3	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1	10	10	1	1	41	42	4	4
Abu Tabari 02/1-3	10	42	1	4	42	10	4	1	42	34	4	3
Abu Tabari 02/1-5	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-6	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-7	21	(15)	2	1	10	34	1	3	34	34	3	3
Abu Tabari 02/1-8	10	15	1	1	10	15	1	1	15	15	1	1
Abu Tabari 02/28-2	50	10	5	1	50	50	5	5	10	10	1	1
02/28-2 (*Dentes decidui*)	10	10	1	1	10	10	1	1				
Abu Tabari 02/28-3	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-4	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-5	10	10	1	1	10	10	1	1	15	15	1	1
Abu Tabari 02/28-7	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-8	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-11	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-13	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-14	15	15	1	1	15	15	1	1	15	15	1	1
02/28-14 (*Dentes decidui*)	10	15	1	1	15	15	1	1				
Abu Tabari 02/28-15	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-20	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-21	10	10	1	1	10	10	1	1	15	15	1	1
Abu Tabari 02/28-22	15	10	1	1	15	10	1	1	10	15	1	1
Abu Tabari 02/28-23	10	10	1	1	10	10	1	1	10	15	1	1
Abu Tabari 03/31	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1	15	15	1	1	15	15	1	1
Conical Hill 95/4	15	15	1	1	10	(21)	1	2	10	10	1	1
Conical Hill 95/4-1	15	34	1	3	34	34	3	3	34	34	3	3
Conical Hill 02/3-4	(21)	34	2	3	(21)	34	2	3	(23)	34	2	3
Djabarona 96/1-1	15	34	1	3	(23)	34	2	3	15	34	1	3
Djabarona 96/1-2	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-3	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-5	34	(23)	3	2	34	34	3	3	34	34	3	3

	DL007	DL008	DL007a	DL008a	DL009	DL010	DL009a	DL010a	DL011	DL012	DL011a	DL012a
♂ No.	14	14	14	14	14	14	14	14	14	14	14	14
♂ Mode	34	34	3	3	34	34	3	3	34	34	3	3
♂ Freq.	(10) 1:14, 7.1%; (15) 2:14, 14.3%; (21) 2:14, 14.3%; (34) 8:14, 57.1%; (50) 1:14, 7.1%	(10) 1:14, 7.1%; (15) 4:14, 28.6%; (34) 9:14, 64.3%	(1) 3:14, 21.4%; (2) 2:14, 14.3%; (3) 8:14, 57.1%; (5) 1:14, 7.1%	(1) 5:14, 35.7%; (3) 9:14, 64.3%	(10) 3:14, 21.4%; (15) 1:14, 7.1%; (21) 1:14, 7.1%; (34) 8:14, 57.1%; (50) 1:14, 7.1%	(15) 2:14, 14.3%; (21) 1:14, 7.1%; (34) 10:14, 71.4%; (50) 1:14, 7.1%	(1) 4:14, 28.6%; (2) 1:14, 7.1%; (3) 8:14, 57.1%; (5) 1:14, 7.1%	(1) 2:14, 14.3%; (2) 1:14, 7.1%; (3) 10:14, 71.4%; (5) 1:14, 7.1%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (23) 1:14, 7.1%; (34) 9:14, 64.3%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (34) 10:14, 71.4%	(1) 4:14, 28.6%; (2) 1:14, 7.1%; (3) 9:14, 64.3%	(1) 4:14, 28.6%; (3) 10:14, 71.4%
♀ No.	16	16	16	16	16	16	16	16	16	16	16	16
♀ Mode	15	10	1	1	10	10	1	1	15	15	1	1
♀ Freq.	(10) 6:16, 37.5%; (15) 7:16, 43.8%; (34) 3:16, 18.8%	(10) 6:16, 37.5%; (15) 4:16, 25.0%; (23) 1:16, 6.3%; (34) 4:16, 25.0%; (42) 1:16, 6.3%	(1) 13:16, 81.3%; (3) 3:16, 18.8%	(1) 10:16, 62.5%; (2) 1:16, 6.3%; (3) 4:16, 25.0%; (4) 1:16, 6.3%	(10) 5:16, 31.3%; (15) 5:16, 31.3%; (23) 1:16, 6.3%; (34) 4:16, 25.0%; (42) 1:16, 6.3%	(10) 7:16, 43.8%; (15) 4:16, 25.0%; (34) 5:16, 31.3%	(1) 10:16, 62.5%; (2) 1:16, 6.3%; (3) 4:16, 25.0%; (4) 1:16, 6.3%	(1) 11:16, 68.8%; (3) 5:16, 31.3%	(10) 3:16, 18.8%; (15) 7:16, 43.8%; (34) 4:16, 25.0%; (41) 1:16, 6.3%; (42) 1:16, 6.3%	(10) 1:16, 6.3%; (15) 8:16, 50.0%; (34) 6:16, 37.5%; (42) 1:16, 6.3%	(1) 10:16, 62.5%; (3) 4:16, 25.0%; (4) 2:16, 12.5%	(1) 9:16, 56.3%; (3) 6:16, 37.5%; (4) 1:16, 6.3%
No.	32	32	32	32	32	32	32	32	32	32	32	32
Mode	34	34	1	3	34	34	3	3	34	34	3	3
Freq.	(10) 7:32, 21.9%; (15) 9:32, 28.1%; (21) 2:32, 6.3%; (34) 13:32, 40.6%; (50) 1:32, 3.1%	(10) 7:32, 21.9%; (15) 8:32, 25.0%; (23) 1:32, 3.1%; (34) 15:32, 46.9%; (42) 1:32, 3.1%	(1) 16:32, 50.0%; (2) 2:32, 6.3%; (3) 13:32, 40.6%; (5) 1:32, 3.1%	(1) 15:32, 46.9%; (2) 1:32, 3.1%; (3) 15:32, 46.9%; (4) 1:32, 3.1%	(10) 8:32, 25.0%; (15) 6:32, 18.8%; (21) 1:32, 3.1%; (23) 1:32, 3.1%; (34) 14:32, 43.8%; (42) 1:32, 3.1%; (50) 1:32, 3.1%	(10) 7:32, 21.9%; (15) 6:32, 18.8%; (21) 1:32, 3.1%; (34) 17:32, 53.1%; (50) 1:32, 3.1%	(1) 14:32, 43.8%; (2) 2:32, 6.3%; (3) 14:32, 43.8%; (4) 1:32, 3.1%; (5) 1:32, 3.1%	(1) 13:32, 40.6%; (2) 1:32, 3.1%; (3) 17:32, 53.1%; (5) 1:32, 3.1%	(10) 5:32, 15.6%; (15) 9:32, 28.1%; (23) 1:32, 3.1%; (34) 15:32, 46.9%; (41) 1:32, 3.1%; (42) 1:32, 3.1%	(10) 3:32, 9.4%; (15) 10:32, 31.3%; (34) 18:32, 56.3%; (42) 1:32, 3.1%	(1) 14:32, 43.8%; (2) 1:32, 3.1%; (3) 15:32, 46.9%; (4) 2:32, 6.3%	(1) 13:32, 40.6%; (3) 18:32, 56.3%; (4) 1:32, 3.1%

	DL013 - Tooth loss UM2 (l)	DL014 - Tooth loss UM2 (r)	DL013a - Tooth loss UM2 (l) - presence	DL014a - Tooth loss UM2 (r) - presence	DL015 - Tooth loss UM3 (l)	DL016 - Tooth loss UM3 (r)	DL015a - Tooth loss UM3 (l) - presence	DL016a - Tooth loss UM3 (r) - presence	DL017 - Tooth loss LI1 (l)	DL018 - Tooth loss LI1 (r)	DL017a - Tooth loss LI1 (l) - presence	DL018a - Tooth loss LI1 (r) - presence
Abu Tabari 95/2-3	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1	34	10	3	1	10	10	1	1
Abu Tabari 02/1-3	42	34	4	3	10	34	1	3	10	10	1	1
Abu Tabari 02/1-5	34	34	3	3	34	34	3	3	23	34	2	3
Abu Tabari 02/1-6	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-7	34	34	3	3	34	34	3	3	[(23)]	34	2	3
Abu Tabari 02/1-8	15	15	1	1	15	15	1	1	15	10	1	1
Abu Tabari 02/28-2	15	15	1	1	50	50	5	5	15	15	1	1
02/28-2 (*Dentes decidui*)									34	34	3	3
Abu Tabari 02/28-3	15	15	1	1	34	34	3	3	15	15	1	1
Abu Tabari 02/28-4	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-5	15	15	1	1	15	15	1	1	10	10	1	1
Abu Tabari 02/28-7	34	15	3	1	15	15	1	1	[(44)]	[(44)]	4	4
Abu Tabari 02/28-8	15	15	1	1	15	15	1	1	[(44)]	[(44)]	4	4
Abu Tabari 02/28-11	34	34	3	3	34	34	3	3	15	34	1	3
Abu Tabari 02/28-13	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-14	15	15	1	1	50	50	5	5	15	15	1	1
02/28-14 (*Dentes decidui*)									34	15	3	1
Abu Tabari 02/28-15	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-20	[(15)]	34	1	3	(15)	(15)	1	1	34	34	3	3
Abu Tabari 02/28-21	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-22	10	15	1	1	10	15	1	1	34	(15)	3	1
Abu Tabari 02/28-23	10	15	1	1	15	15	1	1	10	15	1	1
Abu Tabari 03/31	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1	15	15	1	1	15	15	1	1
Conical Hill 95/4	10	10	1	1	10	10	1	1	(21)	(21)	2	2
Conical Hill 95/4-1	34	34	3	3	34	15	3	1	34	34	3	3
Conical Hill 02/3-4	(21)	34	2	3	34	34	3	3	(44)	(44)	4	4
Djabarona 96/1-1	15	34	1	3	15	15	1	1	15	15	1	1
Djabarona 96/1-2	15	15	1	1	15	15	1	1	[(23)]	[(21)]	2	2
Djabarona 96-4	15	15	1	1	34	34	3	3	34	34	3	3
Djabarona 96/120-3	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-5	34	34	3	3	34	34	3	3	[(23)]	[(23)]	2	2

	DL013	DL014	DL013a	DL014a	DL015	DL016	DL015a	DL016a	DL017	DL018	DL017a	DL018a
♂ No.	14	14	14	14	14	14	14	14	14	14	14	14
♂ Mode	34	34	3	3	34	34	3	3	34	34	3	3
♂ Freq.	(10) 1:14, 7.1%; (15) 5:14, 35.7%; (21) 1:14, 7.1%; (34) 7:14, 50.0%	(10) 1:14, 7.1%; (15) 4:14, 28.6%; (34) 9:14, 64.3%	(1) 6:14, 42.9%; (2) 1:14, 7.1%; (3) 7:14, 50.0%	(1) 5:14, 35.7%; (34) 9:14, 64.3%	(10) 1:14, 7.1%; (15) 2:14, 14.3%; (34) 9:14, 64.3%; (50) 2:14, 14.3%	(10) 1:14, 7.1%; (15) 2:14, 14.3%; (34) 9:14, 64.3%; (50) 2:14, 14.3%	(1) 3:14, 21.4%; (3) 9:14, 64.3%; (5) 2:14, 14.3%	(1) 3:14, 21.4%; (3) 9:14, 64.3%; (5) 2:14, 14.3%	(15) 4:14, 28.6%; (21) 1:14, 7.1%; (23) 2:14, 14.3%; (34) 6:14, 42.9%; (44) 1:14, 7.1%	(10) 1:14, 7.1%; (15) 2:14, 14.3%; (21) 1:14, 7.1%; (34) 9:14, 64.3%; (44) 1:14, 7.1%	(1) 4:14, 28.6%; (2) 3:14, 21.4%; (3) 6:14, 42.9%; (4) 1:14, 7.1%	(1) 3:14, 21.4%; (2) 1:14, 7.1%; (3) 9:14, 64.3%; (4) 1:14, 7.1%
♀ No.	16	16	16	16	16	16	16	16	16	16	16	16
♀ Mode	15	15	1	1	15	15	1	1	10	15	1	1
♀ Freq.	(10) 4:16, 25.0%; (15) 7:16, 43.8%; (34) 4:16, 25.0%; (42) 1:16, 6.3%	(10) 2:16, 12.5%; (15) 9:16, 56.3%; (34) 5:16, 31.3%	(1) 11:16, 68.8%; (3) 4:16, 25.0%; (4) 1:16, 6.3%	(1) 11:16, 68.8%; (3) 5:16, 31.3%	(10) 3:16, 18.8%; (15) 8:16, 50.0%; (34) 5:16, 31.3%	(10) 2:16, 12.5%; (15) 10:16, 62.5%; (34) 4:16, 25.0%	(1) 11:16, 68.8%; (3) 5:16, 31.3%	(1) 12:16, 75.0%; (3) 4:16, 25.0%	(10) 5:16, 31.3%; (15) 4:16, 25.0%; (23) 2:16, 12.5%; (34) 3:16, 18.8%; (44) 2:16, 12.5%	(10) 4:16, 25.0%; (15) 6:16, 37.5%; (21) 1:16, 6.3%; (23) 1:16, 6.3%; (34) 2:16, 12.5%; (44) 2:16, 12.5%	(1) 9:16, 56.3%; (2) 2:16, 12.5%; (3) 3:16, 18.8%; (4) 2:16, 12.5%	(1) 10:16, 62.5%; (2) 2:16, 12.5%; (3) 2:16, 12.5%; (4) 2:16, 12.5%
No.	32	32	32	32	32	32	32	32	32	32	32	32
Mode	34	34	1	3	34	34	3	3	34	34	1	3
Freq.	(10) 5:32, 15.6%; (15) 12:32, 37.5%; (21) 1:32, 3.1%; (34) 13:32, 40.6%; (42) 1:32, 3.1%	(10) 3:32, 9.4%; (15) 13:32, 40.6%; (34) 16:32, 50.0%	(1) 17:32, 53.1%; (2) 1:32, 3.1%; (3) 13:32, 40.6%; (4) 1:32, 3.1%	(1) 16:32, 50.0%; (3) 16:32, 50.0%	(10) 4:32, 12.5%; (15) 10:32, 31.3%; (34) 16:32, 50.0%; (50) 2:32, 6.3%	(10) 3:32, 9.4%; (15) 12:32, 37.5%; (34) 15:32, 46.9%; (50) 2:32, 6.3%	(1) 14:32, 43.8%; (3) 16:32, 50.0%; (5) 2:32, 6.3%	(1) 15:32, 46.9%; (3) 15:32, 46.9%; (5) 2:32, 6.3%	(10) 5:32, 15.6%; (15) 8:32, 25.0%; (21) 1:32, 3.1%; (23) 4:32, 12.5%; (34) 11:32, 34.4%; (44) 3:32, 9.4%	(10) 5:32, 15.6%; (15) 8:32, 25.0%; (21) 2:32, 6.3%; (23) 1:32, 3.1%; (34) 13:32, 40.6%; (44) 3:32, 9.4%	(1) 13:32, 40.6%; (2) 5:32, 15.6%; (3) 11:32, 34.4%; (4) 3:32, 9.4%	(1) 13:32, 40.6%; (2) 3:32, 9.4%; (3) 13:32, 40.6%; (4) 3:32, 9.4%

	DL019 - Tooth loss LI2 (l)	DL020 - Tooth loss LI2 (r)	DL019a - Tooth loss LI2 (l) - presence	DL020a - Tooth loss LI2 (r) - presence	DL021 - Tooth loss LC (l)	DL022 - Tooth loss LC (r)	DL021a - Tooth loss LC (l) - presence	DL022a - Tooth loss LC (r) - presence	DL023 - Tooth loss LP1 (l)	DL024 - Tooth loss LP1 (r)	DL023a - Tooth loss LP1 (l) - presence	DL024a - Tooth loss LP1 (r) - presence
Abu Tabari 95/2-3	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-3	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-5	21	34	2	3	10	21	1	2	23	34	2	3
Abu Tabari 02/1-6	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-7	21	34	2	3	23	34	2	3	23	21	2	2
Abu Tabari 02/1-8	15	10	1	1	15	10	1	1	15	15	1	1
Abu Tabari 02/28-2	15	15	1	1	15	15	1	1	(10)	50	1	5
02/28-2 (*Dentes decidui*)	15	15	1	1	10	15	1	1	10	10	1	1
Abu Tabari 02/28-3	15	15	1	1	15	15	1	1	(24)	15	2	1
Abu Tabari 02/28-4	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-5	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-7	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-8	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-11	34	15	3	1	34	34	3	3	34	34	3	3
Abu Tabari 02/28-13	15	34	1	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-14	15	15	1	1	15	15	1	1	15	15	1	1
02/28-14 (*Dentes decidui*)	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-15	10	10	1	1	10	10	1	1	10	21	1	2
Abu Tabari 02/28-20	15	34	1	3	34	[(15)]	3	1	34	34	3	3
Abu Tabari 02/28-21	15	15	1	1	10	10	1	1	10	21	1	2
Abu Tabari 02/28-22	15	21	1	2	10	10	1	1	10	15	1	1
Abu Tabari 02/28-23	10	21	1	2	10	21	1	2	10	21	1	2
Abu Tabari 03/31	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1	15	15	1	1	15	15	1	1
Conical Hill 95/4	(21)	(21)	2	2	10	10	1	1	10	15	1	1
Conical Hill 95/4-1	34	34	3	3	34	34	3	3	34	34	3	3
Conical Hill 02/3-4	(23)	[(23)]	2	2	(23)	[(23)]	2	2	(21)	34	2	3
Djabarona 96/1-1	(23)	(23)	2	2	15	15	1	1	15	10	1	1
Djabarona 96/1-2	[(21)]	[(21)]	2	2	(23)	34	2	3	(21)	34	2	3
Djabarona 96-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-3	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-5	[(23)]	[(21)]	2	2	34	[(21)]	3	2	34	[(21)]	3	2

	DL019	DL020	DL019a	DL020a	DL021	DL022	DL021a	DL022a	DL023	DL024	DL023a	DL024a
♂ No.	14	14	14	14	14	14	14	14	14	14	14	14
♂ Mode	34	34	3	3	34	34	3	3	34	34	3	3
♂ Freq.	(15) 4:14, 28.6%; (21) 3:14, 21.4%; (23) 1:14, 7.1%; (34) 6:14, 42.9%;	(10) 1:14, 7.1%; (15) 3:14, 21.4%; (21) 1:14, 7.1%; (23) 1:14, 7.1%; (34) 8:14, 57.1%	(1) 4:14, 28.6%; (2) 4:14, 28.6%; (3) 6:14, 42.9%;	(1) 4:14, 28.6%; (2) 2:14, 14.3%; (3) 8:14, 57.1%	(10) 2:14, 14.3%; (15) 3:14, 21.4%; (23) 2:14, 14.3%; (34) 7:14, 50.0%	(10) 2:14, 14.3%; (15) 3:14, 21.4%; (21) 1:14, 7.1%; (23) 1:14, 7.1%; (34) 7:14, 50.0%	(1) 5:14, 35.7%; (2) 2:14, 14.3%; (3) 7:14, 50.0%	(1) 5:14, 35.7%; (2) 2:14, 14.3%; (3) 7:14, 50.0%	(10) 2:14, 14.3%; (15) 2:14, 14.3%; (21) 1:14, 7.1%; (23) 2:14, 14.3%; (34) 7:14, 50.0%	(15) 3:14, 21.4%; (21) 1:14, 7.1%; (34) 9:14, 64.3%; (50) 1:14, 7.1%	(1) 4:14, 28.6%; (2) 3:14, 21.4%; (3) 7:14, 50.0%	(1) 3:14, 21.4%; (2) 1:14, 7.1%; (3) 9:14, 64.3%; (5) 1:14, 7.1%
♀ No.	16	16	16	16	16	16	16	16	16	16	16	16
♀ Mode	15	15	1	1	10	10	1	1	10	15	1	1
♀ Freq.	(10) 5:16, 31.3%; (15) 6:16, 37.5%; (21) 1:16, 6.3%; (23) 2:16, 12.5%; (34) 2:16, 12.5%	(10) 4:16, 25.0%; (15) 5:16, 31.3%; (21) 4:16, 25.0%; (23) 1:16, 6.3%; (34) 2:16, 12.5%	(1) 11:16, 68.8%; (2) 3:16, 18.8%; (3) 2:16, 12.5%	(1) 9:16, 56.3%; (2) 5:16, 31.3%; (3) 2:16, 12.5%	(10) 7:16, 43.8%; (15) 5:16, 31.3%; (23) 1:16, 6.3%; (34) 3:16, 18.8%	(10) 6:16, 37.5%; (15) 5:16, 31.3%; (21) 2:16, 12.5%; (34) 3:16, 18.8%	(1) 12:16, 75.0%; (2) 1:16, 6.3%; (3) 3:16, 18.8%	(1) 11:16, 68.8%; (2) 2:16, 12.5%; (3) 3:16, 18.8%	(10) 7:16, 43.8%; (15) 4:16, 25.0%; (21) 1:16, 6.3%; (24) 1:16, 6.3%; (34) 3:16, 18.8%	(10) 4:16, 25.0%; (15) 5:16, 31.3%; (21) 4:16, 25.0%; (34) 3:16, 18.8%	(1) 11:16, 68.8%; (2) 2:16, 12.5%; (3) 3:16, 18.8%	(1) 9:16, 56.3%; (2) 4:16, 25.0%; (3) 3:16, 18.8%
No.	32	32	32	32	32	32	32	32	32	32	32	32
Mode	15	34	1	1	34	34	1	1	34	34	1	3
Freq.	(10) 5:32, 15.6%; (15) 11:32, 34.4%; (21) 4:32, 12.5%; (23) 3:32, 9.4%; (34) 9:32, 28.1%	(10) 5:32, 15.6%; (15) 8:32, 25.0%; (21) 5:32, 15.6%; (23) 2:32, 6.3%; (34) 12:32, 37.5%	(1) 16:32, 50.0%; (2) 7:32, 21.9%; (3) 9:32, 28.1%	(1) 13:32, 40.6%; (2) 7:32, 21.9%; (3) 12:32, 37.5%	(10) 9:32, 28.1%; (15) 8:32, 25.0%; (23) 3:32, 9.4%; (34) 12:32, 37.5%	(10) 8:32, 25.0%; (15) 8:32, 25.0%; (21) 3:32, 9.4%; (23) 1:32, 3.1%; (34) 12:32, 37.5%	(1) 17:32, 53.1%; (2) 3:32, 9.4%; (3) 12:32, 37.5%	(1) 16:32, 50.0%; (2) 4:32, 12.5%; (3) 12:32, 37.5%	(10) 9:32, 28.1%; (15) 6:32, 18.8%; (21) 2:32, 6.3%; (23) 2:32, 6.3%; (24) 1:32, 3.1%; (34) 12:32, 37.5%	(10) 4:32, 12.5%; (15) 8:32, 25.0%; (21) 5:32, 15.6%; (34) 14:32, 43.8%; (50) 1:32, 3.1%	(1) 15:32, 46.9%; (2) 5:32, 15.6%; (3) 12:32, 37.5%	(1) 12:32, 37.5%; (2) 5:32, 15.6%; (3) 14:32, 43.8%; (5) 1:32, 3.1%

	DL025 - Tooth loss LP2 (l)	DL026 - Tooth loss LP2 (r)	DL025a - Tooth loss LP2 (l) - presence	DL026a - Tooth loss LP2 (r) - presence	DL027 - Tooth loss LM1 (l)	DL028 - Tooth loss LM1 (r)	DL027a - Tooth loss LM1 (l) - presence	DL028a - Tooth loss LM1 (r) - presence	DL029 - Tooth loss LM2 (l)	DL030 - Tooth loss LM2 (r)	DL029a - Tooth loss LM2 (l) - presence	DL030a - Tooth loss LM2 (r) - presence
Abu Tabari 95/2-3	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-3	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/1-5	15	34	1	3	15	34	1	3	15	34	1	3
Abu Tabari 02/1-6	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/1-7	23	21	2	2	(15)	34	1	3	34	34	3	3
Abu Tabari 02/1-8	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-2	50	50	5	5	10	10	1	1	15	15	1	1
02/28-2 (*Dentes decidui*)	10	10	1	1								
Abu Tabari 02/28-3	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-4	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-5	10	10	1	1	15	10	1	1	15	15	1	1
Abu Tabari 02/28-7	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-8	15	15	1	1	15	15	1	1	15	15	1	1
Abu Tabari 02/28-11	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-13	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 02/28-14	15	15	1	1	15	15	1	1	15	34	1	3
02/28-14 (*Dentes decidui*)	15	15	1	1								
Abu Tabari 02/28-15	10	34	1	3	10	34	1	3	10	34	1	3
Abu Tabari 02/28-20	34	(15)	3	1	(34)	(34)	3	3	[(15)]	(34)	1	3
Abu Tabari 02/28-21	15	10	1	1	(10)	10	1	1	10	10	1	1
Abu Tabari 02/28-22	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-23	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 03/31	34	34	3	3	34	34	3	3	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1	15	15	1	1	15	15	1	1
Conical Hill 95/4	(21)	15	2	1	10	15	1	1	10	10	1	1
Conical Hill 95/4-1	34	34	3	3	34	34	3	3	34	34	3	3
Conical Hill 02/3-4	(21)	(21)	2	2	(21)	15	2	1	(21)	15	2	1
Djabarona 96/1-1	15	21	1	2	15	10	1	1	10	15	1	1
Djabarona 96/1-2	(21)	34	2	3	15	34	1	3	34	15	3	1
Djabarona 96-4	34	34	3	3	34	(15)	3	1	[(15)]	34	1	3
Djabarona 96/120-3	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-4	34	34	3	3	34	34	3	3	34	34	3	3
Djabarona 96/120-5	[(15)]	[(15)]	1	1	[(21)]	21	2	2	[(23)]	21	2	2

	DL025	DL026	DL025a	DL026a	DL027	DL028	DL027a	DL028a	DL029	DL030	DL029a	DL030a
♂ No.	14	14	14	14	14	14	14	14	14	14	14	14
♂ Mode	34	34	3	3	34	34	3	3	34	34	1	3
♂ Freq.	(15) 3:14, 21.4%; (21) 2:14, 14.3%; (23) 1:14, 7.1%; (34) 7:14, 50.0%; (50) 1:14, 7.1%	(15) 4:14, 28.6%; (21) 2:14, 14.3%; (34) 7:14, 50.0%; (50) 1:14, 7.1%	(1) 3:14, 21.4%; (2) 3:14, 21.4%; (3) 7:14, 50.0%; (5) 1:14, 7.1%	(1) 4:14, 28.6%; (2) 2:14, 14.3%; (3) 7:14, 50.0%; (5) 1:14, 7.1%	(10) 2:14, 14.3%; (15) 4:14, 28.6%; (21) 1:14, 7.1%; (34) 7:14, 50.0%	(10) 1:14, 7.1%; (15) 5:14, 35.7%; (34) 8:14, 57.1%	(1) 6:14, 42.9%; (2) 1:14, 7.1%; (3) 7:14, 50.0%	(1) 6:14, 42.9%; (3) 8:14, 57.1%	(10) 1:14, 7.1%; (15) 6:14, 42.9%; (21) 1:14, 7.1%; (34) 6:14, 42.9%	(10) 1:14, 7.1%; (15) 3:14, 21.4%; (34) 10:14, 71.4%	(1) 7:14, 50.0%; (2) 1:14, 7.1%; (3) 6:14, 42.9%	(1) 4:14, 28.6%; (3) 10:14, 71.4%
♀ No.	16	16	16	16	16	16	16	16	16	16	16	16
♀ Mode	15	10	1	1	15	10	1	1	10	15	1	1
♀ Freq.	(10) 6:16, 37.5%; (15) 7:16, 43.8%; (21) 1:16, 6.3%; (34) 2:16, 12.5%	(10) 6:16, 37.5%; (15) 5:16, 31.3%; (21) 1:16, 6.3%; (34) 4:16, 25.0%	(1) 13:16, 81.3%; (2) 1:16, 6.3%; (3) 2:16, 12.5%	(1) 11:16, 68.8%; (2) 1:16, 6.3%; (3) 4:16, 25.0%	(10) 6:16, 37.5%; (15) 7:16, 43.8%; (21) 1:16, 6.3%; (34) 2:16, 12.5%	(10) 7:16, 43.8%; (15) 4:16, 25.0%; (21) 1:16, 6.3%; (34) 4:16, 25.0%	(1) 13:16, 81.3%; (2) 1:16, 6.3%; (3) 2:16, 12.5%	(1) 11:16, 68.8%; (2) 1:16, 6.3%; (3) 4:16, 25.0%	(10) 7:16, 43.8%; (15) 5:16, 31.3%; (23) 1:16, 6.3%; (34) 3:16, 18.8%	(10) 5:16, 31.3%; (15) 7:16, 43.8%; (21) 1:16, 6.3%; (34) 3:16, 18.8%	(1) 12:16, 75.0%; (2) 1:16, 6.3%; (3) 3:16, 18.8%	(1) 12:16, 75.0%; (2) 1:16, 6.3%; (3) 3:16, 18.8%
No.	32	32	32	32	32	32	32	32	32	32	32	32
Mode	34	34	1	1	34	34	1	1	34	34	1	1
Freq.	(10) 6:32, 18.8%; (15) 9:32, 28.1%; (21) 3:32, 9.4%; (23) 1:32, 3.1%; (34) 11:32, 34.4%; (50) 1:32, 3.1%	(10) 6:32, 18.8%; (15) 9:32, 28.1%; (21) 3:32, 9.4%; (34) 13:32, 40.6%; (50) 1:32, 3.1%	(1) 15:32, 46.9%; (2) 4:32, 12.5%; (3) 11:32, 34.4%; (5) 1:32, 3.1%	(1) 15:32, 46.9%; (2) 3:32, 9.4%; (3) 13:32, 40.6%; (5) 1:32, 3.1%	(10) 8:32, 25.0%; (15) 11:32, 34.4%; (21) 2:32, 6.3%; (34) 11:32, 34.4%	(10) 8:32, 25.0%; (15) 9:32, 28.1%; (21) 1:32, 3.1%; (34) 14:32, 43.8%	(1) 19:32, 59.4%; (2) 2:32, 6.3%; (3) 11:32, 34.4%	(1) 17:32, 53.1%; (2) 1:32, 3.1%; (3) 14:32, 43.8%	(10) 8:32, 25.0%; (15) 11:32, 34.4%; (21) 1:32, 3.1%; (23) 1:32, 3.1%; (34) 11:32, 34.4%	(10) 6:32, 18.8%; (15) 10:32, 31.3%; (21) 1:32, 3.1%; (34) 15:32, 46.9%	(1) 19:32, 59.4%; (2) 2:32, 6.3%; (3) 11:32, 34.4%	(1) 16:32, 50.0%; (2) 1:32, 3.1%; (3) 15:32, 46.9%

	DL031 - Tooth loss LM3 (l)	DL032 - Tooth loss LM3 (r)	DL031a - Tooth loss LM3 l - presence	DL032a - Tooth loss LM3 r - presence
Abu Tabari 95/2-3	34	34	3	3
Abu Tabari 02/1-2	10	10	1	1
Abu Tabari 02/1-3	10	42	1	4
Abu Tabari 02/1-5	34	34	3	3
Abu Tabari 02/1-6	34	34	3	3
Abu Tabari 02/1-7	34	34	3	3
Abu Tabari 02/1-8	34	15	3	1
Abu Tabari 02/28-2	50	50	5	5
02/28-2 (*Dentes decidui*)				
Abu Tabari 02/28-3	15	15	1	1
Abu Tabari 02/28-4	34	34	3	3
Abu Tabari 02/28-5	15	15	1	1
Abu Tabari 02/28-7	34	15	3	1
Abu Tabari 02/28-8	15	(10)	1	1
Abu Tabari 02/28-11	34	34	3	3
Abu Tabari 02/28-13	34	34	3	3
Abu Tabari 02/28-14	50	50	5	5
02/28-14 (*Dentes decidui*)				
Abu Tabari 02/28-15	10	34	1	3
Abu Tabari 02/28-20	15	15	1	1
Abu Tabari 02/28-21	10	10	1	1
Abu Tabari 02/28-22	10	10	1	1
Abu Tabari 02/28-23	10	10	1	1
Abu Tabari 03/31	34	34	3	3
Abu Tabari 03/34-1	15	15	1	1
Conical Hill 95/4	10	15	1	1
Conical Hill 95/4-1	34	34	3	3
Conical Hill 02/3-4	(21)	15	2	1
Djabarona 96/1-1	10	15	1	1
Djabarona 96/1-2	15	15	1	1
Djabarona 96-4	34	34	3	3
Djabarona 96/120-3	34	[(15)]	3	1
Djabarona 96/120-4	[(15)]	[(15)]	1	1
Djabarona 96/120-5	34	[(23)]	3	2

	DL031	DL032	DL031a	DL032a
♂ No.	14	14	14	14
♂ Mode	34	34	3	3
♂ Freq.	(10) 1:14, 7.1%; (15) 2:14, 14.3%; (21) 1:14, 7.1%; (34) 8:14, 57.1%; (50) 2:14, 14.3%	(15) 5:14, 35.7%; (34) 7:14, 50.0%; (50) 2:14, 14.3%	(1) 3:14, 21.4%; (2) 1:14, 7.1%; (3) 8:14, 57.1%; (5) 2:14, 14.3%	(1) 5:14, 35.7%; (3) 7:14, 50.0%; (5) 2:14, 14.3%
♀ No.	16	16	16	16
♀ Mode	10	15	1	1
♀ Freq.	(10) 7:16, 43.8%; (15) 5:16, 31.3%; (34) 4:16, 25.0%	(10) 5:16, 31.3%; (15) 7:16, 43.8%; (23) 1:16, 6.3%; (34) 2:16, 12.5%; (42) 1:16, 6.3%	(1) 12:16, 75.0%; (3) 4:16, 25.0%	(1) 12:16, 75.0%; (2) 1:16, 6.3%; (3) 2:16, 12.5%; (4) 1:16, 6.3%
No.	32	32	32	32
Mode	34	15	1	1
Freq.	(10) 8:32, 25.0%; (15) 7:32, 21.9%; (21) 1:32, 3.1%; (34) 14:32, 43.8%; (50) 2:32, 6.3%	(10) 5:32, 15.6%; (15) 12:32, 37.5%; (23) 1:32, 3.1%; (34) 11:32, 34.4%; (42) 1:32, 3.1%; (50) 2:32, 6.3%	(1) 15:32, 46.9%; (2) 1:32, 3.1%; (3) 14:32, 43.8%; (5) 2:32, 6.3%	(1) 17:32, 53.1%; (2) 1:32, 3.1%; (3) 11:32, 34.4%; (4) 1:32, 3.1%; (5) 2:32, 6.3%

Appendix XXI.B. Enamel hypoplasia

Appendix XXI.B.1. Variable by variable

	DS001 - Hypoplasia UI1 (l)	DS002 - Hypoplasia UI1 (r)	DS001a - Hypoplasia UI1 (l) - intensity	DS002a - Hypoplasia UI1 (r) - intensity	DS001a/2a - Hypoplasia UI1 (m) - intensity	DS001b - Hypoplasia UI1 (l) - frequency	DS002b - Hypoplasia UI1 (r) - frequency	DS001b/2b - Hypoplasia UI1 (m) - frequency	DS003 - Hypoplasia UI2 (l)	DS004 - Hypoplasia UI2 (r)	DS003a - Hypoplasia UI2 (l) - intensity	DS004a - Hypoplasia UI2 (r) - intensity
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1	1	0	0	0	(10)	(10)	1	1
Abu Tabari 02/1-3	(10)	(10)	1	1	1	0	0	0	(10)	(10)	1	1
Abu Tabari 02/1-5		(10)		1	1		0	0				
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	22	22	2	2	2	2	2	2	22	32	2	3
Abu Tabari 02/28-2	22	22	2	2	2	2	2	2	(22)	22	2	2
02/28-2 (*Dentes decidui*)	10		1		1	0		0	10	10	1	1
Abu Tabari 02/28-3		32		3	3		2	2	62	22	6	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	52	52	5	5	5	2	2	2	(42)	52	4	5
Abu Tabari 02/28-7		(22)		2	2		2	2				
Abu Tabari 02/28-8	(32)	(22)	3	2	2.5	2	2	2				
Abu Tabari 02/28-11		(32)		3	3		2	2				
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	32	32	3	3	3	2	2	2	(22) [(33)]	(10) [(43)]	2	1
02/28-14 (*Dentes decidui*)												
Abu Tabari 02/28-15	22	22	2	2	2	2	2	2	22	22	2	2
Abu Tabari 02/28-20		[(10)]		1	1		0	0				
Abu Tabari 02/28-21	(22)	22	2	2	2	2	2	2	(22)		2	
Abu Tabari 02/28-22	42	(22)	4	2	3	2	2	2				
Abu Tabari 02/28-23	32		3		3	2		2				
Abu Tabari 03/31												
Abu Tabari 03/34-1	(22)	(10)	2	1	1.5	2	0	2	(41)	[(10)]	4	1
Conical Hill 95/4	(42)		4		4	2		2	(41)	(32)	4	3
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(32)		3		3	2		2				
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS001	DS002	DS001a	DS002a	DS001a/2a	DS001b	DS002b	DS001b/2b	DS003	DS004	DS003a	DS004a
♂ No.	4	6	4	6	7	4	6	7	4	4	4	4
♂ Min.			2	1	1.0	2	0	0			2	1
♂ Max.			4	3	4.0	2	2	2			4	3
♂ Mode	22	10	2	1	1.0	2	2	2	22	32	2	3
♂ Median			2.50	2.00	2.00	2.00	2.00	2.00			2.00	2.50
♂ Mean			2.75	2.00	2.29	2.00	1.33	1.43			2.50	2.25
♂ Freq.	(22) 2:4, 50.0%; (32) 1:4, 25.0%; (42) 1:4, 25.0%	(10) 2:6, 33.3%; (22) 2:6, 33.3%; (32) 2:6, 33.3%	(2) 2:4, 50.0%; (3) 1:4, 25.0%; (4) 1:4, 25.0%	(1) 2:6, 33.3%; (2) 2:6, 33.3%; (3) 2:6, 33.3%	(1) 2:7, 28.6%; (2) 2:7, 28.6%; (3) 2:7, 28.6%; (4) 1:7, 14.3%	(2) 4:4, 100.0%	(0) 2:6, 33.3%; (2) 4:6, 66.7%	(0) 2:7, 28.6%; (2) 5:7, 71.4%	(22) 3:4, 75.0%; (41) 1:4, 25.0%	(10) 1:4, 25.0%; (22) 1:4, 25.0%; (32) 2:4, 50.0%	(2) 3:4, 75.0%; (4) 1:4, 25.0%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 2:4, 50.0%
♀ No.	10	10	10	10	12	10	10	12	7	6	7	6
♀ Min.			1	1	1.0	0	0	0			1	1
♀ Max.			5	5	5.0	2	2	2			6	5
♀ Mode	32	22	3	2	3.0	2	2	2	10	10	1	1
♀ Median			2.50	2.00	2.25	2.00	2.00	2.00			2.00	1.50
♀ Mean			2.60	2.10	2.42	1.60	1.40	1.67			2.86	2.00
♀ Freq.	(10) 2:10, 20.0%; (22) 3:10, 30.0%; (32) 3:10, 30.0%; (42) 1:10, 10.0%; (52) 1:10, 10.0%	(10) 3:10, 30.0%; (22) 5:10, 50.0%; (32) 1:10, 10.0%; (52) 1:10, 10.0%	(1) 2:10, 20.0%; (2) 3:10, 30.0%; (3) 3:10, 30.0%; (4) 1:10, 10.0%; (5) 1:10, 10.0%	(1) 3:10, 30.0%; (2) 5:10, 50.0%; (3) 1:10, 10.0%; (5) 1:10, 10.0%	(1) 2:12, 16.7%; (1.5) 1:12, 8.3%; (2) 3:12, 25.0%; (2.5) 1:12, 8.3%; (3) 4:12, 33.3%; (5) 1:12, 8.3%	(0) 2:10, 20.0%; (2) 8:10, 80.0%	(0) 3:10, 30.0%; (2) 7:10, 70.0%	(0) 2:12, 16.7%; (2) 10:12, 83.3%	(10) 2:7, 28.6%; (22) 2:7, 28.6%; (41) 1:7, 14.3%; (42) 1:7, 14.3%; (62) 1:7, 14.4%	(10) 3:6, 50.0%; (22) 2:6, 33.3%; (52) 1:6, 16.7%	(1) 2:7, 28.6%; (2) 2:7, 28.6%; (4) 2:7, 28.6%; (6) 1:7, 14.4%	(1) 3:6, 50.0%; (2) 2:6, 33.3%; (5) 1:6, 16.7%
No.	14	16	14	16	19	14	16	19	11	10	11	10
Min.			1	1	1.0	0	0	0			1	1
Max.			5	5	5.0	2	2	2			6	5
Mode	22	22	2	2	3.0	2	2	2	22	10	2	1
Median			2.50	2.00	2.00	2.00	2.00	2.00			2.00	2.00
Mean			2.64	2.06	2.37	1.71	1.38	1.58			2.73	2.10
Freq.	(10) 2:14, 14.3%; (22) 5:14, 35.7%; (32) 4:14, 28.6%; (42) 2:14, 14.3%; (52) 1:14, 7.1%	(10) 5:16, 31.3%; (22) 7:16, 43.8%; (32) 3:16, 18.8%; (52) 1:16, 6.3%	(1) 2:14, 14.3%; (2) 5:14, 35.7%; (3) 4:14, 28.6%; (4) 2:14, 14.3%; (5) 1:14, 7.1%	(1) 5:16, 31.3%; (2) 7:16, 43.8%; (3) 3:16, 18.8%; (5) 1:16, 6.3%	(1) 4:19, 21.1%; (1.5) 1:19, 5.3%; (2) 4:19, 21.1%; (2.5) 1:19, 5.3%; (3) 6:19, 31.6%; (4) 1:19, 5.3%; (5) 1:19, 5.3%	(0) 2:14, 14.3%; (2) 12:14, 85.7%	(0) 5:16, 31.3%; (2) 11:16, 68.8%	(0) 4:19, 21.1%; (2) 15:19, 78.9%	(10) 2:11, 18.2%; (22) 5:11, 45.5%; (41) 2:11, 18.2%; (42) 1:11, 9.1%; (62) 1:11, 9.1%	(10) 4:10, 40.0%; (22) 3:10, 30.0%; (32) 2:10, 20.0%; (52) 1:10, 10.0%	(1) 2:11, 18.2%; (2) 5:11, 45.5%; (4) 3:11, 27.3%; (6) 1:11, 9.1%	(1) 4:10, 40.0%; (2) 3:10, 30.0%; (3) 2:10, 20.0%; (5) 1:10, 10.0%

All descriptive statistics were calculated without milk tooth (*Dens deciduus*) values.

	DS003a/4a - Hypoplasia UI2 (m) - intensity	DS003b - Hypoplasia UI2 (l) - frequency	DS004b - Hypoplasia UI2 (r) - frequency	DS003b/4b - Hypoplasia UI2 (m) - frequency	DS005 - Hypoplasia UC (l)	DS006 - Hypoplasia UC (r)	DS005a - Hypoplasia UC (l) - intensity	DS006a - Hypoplasia UC (r) - intensity	DS005a/6a - Hypoplasia UC (m) - intensity	DS005b - Hypoplasia UC (l) - frequency	DS006b - Hypoplasia UC (r) - frequency	DS005a/6b - Hypoplasia UC (m) - frequency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	0	0	0	[(10)]	(10)	1	1	1	0	0	0
Abu Tabari 02/1-3	1	0	0	0	(10)	(21)	1	2	1.5	0	1	1
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	2.5	2	2	2	42	42	4	4	4	2	2	2
Abu Tabari 02/28-2	2	2	2	2		(31)		3	3		1	1
02/28-2 (*Dentes decidui*)	1	0	0	0	10	10	1	1	1	0	0	0
Abu Tabari 02/28-3	4	2	2	2	62	42	6	4	5	2	2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	4.5	2	2	2	52	52	5	5	5	2	2	2
Abu Tabari 02/28-7					(32)	(22)	3	2	2.5	2	2	2
Abu Tabari 02/28-8					32	32	3	3	3	2	2	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	1.5	2	0	2	(32) [(33)]	(32) [(33)]	3	3	3	2	2	2
02/28-14 (*Dentes decidui*)					(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/28-15	2	2	2	2	(10)	22	1	2	1.5	0	2	2
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	2	2		2	(32)	(22)	3	2	2.5	2	2	2
Abu Tabari 02/28-22					32	(32)	3	3	3	2	2	2
Abu Tabari 02/28-23												
Abu Tabari 03/31												
Abu Tabari 03/34-1	2.5	1	0	1	(51)	(51)	5	5	5	1	1	1
Conical Hill 95/4	3.5	1	2	2	(32)	(41)	3	4	3.5	2	1	2
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1					[(52)]	52	5	5	5	2	2	2
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS003a/4a	DS003b	DS004b	DS003b/4b	DS005	DS006	DS005a	DS006a	DS005a/6a	DS005b	DS006b	DS005a/6b
♂ No.	4	4	4	4	3	4	3	4	4	3	4	4
♂ Min.	1.5	1	0	2			3	3	3.0	2	1	1
♂ Max.	3.5	2	2	2			4	4	4.0	2	2	2
♂ Mode		2	2	2	32		3	4	3.0	2	2	2
♂ Median	2.25	2.00	2.00	2.00			3.00	3.50	3.25	2.00	1.50	2.00
♂ Mean	2.38	1.75	1.50	2.00			3.33	3.50	3.38	2.00	1.50	1.75
♂ Freq.	(1.5) 1:4, 25.0%; (2) 1:4, 25.0%; (2.5) 1:4, 25.0%; (3.5) 1:4, 25.0%	(1) 1:4, 25.0%; (2) 3:4, 75.0%	(0) 1:4, 25.0%; (2) 3:4, 75.0%	(2) 4:4, 100.0%	(32) 2:3, 66.7%; (42) 1:3, 33.3%	(31) 1:4, 25.0%; (32) 1:4, 25.0%; (41) 1:4, 25.0%; (42) 1:4, 25.0%	(3) 2:3, 66.7%; (4) 1:3, 33.3%	(3) 2:4, 50.0%; (4) 2:4, 50.0%	(3) 2:4, 50.0%; (3.5) 1:4, 25.0%; (4) 1:4, 25.0%	(2) 2:3, 66.7%; (2) 1:3, 33.3%	(1) 2:4, 50.0%; (2) 2:4, 50.0%	(1) 1:4, 25.0%; (2) 3:4, 75.0%
♀ No.	7	7	6	7	11	11	11	11	11	11	11	11
♀ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♀ Max.	4.5	2	2	2			6	5	5.0	2	2	2
♀ Mode	1.0	2	0	2	32	22	3	2	5.0	2	2	2
♀ Median	2.00	2.00	1.00	2.00			3.00	3.00	3.00	2.00	2.00	2.00
♀ Mean	2.43	1.29	1.00	1.29			3.27	3.09	3.18	1.36	1.64	1.64
♀ Freq.	(1) 2:7, 28.6%; (2) 2:7, 28.6%; (2.5) 1:7, 14.3%; (4) 1:7, 14.3%; (4.5) 1:7, 14.3%	(0) 2:7, 28.6%; (1) 1:7, 14.3%; (2) 4:7, 57.1%	(0) 3:6, 50.0%; (2) 3:6, 50.0%	(0) 2:7, 28.6%; (1) 1:7, 14.3%; (2) 4:7, 57.1%	(10) 3:11, 27.3%; (32) 4:11, 36.4%; (51) 1:11, 9.1%; (52) 2:11, 18.2%; (62) 1:11, 9.1%	(10) 1:11, 9.1%; (21) 1:11, 9.1%; (22) 3:11, 27.3%; (32) 2:11, 18.2%; (42) 1:11, 9.1%; (51) 1:11, 9.1%; (52) 2:11, 18.2%	(1) 3:11, 27.3%; (3) 4:11, 36.4%; (5) 3:11, 27.3%; (6) 1:11, 9.1%	(1) 1:11, 9.1%; (2) 4:11, 36.4%; (3) 2:11, 18.2%; (4) 1:11, 9.1%; (5) 3:11, 27.3%	(1) 1:11, 9.1%; (1.5) 2:11, 18.2%; (2.5) 2:11, 18.2%; (3) 2:11, 18.2%; (5) 4:11, 36.4%	(0) 3:11, 27.3%; (1) 1:11, 9.1%; (2) 7:11, 63.6%	(0) 1:11, 9.1%; (1) 2:11, 18.2%; (2) 8:11, 72.7%	(0) 1:11, 9.1%; (1) 2:11, 18.2%; (2) 8:11, 72.7%
No.	11	11	10	11	14	15	14	15	15	14	15	15
Min.	1.0	0	0	0			1	1	1.0	0	0	0
Max.	4.5	2	2	2			6	5	5.0	2	2	2
Mode	2.0	2	2	2	32	22	3	2	3.0	2	2	2
Median	2.00	2.00	2.00	2.00			3.00	3.00	3.00	2.00	2.00	2.00
Mean	2.41	1.45	1.20	1.55			3.29	3.20	3.23	1.50	1.60	1.67
Freq.	(1) 2:11, 18.2%; (1.5) 1:11, 9.1%; (2) 3:11, 27.3%; (2.5) 2:11, 18.2%; (3.5) 1:11, 9.1%; (4) 1:11, 9.1%; (4.5) 1:11, 9.1%	(0) 2:11, 18.2%; (1) 2:11, 18.2%; (2) 7:11, 63.6%	(0) 4:10, 40.0%; (2) 6:10, 60.0%	(0) 2:11, 18.2%; (1) 1:11, 9.1%; (2) 8:11, 72.7%	(10) 3:14, 21.4%; (32) 6:14, 42.9%; (42) 1:14, 7.1%; (51) 1:14, 7.1%; (52) 2:14, 14.3%; (62) 1:14, 7.1%	(10) 1:15, 6.7%; (21) 1:15, 6.7%; (22) 3:15, 20.0%; (31) 1:15, 6.7%; (32) 3:15, 20.0%; (41) 1:15, 6.7%; (42) 2:15, 13.3%; (51) 1:15, 6.7%; (52) 2:15, 13.3%	(1) 3:14, 21.4%; (3) 6:14, 42.9%; (4) 1:14, 7.1%; (5) 3:14, 21.4%; (6) 1:14, 7.1%	(1) 1:15, 6.7%; (2) 4:15, 26.7%; (3) 4:15, 26.7%; (4) 3:15, 20.0%; (5) 3:15, 20.0%	(1) 1:15, 6.7%; (1.5) 2:15, 13.3%; (2.5) 2:15, 13.3%; (3) 4:15, 26.7%; (3.5) 1:15, 6.7%; (4) 1:15, 6.7%; (5) 4:15, 26.7%	(0) 3:14, 21.4%; (1) 1:14, 7.1%; (2) 10:14, 71.4%	(0) 1:15, 6.7%; (1) 4:15, 26.7%; (2) 10:15, 66.7%	(0) 1:15, 6.7%; (1) 3:15, 20.0%; (2) 11:15, 73.3%

	DS007 - Hypoplasia UP1 (l)	DS008 - Hypoplasia UP1 (r)	DS007a - Hypoplasia UP1 (l) - intensity	DS008a - Hypoplasia UP1 (r) - intensity	DS007a/8a - Hypoplasia UP1 (m) - intensity	DS007b - Hypoplasia UP1 (l) - frequency	DS008b - Hypoplasia UP1 (r) - frequency	DS007b/8b - Hypoplasia UP1 (m) - frequency	DS009 - Hypoplasia UP2 (l)	DS010 - Hypoplasia UP2 (r)	DS009a - Hypoplasia UP2 (l) – intensity	DS010a - Hypoplasia UP2 (r) - intensity
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		(10)		1	1		0	0	[(10)]		1	
Abu Tabari 02/1-3	(10)		1		1	0		0		(10)		1
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		(10)		1	1		0	0	(42)		4	
Abu Tabari 02/1-8	42	52	4	5	4.5	2	2	2	32	42	3	4
Abu Tabari 02/28-2												
02/28-2 (*Dentes decidui*)	10	10	1	1	1	0	0	0	(10)	10	1	1
Abu Tabari 02/28-3	(10)	22	1	2	1.5	0	2	2	(10)	22	1	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	32	42	3	4	3.5	2	2	2	32	(22)	3	2
Abu Tabari 02/28-7	(22)	(10)	2	1	1.5	2	0	2	(10)	(32)	1	3
Abu Tabari 02/28-8	(10)	(22)	1	2	1.5	0	2	2	(22)	(22)	2	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	(32)	32	3	3	3	2	2	2	(22)	22	2	2
02/28-14 (*Dentes decidui*)	(10)	(10)	1	1	1	0	0	0	(10)	(10) [(33)]	1	1
Abu Tabari 02/28-15	10	(10)	1	1	1	0	0	0	10	(22)	1	2
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	(22)	(22)	2	2	2	2	2	2	(10)	(10)	1	1
Abu Tabari 02/28-22	(10)	31	1	3	2	0	1	1	(31)		3	
Abu Tabari 02/28-23	(22)	(32)	2	3	2.5	2	2	2	32	(32)	3	3
Abu Tabari 03/31												
Abu Tabari 03/34-1	(42)	(42)	4	4	4	2	2	2	(62)	[(52)]	6	5
Conical Hill 95/4									[(10)]		1	
Conical Hill 95/4-1	10		1		1	0		0				
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS007	DS008	DS007a	DS008a	DS007a/8a	DS007b	DS008b	DS007b/8b	DS009	DS010	DS009a	DS010a
♂ No.	2	3	2	3	3	2	3	3	4	2	4	2
♂ Min.			3	1	1.0	2	0	0			1	2
♂ Max.			4	5	4.5	2	2	2			4	4
♂ Mode						2	2	2				
♂ Median			3.50	3.00	3.00	2.00	2.00	2.00			2.50	3.00
♂ Mean			3.50	3.00	2.83	2.00	1.33	1.33			2.50	3.00
♂ Freq.	(32) 1:2, 50.0%; (42) 1:2, 50.0%	(10) 1:3, 33.3%; (32) 1:3, 33.3%; (52) 1:3, 33.3%	(3) 1:2, 50.0%; (4) 1:2, 50.0%	(1) 1:3, 33.3%; (3) 1:3, 33.3%; (5) 1:3, 33.3%	(1) 1:3, 33.3%; (3) 1:3, 33.3%; (4.5) 1:3, 33.3%	(2) 2:2, 100.0%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(10) 1:4, 25.0%; (22) 1:4, 25.0%; (32) 1:4, 25.0%; (42) 1:4, 25.0%	(22) 1:2, 50.0%; (42) 1:2, 50.0%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 1:4, 25.0%; (4) 1:4, 25.0%	(2) 1:2, 50.0%; (4) 1:2, 50.0%
♀ No.	11	10	11	10	12	11	10	12	10	9	10	9
♀ Min.			1	1	1.0	0	0	0			1	1
♀ Max.			4	4	4.0	2	2	2			6	5
♀ Mode	10	10	1	1	1.0	0	2	2	10	22	1	2
♀ Median			1.00	2.00	1.50	0.00	2.00	2.00			1.50	2.00
♀ Mean			1.73	2.30	1.88	0.91	1.30	1.25			2.20	2.33
♀ Freq.	(10) 6:11, 54.5%; (22) 3:11, 27.3%; (32) 1:11, 9.1%; (42) 1:11, 9.1%	(10) 3:10, 30.0%; (22) 3:10, 30.0%; (31) 1:10, 10.0%; (32) 1:10, 10.0%; (42) 2:10, 20.0%	(1) 6:11, 54.5%; (2) 3:11, 27.3%; (3) 1:11, 9.1%; (4) 1:11, 9.1%	(1) 3:10, 30.0%; (2) 3:10, 30.0%; (3) 2:10, 20.0%; (4) 2:10, 20.0%	(1) 4:12, 33.3%; (1.5) 3:12, 25.0%; (2) 2:12, 16.7%; (2.5) 1:12, 8.3%; (3.5) 1:12, 8.3%; (4) 1:12, 8.3%	(0) 6:11, 54.5%; (2) 5:11, 45.5%	(0) 3:10, 30.0%; (1) 1:10, 10.0%; (2) 6:10, 60.0%	(0) 4:12, 33.3%; (1) 1:12, 8.3%; (2) 7:12, 58.3%	(10) 5:10, 50.0%; (22) 1:10, 10.0%; (31) 1:10, 10.0%; (32) 2:10, 20.0%; (62) 1:10, 10.0%	(10) 2:9, 22.2%; (22) 4:9, 44.4%; (32) 2:9, 22.2%; (52) 1:9, 11.1%	(1) 5:10, 50.0%; (2) 1:10, 10.0%; (3) 3:10, 30.0%; (6) 1:10, 10.0%	(1) 2:9, 22.2%; (2) 4:9, 44.4%; (3) 2:9, 22.2%; (5) 1:9, 11.1%
No.	13	13	13	13	15	13	13	15	14	11	14	11
Min.			1	1	1.0	0	0	0			1	1
Max.			4	5	4.5	2	2	2			6	5
Mode	10	10	1	1	1.0	2	2	2	10	22	1	2
Median			2.00	2.00	1.50	2.00	2.00	2.00			2.00	2.00
Mean			2.00	2.46	2.07	1.08	1.31	1.27			2.29	2.45
Freq.	(10) 6:13, 46.2%; (22) 3:13, 23.1%; (32) 2:13, 15.4%; (42) 2:13, 15.4%	(10) 4:13, 30.8%; (22) 3:13, 23.1%; (31) 1:13, 7.7%; (32) 2:13, 15.4%; (42) 2:13, 15.4%; (52) 1:13, 7.7%	(1) 6:13, 46.2%; (2) 3:13, 23.1%; (3) 2:13, 15.4%; (4) 2:13, 15.4%	(1) 4:13, 30.8%; (2) 3:13, 23.1%; (3) 3:13, 23.1%; (4) 2:13, 15.4%; (5) 1:13, 7.7%	(1) 5:15, 33.3%; (1.5) 3:15, 20.0%; (2) 2:15, 13.3%; (2.5) 1:15, 6.7%; (3) 1:15, 6.7%; (3.5) 1:15, 6.7%; (4) 1:15, 6.7%; (4.5) 1:15, 6.7%	(0) 6:13, 46.2%; (2) 7:13, 53.8%	(0) 4:13, 30.8%; (1) 1:13, 7.7%; (2) 8:13, 61.5%	(0) 5:15, 33.3%; (1) 1:15, 6.7%; (2) 9:15, 60.0%	(10) 6:14, 42.9%; (22) 2:14, 14.3%; (31) 1:14, 7.1%; (32) 3:14, 21.4%; (42) 1:14, 7.1%; (62) 1:14, 7.1%	(10) 2:11, 18.2%; (22) 5:11, 45.5%; (32) 2:11, 18.2%; (42) 1:11, 9.1%; (52) 1:11, 9.1%	(1) 6:14, 42.9%; (2) 2:14, 14.3%; (3) 4:14, 28.6%; (4) 1:14, 7.1%; (6) 1:14, 7.1%	(1) 2:11, 18.2%; (2) 5:11, 45.5%; (3) 2:11, 18.2%; (4) 1:11, 9.1%; (5) 1:11, 9.1%

	DS009a/10 a - Hypoplasia UP2 (m) - intensity	DS009b - Hypoplasia UP2 (l) - frequency	DS010b - Hypoplasia UP2 (r) - frequency	DS009b/10 b - Hypoplasia UP2 (m) - frequency	DS011 - Hypoplasia UM1 (l)	DS012 - Hypoplasia UM1 (r)	DS011a - Hypoplasia UM1 (l) - intensity	DS012a - Hypoplasia UM1 (r) - intensity	DS011a/12 a - Hypoplasia UM1 (m) - intensity	DS011b - Hypoplasia UM1 (l) - frequency	DS012b - Hypoplasia UM1 (r) - frequency	DS011b/12 b - Hypoplasia UM1 (m) - frequency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1	0		0								
Abu Tabari 02/1-3	1		0	0								
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7	4	2		2								
Abu Tabari 02/1-8	3.5	2	2	2	10	10	1	1	1	0	0	0
Abu Tabari 02/28-2					10	10	1	1	1	0	0	0
02/28-2 (*Dentes decidui*)	1	0	0	0								
Abu Tabari 02/28-3	1.5	0	2	2	(10)	10	1	1	1	0	0	0
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2.5	2	2	2	22	22	2	2	2	2	2	2
Abu Tabari 02/28-7	2	0	2	2	(31)	(21)	3	2	2.5	1	1	1
Abu Tabari 02/28-8	2	2	2	2	(22)	(32)	2	3	2.5	2	2	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	2	2	2	2	32	(32)	3	3	3	2	2	2
02/28-14 (*Dentes decidui*)	1	0	0	0								
Abu Tabari 02/28-15	1.5	0	2	2	10	(10)	1	1	1	0	0	0
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	1	0	0	0	22		2		2	2		2
Abu Tabari 02/28-22	3	1		1								
Abu Tabari 02/28-23	3	2	2	2	31	(31)	3	3	3	1	1	1
Abu Tabari 03/31												
Abu Tabari 03/34-1	5.5	2	2	2	(42)	[(42)]	4	4	4	2	2	2
Conical Hill 95/4	1	0		0	[(10)]	(51)	1	5	3	0	1	1
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1					[(10)]		1		1	0		0
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS009a/10a	DS009b	DS010b	DS009b/10b	DS011	DS012	DS011a	DS012a	DS011a/12a	DS011b	DS012b	DS011b/12b
♂ No.	4	4	2	4	4	4	4	4	4	4	4	4
♂ Min.	1.0	0	2	0			1	1	1.0	0	0	0
♂ Max.	4.0	2	2	2			3	5	3.0	2	2	2
♂ Mode		2	2	2	10	10	1	1	1.0	0	0	0
♂ Median	2.75	2.00	2.00	2.00			1.00	2.00	2.00	0.00	0.50	0.50
♂ Mean	2.63	1.50	2.00	1.50			1.50	2.50	2.00	0.50	0.75	0.75
♂ Freq.	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3.5) 1:4, 25.0%; (4) 1:4, 25.0%	(0) 1:4, 25.0%; (2) 3:4, 75.0%	(2) 2:2, 100.0%	(0) 1:4, 25.0%; (2) 3:4, 75.0%	(10) 3:4, 75.0%; (32) 1:4, 25.0%	(10) 2:4, 50.0%; (32) 1:4, 25.0%; (51) 1:4, 25.0%	(1) 3:4, 75.0%; (3) 1:4, 25.0%	(1) 2:4, 50.0%; (3) 1:4, 25.0%; (5) 1:4, 25.0%	(1) 2:4, 50.0%; (3) 2:4, 50.0%	(0) 3:4, 75.0%; (2) 1:4, 25.0%	(0) 2:4, 50.0%; (1) 1:4, 25.0%; (2) 1:4, 25.0%	(0) 2:4, 50.0%; (1) 1:4, 25.0%; (2) 1:4, 25.0%
♀ No.	11	10	9	11	9	7	9	7	9	9	7	9
♀ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♀ Max.	5.5	2	2	2			4	4	4.0	2	2	2
♀ Mode	1.0	0	2	2	10	10	1	1	1.0	2	2	2
♀ Median	2.00	0.50	2.00	2.00			2.00	2.00	2.00	1.00	1.00	1.00
♀ Mean	2.18	0.90	1.56	1.36			2.11	2.29	2.11	1.11	1.14	1.11
♀ Freq.	(1) 3:11, 27.3%; (1.5) 2:11, 18.2%; (2) 2:11, 18.2%; (2.5) 1:11, 9.1%; (3) 2:11, 18.2%; (5.5) 1:11, 9.1%	(0) 5:10, 50.0%; (1) 1:10, 10.0%; (2) 4:10, 40.0%	(0) 2:9, 22.2%; (2) 7:9, 77.8%	(0) 3:11, 27.3%; (1) 7:11, 63.6%; (2) 1:11, 9.1%	(10) 3:9, 33.3%; (22) 3:9, 33.3%; (31) 2:9, 22.2%; (42) 1:9, 11.1%	(10) 2:7, 28.6%; (21) 1:7, 14.3%; (22) 1:7, 14.3%; (31) 1:7, 14.3%; (32) 1:7, 14.3%; (42) 1:7, 14.3%	(1) 3:9, 33.3%; (2) 3:9, 33.3%; (3) 2:9, 22.2%; (4) 1:9, 11.1%	(1) 2:7, 28.6%; (2) 2:7, 28.6%; (3) 2:7, 28.6%; (4) 1:7, 14.3%	(1) 3:9, 33.3%; (2) 2:9, 22.2%; (2.5) 2:9, 22.2%; (3) 1:9, 11.1%; (4) 1:9, 11.1%	(0) 3:9, 33.3%; (1) 2:9, 22.2%; (2) 4:9, 44.4%	(0) 2:7, 28.6%; (1) 2:7, 28.6%; (2) 3:7, 42.9%	(0) 3:9, 33.3%; (1) 2:9, 22.2%; (2) 4:9, 44.4%
No.	15	14	11	15	13	11	13	11	13	13	11	13
Min.	1.0	0	0	0			1	1	1.0	0	0	0
Max.	5.5	2	2	2			4	5	4.0	2	2	2
Mode	1.0	2	2	2	10	10	1	1	1.0	0	0	0
Median	2.00	1.50	2.00	2.00			2.00	2.00	2.00	1.00	1.00	1.00
Mean	2.30	1.07	1.64	1.40			1.92	2.36	2.08	0.92	1.00	1.00
Freq.	(1) 4:15, 26.7%; (1.5) 2:15, 13.3%; (2) 3:15, 20.0%; (2.5) 1:15, 6.7%; (3) 2:15, 13.3%; (3.5) 1:15, 6.7%; (4) 1:15, 6.7%; (5.5) 1:15, 6.7%	(0) 6:14, 42.9%; (1) 1:14, 7.1%; (2) 7:14, 50.0%	(0) 2:11, 18.2%; (2) 9:11, 81.8%	(0) 4:15, 26.7%; (1) 1:15, 6.7%; (2) 10:15, 66.7%	(10) 6:13, 46.2%; (22) 3:13, 23.1%; (31) 2:13, 15.4%; (32) 1:13, 7.7%; (42) 1:13, 7.7%	(10) 4:11, 36.4%; (21) 1:11, 9.1%; (22) 1:11, 9.1%; (31) 1:11, 9.1%; (32) 2:11, 18.2%; (42) 1:11, 9.1%; (51) 1:11, 9.1%	(1) 6:13, 46.2%; (2) 3:13, 23.1%; (3) 3:13, 23.1%; (4) 1:13, 7.7%	(1) 4:11, 36.4%; (2) 2:11, 18.2%; (3) 3:11, 27.3%; (4) 1:11, 9.1%; (5) 1:11, 9.1%	(1) 5:13, 38.5%; (2) 2:13, 15.4%; (2.5) 2:13, 15.4%; (3) 3:13, 23.1%; (4) 1:13, 7.7%	(0) 6:13, 46.2%; (1) 2:13, 15.4%; (2) 5:13, 38.5%	(0) 4:11, 36.4%; (1) 3:11, 27.3%; (2) 4:11, 36.4%	(0) 5:13, 38.5%; (1) 3:13, 23.1%; (2) 5:13, 38.5%

	DS013 - Hypoplasia UM2 (l)	DS014 - Hypoplasia UM2 (r)	DS013a - Hypoplasia UM2 (l) - intensity	DS014a - Hypoplasia UM2 (r) - intensity	DS013a/14a - Hypoplasia UM2 (m) - intensity	DS013b - Hypoplasia UM2 (l) - frequency	DS014b - Hypoplasia UM2 (r) - frequency	DS013b/14b - Hypoplasia UM2 (m) - frequency	DS015 - Hypoplasia UM3 (l)	DS016 - Hypoplasia UM3 (r)	DS015a - Hypoplasia UM3 (l) - intensity	DS016a - Hypoplasia UM3 (r) - intensity
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	[(10)]	(10)	1	1	1	0	0	0		10		1
Abu Tabari 02/1-3									(41)		4	
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	52	52	5	5	5	2	2	2	(22)	22	2	2
Abu Tabari 02/28-2	22	32	2	3	2.5	2	2	2				
02/28-2 (*Dentes decidui*)												
Abu Tabari 02/28-3	22	(10)	2	1	1.5	2	0	2				
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	42	(42)	4	4	4	2	2	2	32	(22)	3	2
Abu Tabari 02/28-7		(10)		1	1		0	0	(21)	(10)	2	1
Abu Tabari 02/28-8	(31)	(31)	3	3	3	1	1	1	(51)	(51)	5	5
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	32	(22)	3	2	2.5	2	2	2				
02/28-14 (*Dentes decidui*)												
Abu Tabari 02/28-15	(10)	(21)	1	2	1.5	0	1	1	(10)	(10)	1	1
Abu Tabari 02/28-20	[(10)]		1		1	0		0	[(10)]	[(10)]	1	1
Abu Tabari 02/28-21	(22)		2		2	2		2	(10)	(10)	1	1
Abu Tabari 02/28-22		(31)		3	3		1	1	42	(32)	4	3
Abu Tabari 02/28-23	31	(21)	3	2	2.5	1	1	1	32	32	3	3
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(42)]	[(42)]	4	4	4	2	2	2	42	(32)	4	3
Conical Hill 95/4	[(31)]	(32)	3	3	3	1	2	2	(31)	(41)	3	4
Conical Hill 95/4-1										(10)		1
Conical Hill 02/3-4												
Djabarona 96/1-1	[(41)]		4		4	1		1				
Djabarona 96/1-2	[(10)]	[(10)]	1	1	1	0	0	0	[(10)]	[(10)]	1	1
Djabarona 96-4	[(10)]	[(10)]	1	1	1	0	0	0				
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS013	DS014	DS013a	DS014a	DS013a/14a	DS013b	DS014b	DS013b/14b	DS015	DS016	DS015a	DS016a
♂ No.	6	5	6	5	6	6	5	6	3	3	3	3
♂ Min.			1	1	1.0	0	0	0			1	1
♂ Max.			5	5	5.0	2	2	2			3	4
♂ Mode	10	32	3	3	2.5	2	2	2				
♂ Median			2.50	3.00	2.50	1.50	2.00	2.00			2.00	2.00
♂ Mean			2.50	2.80	2.50	1.17	1.60	1.33			2.00	2.33
♂ Freq.	(10) 2:6, 33.3%; (22) 1:6, 16.7%; (31) 1:6, 16.7%; (32) 1:6, 16.7%; (52) 1:6, 16.7%	(10) 1:5, 20.0%; (22) 1:5, 20.0%; (32) 2:5, 40.0%; (52) 1:5, 20.0%	(1) 2:6, 33.3%; (2) 1:6, 16.7%; (3) 2:6, 33.3%; (5) 1:6, 16.7%	(1) 1:5, 20.0%; (2) 1:5, 20.0%; (3) 2:5, 40.0%; (5) 1:5, 20.0%	(1) 2:6, 33.3%; (2.5) 2:6, 33.3%; (3) 1:6, 16.7%; (5) 1:6, 16.7%	(0) 2:6, 33.3%; (1) 1:6, 16.7%; (2) 3:6, 50.0%	(0) 1:5, 20.0%; (2) 4:5, 80.0%	(0) 2:6, 33.3%; (2) 4:6, 66.7%	(10) 1:3, 33.3%; (22) 1:3, 33.3%; (31) 1:3, 33.3%	(10) 1:3, 33.3%; (22) 1:3, 33.3%; (41) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (4) 1:3, 33.3%
♀ No.	10	10	10	10	12	10	10	12	10	11	10	11
♀ Min.			1	1	1.0	0	0	0			1	1
♀ Max.			4	4	4.0	2	2	2			5	5
♀ Mode	10	10	1	1	1.0	2	0	1	10	10	4	1
♀ Median			2.50	2.00	2.25	1.00	1.00	1.00			3.00	1.00
♀ Mean			2.50	2.20	2.38	1.10	0.80	1.08			2.80	2.00
♀ Freq.	(10) 3:10, 30.0%; (22) 2:10, 20.0%; (31) 2:10, 20.0%; (41) 1:10, 10.0%; (42) 2:10, 20.0%	(10) 4:10, 40.0%; (21) 2:10, 20.0%; (31) 2:10, 20.0%; (42) 2:10, 20.0%	(1) 3:10, 30.0%; (2) 2:10, 20.0%; (3) 2:10, 20.0%; (4) 3:10, 30.0%	(1) 4:10, 40.0%; (2) 2:10, 20.0%; (3) 2:10, 20.0%; (4) 2:10, 20.0%	(1) 3:12, 25.0%; (1.5) 2:12, 16.7%; (2) 1:12, 8.3%; (2.5) 1:12, 8.3%; (3) 2:12, 16.7%; (4) 3:12, 25.0%	(0) 3:10, 30.0%; (1) 3:10, 30.0%; (2) 4:10, 40.0%	(0) 4:10, 40.0%; (1) 4:10, 40.0%; (2) 2:10, 20.0%	(0) 3:12, 25.0%; (1) 5:12, 41.7%; (2) 4:12, 33.3%	(10) 3:10, 30.0%; (21) 1:10, 10.0%; (32) 2:10, 20.0%; (41) 1:10, 10.0%; (42) 2:10, 20.0%; (51) 1:10, 10.0%	(10) 6:11, 54.5%; (22) 1:11, 9.1%; (32) 3:11, 27.3%; (51) 1:11, 9.1%	(1) 3:10, 30.0%; (2) 1:10, 10.0%; (3) 2:10, 20.0%; (4) 3:10, 30.0%; (5) 1:10, 10.0%	(1) 6:11, 54.5%; (2) 1:11, 9.1%; (3) 3:11, 27.3%; (5) 1:11, 9.1%
No.	16	15	16	15	18	16	15	18	13	14	13	14
Min.			1	1	1.0	0	0	0			1	1
Max.			5	5	5.0	2	2	2			5	5
Mode	10	10	1	1	1.0	2	2	2	10	10	1	1
Median			2.50	2.00	2.50	1.00	1.00	1.00			3.00	1.50
Mean			2.50	2.40	2.42	1.13	1.07	1.17			2.62	2.07
Freq.	(10) 5:16, 31.3%; (22) 3:16, 18.8%; (31) 3:16, 18.8%; (32) 1:16, 6.3%; (41) 1:16, 6.3%; (42) 2:16, 12.5%; (52) 1:16, 6.3%	(10) 5:15, 33.3%; (21) 2:15, 13.3%; (22) 1:15, 6.7%; (31) 2:15, 13.3%; (32) 2:15, 13.3%; (42) 2:15, 13.3%; (52) 1:15, 6.7%	(1) 5:16, 31.3%; (2) 3:16, 18.8%; (3) 4:16, 25.0%; (4) 3:16, 18.8%; (5) 1:16, 6.3%	(1) 5:15, 33.3%; (2) 3:15, 20.0%; (3) 4:15, 26.7%; (4) 2:15, 13.3%; (5) 1:15, 6.7%	(1) 5:18, 27.8%; (1.5) 2:18, 11.1%; (2) 1:18, 5.6%; (2.5) 3:18, 16.7%; (3) 3:18, 16.7%; (4) 3:18, 16.7%; (5) 1:18, 5.6%	(0) 5:16, 31.3%; (1) 4:16, 25.0%; (2) 7:16, 43.8%	(0) 5:15, 33.3%; (1) 4:15, 26.7%; (2) 6:15, 40.0%	(0) 5:18, 27.8%; (1) 5:18, 27.8%; (2) 8:18, 44.4%	(10) 4:13, 30.8%; (21) 1:13, 7.7%; (22) 1:13, 7.7%; (31) 1:13, 7.7%; (32) 2:13, 15.4%; (41) 1:13, 7.7%; (42) 2:13, 15.4%; (51) 1:13, 7.7%	(10) 7:14, 50.0%; (22) 2:14, 14.3%; (32) 3:14, 21.4%; (41) 1:14, 7.1%; (51) 1:14, 7.1%	(1) 4:13, 30.8%; (2) 2:13, 15.4%; (3) 3:13, 23.1%; (4) 3:13, 23.1%; (5) 1:13, 7.7%	(1) 7:14, 50.0%; (2) 2:14, 14.3%; (3) 3:14, 21.4%; (4) 1:14, 7.1%; (5) 1:14, 7.1%

	DS015a/16a - Hypoplasia UM3 (m) - intensity	DS015b - Hypoplasia UM3 (l) - frequency	DS016b - Hypoplasia UM3 (r) - frequency	DS015b/16b - Hypoplasia UM3 (m) - frequency	DS017 - Hypoplasia LI1 (l)	DS018 - Hypoplasia LI1 (r)	DS017a - Hypoplasia LI1 (l) - intensity	DS018a - Hypoplasia LI1 (r) - intensity	DS017a/18a - Hypoplasia LI1 (m) - intensity	DS017b - Hypoplasia LI1 (l) - frequency	DS018b - Hypoplasia LI1 (r) - frequency	DS017b/18b - Hypoplasia LI1 (m) - frequency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1		0	0	(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/1-3	4	1		1	(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	2	2	2	2	10	(22)	1	2	1.5	0	2	2
Abu Tabari 02/28-2					10	10	1	1	1	0	0	0
02/28-2 (*Dentes decidui*)												
Abu Tabari 02/28-3					[(10)]	(21)	1	2	1.5	0	1	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	2.5	2	2	2	52	52	5	5	5	2	2	2
Abu Tabari 02/28-7	1.5	1	0	1								
Abu Tabari 02/28-8	5	1	1	1								
Abu Tabari 02/28-11					(10)		1		1	0		0
Abu Tabari 02/28-13												
Abu Tabari 02/28-14					(22)	(22)	2	2	2	2	2	2
02/28-14 (*Dentes decidui*)						(10)		1	1		0	0
Abu Tabari 02/28-15	1	0	0	0	(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/28-20	1	0	0	0								
Abu Tabari 02/28-21	1	0	0	0	22		2		2	2		2
Abu Tabari 02/28-22	3.5	2	2	2		(22)		2	2		2	2
Abu Tabari 02/28-23	3	2	2	2	32	(22)	3	2	2.5	2	2	2
Abu Tabari 03/31												
Abu Tabari 03/34-1	3.5	2	2	2	[(10)]	(10)	1	1	1	0	0	0
Conical Hill 95/4	3.5	1	1	1								
Conical Hill 95/4-1	1		0	0								
Conical Hill 02/3-4												
Djabarona 96/1-1												
Djabarona 96/1-2	1	0	0	0								
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS015a/16a	DS015b	DS016b	DS015b/16b	DS017	DS018	DS017a	DS018a	DS017a/18a	DS017b	DS018b	DS017b/18b
♂ No.	3	3	3	3	4	3	4	3	4	4	3	4
♂ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♂ Max.	3.5	2	2	2			2	2	2.0	2	2	2
♂ Mode					10	22	1	2	1.0	0	2	2
♂ Median	2.00	1.00	1.00	1.00			1.00	2.00	1.25	0.00	2.00	1.00
♂ Mean	2.17	1.00	1.00	1.00			1.25	1.67	1.38	0.50	1.33	1.00
♂ Freq.	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3.5) 1:3, 33.3%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(10) 3:4, 75.0%; (22) 1:4, 25.0%	(10) 1:3, 33.3%; (22) 2:3, 66.7%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(1) 2:4, 50.0%; (1.5) 1:4, 25.0%; (2) 1:4, 25.0%	(0) 3:4, 75.0%; (2) 1:4, 25.0%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 2:4, 50.0%; (2) 2:4, 50.0%
♀ No.	12	10	11	12	8	8	8	8	9	8	8	9
♀ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♀ Max.	5.0	2	2	2			5	5	5.0	2	2	2
♀ Mode	1.0	2	0	0	10	10	1	1	1.0	0	0	0
♀ Median	2.00	1.00	0.00	1.00			1.00	1.50	1.50	0.00	0.50	1.00
♀ Mean	2.33	1.10	0.82	0.92			1.88	1.88	1.89	0.75	0.88	1.00
♀ Freq.	(1) 5:12, 41.7%; (1.5) 1:12, 8.3%; (2.5) 1:12, 8.3%; (3) 1:12, 8.3%; (3.5) 2:12, 16.7%; (4) 1:12, 8.3%	(0) 3:10, 30.0%; (1) 3:10, 30.0%; (2) 4:10, 40.0%	(0) 6:11, 54.5%; (1) 1:11, 9.1%; (2) 4:11, 36.4%	(0) 5:12, 41.7%; (1) 3:12, 25.0%; (2) 4:12, 33.3%	(10) 5:8, 62.5%; (22) 1:8, 12.5%; (32) 1:8, 12.5%; (52) 1:8, 12.5%	(10) 4:8, 50.0%; (21) 1:8, 12.5%; (22) 2:8, 25.0%; (52) 1:8, 12.5%	(1) 5:8, 62.5%; (2) 1:8, 12.5%; (3) 1:8, 12.5%; (5) 1:8, 12.5%	(1) 4:8, 50.0%; (2) 3:8, 37.5%; (5) 1:8, 12.5%	(1) 4:9, 44.4%; (1.5) 1:9, 11.1%; (2) 2:9, 22.2%; (2.5) 1:9, 11.1%; (5) 1:9, 11.1%	(0) 5:8, 62.5%; (2) 3:8, 37.5%	(0) 4:8, 50.0%; (1) 1:8, 12.5%; (2) 3:8, 37.5%	(0) 4:9, 44.4%; (1) 1:9, 11.1%; (2) 4:9, 44.4%
No.	15	13	14	15	12	11	12	11	13	12	11	13
Min.	1.0	0	0	0			1	1	1.0	0	0	0
Max.	5.0	2	2	2			5	5	5.0	2	2	2
Mode	1.0	2	0	0	10	10	1	1	1.0	0	0	0
Median	2.00	1.00	0.50	1.00			1.00	2.00	1.50	0.00	1.00	1.00
Mean	2.30	1.08	0.86	0.93			1.67	1.82	1.73	0.67	1.00	1.00
Freq.	(1) 6:15, 40.0%; (1.5) 1:15, 6.7%; (2) 1:15, 6.7%; (2.5) 1:15, 6.7%; (3) 1:15, 6.7%; (3.5) 3:15, 20.0%; (4) 1:15, 6.7%; (5) 1:15, 6.7%	(0) 4:13, 30.8%; (1) 4:13, 30.8%; (2) 5:13, 38.5%	(0) 7:14, 50.0%; (1) 2:14, 14.3%; (2) 5:14, 35.7%	(0) 6:15, 40.0%; (1) 4:15, 26.7%; (2) 5:15, 33.3%	(10) 8:12, 66.7%; (22) 2:12, 16.7%; (32) 1:12, 8.3%; (52) 1:12, 8.3%	(10) 5:11, 45.5%; (21) 1:11, 9.1%; (22) 4:11, 36.4%; (52) 1:11, 9.1%	(1) 8:12, 66.7%; (2) 2:12, 16.7%; (3) 1:12, 8.3%; (5) 1:12, 8.3%	(1) 5:11, 45.5%; (2) 5:11, 45.5%; (5) 1:11, 9.1%	(1) 6:13, 46.2%; (1.5) 2:13, 15.4%; (2) 3:13, 23.1%; (2.5) 1:13, 7.7%; (5) 1:13, 7.7%	(0) 8:12, 66.7%; (2) 4:12, 33.3%	(0) 5:11, 45.5%; (1) 1:11, 9.1%; (2) 5:11, 45.5%	(0) 6:13, 46.2%; (1) 1:13, 7.7%; (2) 6:13, 46.2%

	DS019 - Hypoplasia LI2 (l)	DS020 - Hypoplasia LI2 (r)	DS019a - Hypoplasia LI2 (l) - intensity	DS020a - Hypoplasia LI2 (r) - intensity	DS019a/20 a - Hypoplasia LI2 (m) - intensity	DS019b - Hypoplasia LI2 (l) - frequency	DS020b - Hypoplasia LI2 (r) - frequency	DS019b/20 b - Hypoplasia LI2 (m) - frequency	DS021 - Hypoplasia LC (l)	DS022 - Hypoplasia LC (r)	DS021a - Hypoplasia LC (l) - intensity	DS022a - Hypoplasia LC (r) - intensity
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(22)	(10)	2	1	1.5	2	0	2	(10)	(22)	1	2
Abu Tabari 02/1-3	(10)	(10)	1	1	1	0	0	0	31	(31)	3	3
Abu Tabari 02/1-5									(10)		1	
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	10	(22)	1	2	1.5	0	2	2	32	42	3	4
Abu Tabari 02/28-2	10	10	1	1	1	0	0	0	22	22	2	2
02/28-2 (*Dentes decidui*)	10	10	1	1	1	0	0	0	10	(10)	1	1
Abu Tabari 02/28-3	(22)	(32)	2	3	2.5	2	2	2	62	(62)	6	6
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(42)	(32)	4	3	3.5	2	2	2	42	42	4	4
Abu Tabari 02/28-7	(10)	(10)	1	1	1	0	0	0	(10)	(10)	1	1
Abu Tabari 02/28-8	(22)	(22)	2	2	2	2	2	2	(32)	(22)	3	2
Abu Tabari 02/28-11		(22)		2	2		2	2				
Abu Tabari 02/28-13	(10)		1		1	0		0				
Abu Tabari 02/28-14	[(22)]	(22)	2	2	2	2	2	2	(62)	(62)	6	6
02/28-14 (*Dentes decidui*)	(10)	(10)	1	1	1	0	0	0	(10)	(10)	1	1
Abu Tabari 02/28-15	(10)	(10)	1	1	1	0	0	0	(32)	[(22)]	3	2
Abu Tabari 02/28-20	[(10)]		1		1	0		0		[(32)]		3
Abu Tabari 02/28-21	22	22	2	2	2	2	2	2	22	(22)	2	2
Abu Tabari 02/28-22									(32)	32	3	3
Abu Tabari 02/28-23	42		4		4	2		2	52		5	
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(10)]		1		1	0		0	[(31)]		3	
Conical Hill 95/4										[(42)]		4
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1									[(32)]	(42)	3	4
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS019	DS020	DS019a	DS020a	DS019a/20a	DS019b	DS020b	DS019b/20b	DS021	DS022	DS021a	DS022a
♂ No.	4	4	4	4	5	4	4	5	4	5	4	5
♂ Min.			1	1	1.0	0	0	0			1	2
♂ Max.			2	2	2.0	2	2	2			6	6
♂ Mode	10	22	1	2	1.0	0	2	2		42		4
♂ Median			1.00	2.00	1.50	0.00	2.00	2.00			2.50	4.00
♂ Mean			1.25	1.75	1.50	0.50	1.50	1.20			3.00	3.80
♂ Freq.	(10) 3:4, 75.0%; (22) 1:4, 25.0%	(10) 1:4, 25.0%; (22) 3:4, 75.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 1:4, 25.0%; (2) 3:4, 75.0%	(1) 2:5, 40.0%; (1.5) 1:5, 20.0%; (2) 2:5, 40.0%	(0) 3:4, 75.0%; (2) 1:4, 25.0%	(0) 1:4, 25.0%; (2) 3:4, 75.0%	(0) 2:5, 40.0%; (2) 3:5, 60.0%	(10) 1:4, 25.0%; (22) 1:4, 25.0%; (32) 1:4, 25.0%; (62) 1:4, 25.0%	(22) 1:5, 20.0%; (32) 1:5, 20.0%; (42) 2:5, 40.0%; (62) 1:5, 20.0%	(1) 1:4, 25.0%; (2) 1:4, 25.0%; (3) 1:4, 25.0%; (6) 1:4, 25.0%	(2) 1:5, 20.0%; (3) 1:5, 20.0%; (4) 2:5, 40.0%; (6) 1:5, 20.0%
♀ No.	10	8	10	8	10	10	8	10	12	10	12	10
♀ Min.			1	1	1.0	0	0	0			1	1
♀ Max.			4	3	4.0	2	2	2			6	6
♀ Mode	22	10	2	1	1.0	2	0	2	32	22	3	2
♀ Median			2.00	1.50	1.75	2.00	1.00	2.00			3.00	2.50
♀ Mean			2.00	1.75	1.95	1.20	1.00	1.20			3.08	2.90
♀ Freq.	(10) 4:10, 40.0%; (22) 4:10, 40.0%; (42) 2:10, 20.0%	(10) 4:8, 50.0%; (22) 2:8, 25.0%; (32) 2:8, 25.0%	(1) 4:10, 40.0%; (2) 4:10, 40.0%; (4) 2:10, 20.0%	(1) 4:8, 50.0%; (2) 2:8, 25.0%; (3) 2:8, 25.0%	(1) 4:10, 40.0%; (1.5) 1:10, 10.0%; (2) 2:10, 20.0%; (2.5) 1:10, 10.0%; (3.5) 1:10, 10.0%; (4) 1:10, 10.0%	(0) 4:10, 40.0%; (2) 6:10, 60.0%	(0) 4:8, 50.0%; (2) 4:8, 50.0%	(0) 4:10, 40.0%; (2) 6:10, 60.0%	(10) 2:12, 16.7%; (22) 1:12, 8.3%; (31) 2:12, 16.7%; (32) 4:12, 33.3%; (42) 1:12, 8.3%; (52) 1:12, 8.3%; (62) 1:12, 8.3%	(10) 1:10, 10.0%; (22) 4:10, 40.0%; (31) 1:10, 10.0%; (32) 1:10, 10.0%; (42) 2:10, 20.0%; (62) 1:10, 10.0%	(1) 2:12, 16.7%; (2) 1:12, 8.3%; (3) 6:12, 50.0%; (4) 1:12, 8.3%; (5) 1:12, 8.3%; (6) 1:12, 8.3%	(1) 1:10, 10.0%; (2) 4:10, 40.0%; (3) 2:10, 20.0%; (4) 2:10, 20.0%; (6) 1:10, 10.0%
No.	15	12	15	12	16	15	12	16	16	15	16	15
Min.			1	1	1.0	0	0	0			1	1
Max.			4	3	4.0	2	2	2			6	6
Mode	10	10	1	1	1.0	0	2	2	32	22	3	2
Median			1.00	2.00	1.50	0.00	2.00	2.00			3.00	3.00
Mean			1.73	1.75	1.75	0.93	1.17	1.13			3.06	3.20
Freq.	(10) 8:15, 53.3%; (22) 5:15, 33.3%; (42) 2:15, 13.3%	(10) 5:12, 41.7%; (22) 5:12, 41.7%; (32) 2:12, 16.7%	(1) 8:15, 53.3%; (2) 5:15, 33.3%; (4) 2:15, 13.3%	(1) 5:12, 41.7%; (2) 5:12, 41.7%; (3) 2:12, 16.7%	(1) 7:16, 43.8%; (1.5) 2:16, 12.5%; (2) 4:16, 25.0%; (2.5) 1:16, 6.3%; (3.5) 1:16, 6.3%; (4) 1:16, 6.3%	(0) 8:15, 53.3%; (2) 7:15, 46.7%	(0) 5:12, 41.7%; (2) 7:12, 58.3%	(0) 7:16, 43.8%; (2) 9:16, 56.3%	(10) 3:16, 18.8%; (22) 2:16, 12.5%; (31) 2:16, 12.5%; (32) 5:16, 31.3%; (42) 1:16, 6.3%; (52) 1:16, 6.3%; (62) 2:16, 12.5%	(10) 1:15, 6.7%; (22) 5:15, 33.3%; (31) 1:15, 6.7%; (32) 2:15, 13.3%; (42) 4:15, 26.7%; (62) 2:15, 13.3%	(1) 3:16, 18.8%; (2) 2:16, 12.5%; (3) 7:16, 43.8%; (4) 1:16, 6.3%; (5) 1:16, 6.3%; (6) 2:16, 12.5%	(1) 1:15, 6.7%; (2) 5:15, 33.3%; (3) 3:15, 20.0%; (4) 4:15, 26.7%; (6) 2:15, 13.3%

	DS021a/22a - Hypoplasia LC (m) - intensity	DS021b - Hypoplasia LC (l) - frequency	DS022b - Hypoplasia LC (r) - frequency	DS021b/22b - Hypoplasia LC (m) - frequency	DS023 - Hypoplasia LP1 (l)	DS024 - Hypoplasia LP1 (r)	DS023a - Hypoplasia LP1 (l) - intensity	DS024a - Hypoplasia LP1 (r) - intensity	DS023a/24a - Hypoplasia LP1 (m) - intensity	DS023b - Hypoplasia LP1 (l) - frequency	DS024b - Hypoplasia LP1 (r) - frequency	DS023b/24b - Hypoplasia LP1 (m) - frequency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1.5	0	2	2		41		4	4		1	1
Abu Tabari 02/1-3	3	1	1	1	(10)	(31)	1	3	2	0	1	1
Abu Tabari 02/1-5	1	0		0								
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	3.5	2	2	2	42	32	4	3	3.5	2	2	2
Abu Tabari 02/28-2	2	2	2	2								
02/28-2 (*Dentes decidui*)	1	0	0	0	10	10	1	1	1	0	0	0
Abu Tabari 02/28-3	6	2	2	2	(42)		4		4	2		2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	4	2	2	2	(32)	32	3	3	3	2	2	2
Abu Tabari 02/28-7	1	0	0	0	(22)	(10)	2	1	1.5	2	0	2
Abu Tabari 02/28-8	2.5	2	2	2	(22)	(22)	2	2	2	2	2	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	6	2	2	2	22	[(22)]	2	2	2	2	2	2
02/28-14 (*Dentes decidui*)	1	0	0	0	(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/28-15	2.5	2	2	2	31		3		3	1		1
Abu Tabari 02/28-20	3		2	2								
Abu Tabari 02/28-21	2	2	2	2	22		2		2	2		2
Abu Tabari 02/28-22	3	2	2	2		(22)		2	2		2	2
Abu Tabari 02/28-23	5	2		2	42		4		4	2		2
Abu Tabari 03/31												
Abu Tabari 03/34-1	3	1		1	(31)		3		3	1		1
Conical Hill 95/4	4		2	2	[(31)]		3		3	1		1
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	3.5	2	2	2		(41)		4	4		1	1
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS021a/22a	DS021b	DS022b	DS021b/22b	DS023	DS024	DS023a	DS024a	DS023a/24a	DS023b	DS024b	DS023b/24b
♂ No.	6	4	5	6	3	2	3	2	3	3	2	3
♂ Min.	1.0	0	2	0			2	2	2.0	1	2	1
♂ Max.	6.0	2	2	2			4	3	3.5	2	2	2
♂ Mode		2	2	2						2	2	2
♂ Median	3.25	2.00	2.00	2.00			3.00	2.50	3.00	2.00	2.00	2.00
♂ Mean	3.25	1.50	2.00	1.67			3.00	2.50	2.83	1.67	2.00	1.67
♂ Freq.	(1) 1:6, 16.7%; (2) 1:6, 16.7%; (3) 1:6, 16.7%; (3.5) 1:6, 16.7%; (4) 1:6, 16.7%; (6) 1:6, 16.7%	(0) 1:4, 25.0%; (2) 3:4, 75.0%	(2) 5:5, 100.0%	(0) 1:6, 16.7%; (2) 5:6, 83.3%	(22) 1:3, 33.3%; (31) 1:3, 33.3%; (42) 1:3, 33.3%	(22) 1:2, 50.0%; (32) 1:2, 50.0%	(2) 1:3, 33.3%; (3) 1:3, 33.3%; (4) 1:3, 33.3%	(2) 1:2, 50.0%; (3) 1:2, 50.0%	(2) 1:3, 33.3%; (3) 1:3, 33.3%; (3.5) 1:3, 33.3%	(1) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 2:2, 100.0%	(1) 1:3, 33.3%; (2) 2:3, 66.7%
♀ No.	12	12	10	12	9	7	9	7	12	9	7	12
♀ Min.	1.0	0	0	0			1	1	1.5	0	0	1
♀ Max.	6.0	2	2	2			4	4	4.0	2	2	2
♀ Mode	3.0	2	2	2	22	41	3	4	4.0	2	1	2
♀ Median	3.00	2.00	2.00	2.00			3.00	3.00	3.00	2.00	1.00	2.00
♀ Mean	3.08	1.50	1.70	1.67			2.67	2.71	2.88	1.56	1.29	1.58
♀ Freq.	(1) 1:12, 8.3%; (1.5) 1:12, 8.3%; (2) 1:12, 8.3%; (2.5) 2:12, 16.7%; (3) 3:12, 25.0%; (3.5) 1:12, 8.3%; (4) 1:12, 8.3%; (5) 1:12, 8.3%; (6) 1:12, 8.3%	(0) 2:12, 16.7%; (1) 2:12, 16.7%; (2) 8:12, 66.7%	(0) 1:10, 10.0%; (1) 1:10, 10.0%; (2) 8:10, 80.0%	(0) 1:12, 8.3%; (1) 2:12, 16.7%; (2) 9:12, 75.0%	(10) 1:9, 11.1%; (22) 3:9, 33.3%; (31) 2:9, 22.2%; (32) 1:9, 11.1%; (42) 2:9, 22.2%	(10) 1:7, 14.3%; (22) 2:7, 28.6%; (31) 1:7, 14.3%; (32) 1:7, 14.3%; (41) 2:7, 28.6%	(1) 1:9, 11.1%; (2) 3:9, 33.3%; (3) 3:9, 33.3%; (4) 2:9, 22.2%	(1) 1:7, 14.3%; (2) 2:7, 28.6%; (3) 2:7, 28.6%; (4) 2:7, 28.6%	(1.5) 1:12, 8.3%; (2) 4:12, 33.3%; (3) 3:12, 25.0%; (4) 4:12, 33.3%	(0) 1:9, 11.1%; (1) 2:9, 22.2%; (2) 6:9, 66.7%	(0) 1:7, 14.3%; (1) 3:7, 42.9%; (2) 3:7, 42.9%	(1) 5:12, 41.7%; (2) 7:12, 58.3%
No.	18	16	15	18	12	9	12	9	15	12	9	15
Min.	1.0	0	0	0			1	1	1.5	0	0	1
Max.	6.0	2	2	2			4	4	4.0	2	2	2
Mode	3.0	2	2	2	22	22	3	3	2.0	2	2	2
Median	3.00	2.00	2.00	2.00			3.00	3.00	3.00	2.00	2.00	2.00
Mean	3.14	1.50	1.80	1.67			2.75	2.67	2.87	1.58	1.44	1.60
Freq.	(1) 2:18, 11.1%; (1.5) 1:18, 5.6%; (2) 2:18, 11.1%; (2.5) 2:18, 11.1%; (3) 4:18, 22.2%; (3.5) 2:18, 11.1%; (4) 2:18, 11.1%; (5) 1:18, 5.6%; (6) 2:18, 11.1%	(0) 3:16, 18.8%; (1) 2:16, 12.5%; (2) 11:16, 68.8%	(0) 1:15, 6.7%; (2) 5:15, 33.3%; (1) 1:15, 6.7%; (2) 8:15, 53.3%	(0) 2:18, 11.1%; (1) 2:18, 11.1%; (2) 14:18, 77.8%	(10) 1:12, 8.3%; (22) 4:12, 33.3%; (31) 3:12, 25.0%; (32) 1:12, 8.3%; (42) 3:12, 25.0%	(10) 1:9, 11.1%; (22) 3:9, 33.3%; (31) 1:9, 11.1%; (32) 2:9, 22.2%; (41) 2:9, 22.2%	(1) 1:12, 8.3%; (2) 4:12, 33.3%; (3) 4:12, 33.3%; (4) 3:12, 25.0%	(1) 1:9, 11.1%; (2) 3:9, 33.3%; (3) 3:9, 33.3%; (4) 2:9, 22.2%	(1.5) 1:15, 6.7%; (2) 5:15, 33.3%; (3) 4:15, 26.7%; (3.5) 1:15, 6.7%; (4) 4:15, 26.7%	(0) 1:12, 8.3%; (1) 3:12, 25.0%; (2) 8:12, 66.7%	(0) 1:9, 11.1%; (1) 3:9, 33.3%; (2) 5:9, 55.6%	(1) 6:15, 40.0%; (2) 9:15, 60.0%

	DS025 - Hypoplasia LP2 (l)	DS026 - Hypoplasia LP2 (r)	DS025a - Hypoplasia LP2 (l) - intensity	DS026a - Hypoplasia LP2 (r) - intensity	DS025a/26a - Hypoplasia LP2 (m) - intensity	DS025b - Hypoplasia LP2 (l) - frequency	DS026b - Hypoplasia LP2 (r) - frequency	DS025b/26b - Hypoplasia LP2 (m) - frequency	DS027 - Hypoplasia LM1 (l)	DS028 - Hypoplasia LM1 (r)	DS027a - Hypoplasia LM1 (l) - intensity	DS028a - Hypoplasia LM1 (r) – intensity
Abu Tabari 95/2-3												
Abu Tabari 02/1-2		(32)		3	3		2	2		(10)		1
Abu Tabari 02/1-3	(22)	(31)	2	3	2.5	2	1	2	(22)	(10)	2	1
Abu Tabari 02/1-5	(10)		1		1	0		0				
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	32	32	3	3	3	2	2	2	10	(10)	1	1
Abu Tabari 02/28-2									10	10	1	1
02/28-2 (*Dentes decidui*)	10	10	1	1	1	0	0	0				
Abu Tabari 02/28-3	(42)	[(10)]	4	1	2.5	2	0	2	[(21)]	[(21)]	2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(42)	(32)	4	3	3.5	2	2	2	(22)	(42)	2	4
Abu Tabari 02/28-7	(22)	(41)	2	4	3	2	1	2	(10)	(10)	1	1
Abu Tabari 02/28-8	(32)	(41)	3	4	3.5	2	1	2	(51)		5	
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	22	22	2	2	2	2	2	2	22	22	2	2
02/28-14 (*Dentes decidui*)	(10)	(10)	1	1	1	0	0	0				
Abu Tabari 02/28-15	(10)		1		1	0		0	(10)		1	
Abu Tabari 02/28-20		[(31)]		3	3		1	1				
Abu Tabari 02/28-21	(22)	22	2	2	2	2	2	2				
Abu Tabari 02/28-22	(22)	(10)	2	1	1.5	2	0	2	(31)		3	
Abu Tabari 02/28-23	42	42	4	4	4	2	2	2	42	42	4	4
Abu Tabari 03/31												
Abu Tabari 03/34-1	(41)		4		4	1		1	(31)	[(31)]	3	3
Conical Hill 95/4									[(10)]		1	
Conical Hill 95/4-1												
Conical Hill 02/3-4		[(42)]		4	4		2	2		[(31)]		3
Djabarona 96/1-1										[(22)]		2
Djabarona 96/1-2									[(10)]		1	
Djabarona 96-4										[(10)]		1
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5	[(10)]	[(10)]	1	1	1	0	0	0				

	DS025	DS026	DS025a	DS026a	DS025a/26a	DS025b	DS026b	DS025b/26b	DS027	DS028	DS027a	DS028a
♂ No.	3	4	3	4	5	3	4	5	4	5	4	5
♂ Min.			1	2	1.0	0	1	0			1	1
♂ Max.			3	4	4.0	2	2	2			2	3
♂ Mode				3	3.0	2	2	2	10	10	1	1
♂ Median			2.00	3.00	3.00	2.00	2.00	2.00			1.00	1.00
♂ Mean			2.00	3.00	2.60	1.33	1.75	1.40			1.25	1.60
♂ Freq.	(10) 1:3, 33.3%; (22) 1:3, 33.3%; (32) 1:3, 33.3%	(22) 1:4, 25.0%; (31) 1:4, 25.0%; (32) 1:4, 25.0%; (42) 1:4, 25.0%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (3) 1:3, 33.3%	(2) 1:4, 25.0%; (3) 2:4, 50.0%; (4) 1:4, 25.0%	(1) 1:5, 20.0%; (2) 1:5, 20.0%; (3) 2:5, 40.0%; (4) 1:5, 20.0%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(2) 1:4, 25.0%; (1) 1:4, 25.0%; (2) 2:4, 50.0%	(0) 1:5, 20.0%; (1) 1:5, 20.0%; (2) 3:5, 60.0%	(10) 3:4, 75.0%; (22) 1:4, 25.0%	(10) 3:5, 60.0%; (22) 1:5, 20.0%; (31) 1:5, 20.0%	(1) 3:4, 75.0%; (2) 1:4, 25.0%	(1) 3:5, 60.0%; (2) 1:5, 20.0%; (3) 1:5, 20.0%
♀ No.	11	10	11	10	12	11	10	12	10	8	10	8
♀ Min.			1	1	1.0	0	0	0			1	1
♀ Max.			4	4	4.0	2	2	2			5	4
♀ Mode	22	10	2	3	3.0	2	2	2	10	10	2	1
♀ Median			2.00	3.00	2.75	2.00	1.00	2.00			2.00	2.00
♀ Mean			2.64	2.60	2.63	1.55	1.10	1.58			2.40	2.25
♀ Freq.	(10) 2:11, 18.2%; (22) 4:11, 36.4%; (32) 1:11, 9.1%; (41) 1:11, 9.1%; (42) 3:11, 27.3%	(10) 3:10, 30.0%; (22) 1:10, 10.0%; (31) 1:10, 10.0%; (32) 2:10, 20.0%; (41) 2:10, 20.0%; (42) 1:10, 10.0%	(1) 2:11, 18.2%; (2) 4:11, 36.4%; (3) 1:11, 9.1%; (4) 4:11, 36.4%	(1) 3:10, 30.0%; (2) 1:10, 10.0%; (3) 3:10, 30.0%; (4) 3:10, 30.0%	(1) 2:12, 16.7%; (1.5) 1:12, 8.3%; (2) 1:12, 8.3%; (2.5) 2:12, 16.7%; (3) 2:12, 8.3%; (3.5) 2:12, 8.3%; (4) 2:12, 8.3%	(0) 2:11, 18.2%; (1) 1:11, 9.1%; (2) 8:11, 72.7%	(0) 3:10, 30.0%; (1) 3:10, 30.0%; (2) 4:10, 40.0%	(0) 2:12, 16.7%; (1) 1:12, 8.3%; (2) 9:12, 75.0%	(10) 3:10, 30.0%; (21) 1:10, 10.0%; (22) 2:10, 20.0%; (31) 2:10, 20.0%; (42) 1:10, 10.0%; (51) 1:10, 10.0%	(10) 3:8, 37.5%; (21) 1:8, 12.5%; (22) 1:8, 12.5%; (31) 1:8, 12.5%; (42) 2:8, 25.0%	(1) 3:10, 30.0%; (2) 3:10, 30.0%; (3) 2:10, 20.0%; (4) 1:10, 10.0%; (5) 1:10, 10.0%	(1) 3:8, 37.5%; (2) 2:8, 25.0%; (3) 1:8, 12.5%; (4) 2:8, 25.0%
No.	14	14	14	14	17	14	14	17	14	13	14	13
Min.			1	1	1.0	0	0	0			1	1
Max.			4	4	4.0	2	2	2			5	4
Mode	22	32	2	3	3.0	2	2	2	10	10	1	1
Median			2.00	3.00	3.00	2.00	1.50	2.00			2.00	2.00
Mean			2.50	2.71	2.62	1.50	1.29	1.53			2.07	2.00
Freq.	(10) 3:14, 21.4%; (22) 5:14, 35.7%; (32) 2:14, 14.3%; (41) 1:14, 7.1%; (42) 3:14, 21.4%	(10) 3:14, 21.4%; (22) 2:14, 14.3%; (31) 2:14, 14.3%; (32) 3:14, 21.4%; (41) 2:14, 14.3%; (42) 2:14, 14.3%	(1) 3:14, 21.4%; (2) 5:14, 35.7%; (3) 2:14, 14.3%; (4) 4:14, 28.6%	(1) 3:14, 21.4%; (2) 4:14, 28.6%; (3) 3:14, 21.4%; (4) 4:14, 28.6%	(1) 3:17, 17.6%; (1.5) 1:17, 5.9%; (2) 2:17, 11.8%; (2.5) 2:17, 11.8%; (3) 4:17, 23.5%; (3.5) 2:17, 11.8%; (4) 3:17, 17.6%	(0) 3:14, 21.4%; (1) 1:14, 7.1%; (2) 10:14, 71.4%	(0) 3:14, 21.4%; (1) 4:14, 28.6%; (2) 7:14, 50.0%	(0) 3:17, 17.6%; (1) 2:17, 11.8%; (2) 12:17, 70.6%	(10) 6:14, 42.9%; (21) 1:14, 7.1%; (22) 3:14, 21.4%; (31) 2:14, 14.3%; (42) 1:14, 7.1%; (51) 1:14, 7.1%	(10) 6:13, 46.2%; (21) 1:13, 7.7%; (22) 2:13, 15.4%; (31) 2:13, 15.4%; (42) 2:13, 15.4%	(1) 6:14, 42.9%; (2) 4:14, 28.6%; (3) 2:14, 14.3%; (4) 1:14, 7.1%; (5) 1:14, 7.1%	(1) 6:13, 46.2%; (2) 3:13, 23.1%; (3) 2:13, 15.4%; (4) 2:13, 15.4%

	DS027a/28a - Hypoplasia LM1 (m) - intensity	DS027b - Hypoplasia LM1 (l) - frequency	DS028b - Hypoplasia LM1 (r) - frequency	DS027b/28b - Hypoplasia LM1 (m) - frequency	DS029 - Hypoplasia LM2 (l)	DS030 - Hypoplasia LM2 (r)	DS029a - Hypoplasia LM2 (l) - intensity	DS030a - Hypoplasia LM2 (r) - intensity	DS029a/30a - Hypoplasia LM2 (m) - intensity	DS029b - Hypoplasia LM2 (l) - frequency	DS030b - Hypoplasia LM2 (r) - frequency	DS029b/30b - Hypoplasia LM2 (m) - frequency
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	1		0	0		(42)		4	4		2	2
Abu Tabari 02/1-3	1.5	2	0	2	(10)	(10)	1	1	1	0	0	0
Abu Tabari 02/1-5					(10)		1		1	0		0
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	1	0	0	0	52	52	5	5	5	2	2	2
Abu Tabari 02/28-2	1	0	0	0	(41)	(22)	4	2	3	1	2	2
02/28-2 (*Dentes decidui*)												
Abu Tabari 02/28-3	2	1	1	1	42	[(52)]	4	5	4.5	2	2	2
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	3	2	2	2	(32)	32	3	3	3	2	2	2
Abu Tabari 02/28-7	1	0	0	0	(41)	(21)	4	2	3	1	1	1
Abu Tabari 02/28-8	5	1		1	(32)	(32)	3	3	3	2	2	2
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	2	2	2	2	(10)		1		1	0		0
02/28-14 (*Dentes decidui*)												
Abu Tabari 02/28-15	1	0		0	(10)		1		1	0		0
Abu Tabari 02/28-20					[(10)]		1		1	0		0
Abu Tabari 02/28-21					(32)	(22)	3	2	2.5	2	2	2
Abu Tabari 02/28-22	3	1		1	(10)		1		1	0		0
Abu Tabari 02/28-23	4	2	2	2	42	42	4	4	4	2	2	2
Abu Tabari 03/31												
Abu Tabari 03/34-1	3	1	1	1	[(10)]	[(10)]	1	1	1	0	0	0
Conical Hill 95/4	1	0		0	[(21)]		2		2	1		1
Conical Hill 95/4-1												
Conical Hill 02/3-4	3		1	1		[(10)]		1	1		0	0
Djabarona 96/1-1	2		2	2	[(32)]		3		3	2		2
Djabarona 96/1-2	1	0		0		[(21)]		2	2		1	1
Djabarona 96-4	1		0	0	[(10)]		1		1	0		0
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DS027a/28a	DS027b	DS028b	DS027b/28b	DS029	DS030	DS029a	DS030a	DS029a/30a	DS029b	DS030b	DS029b/30b
♂ No.	6	4	5	6	7	3	7	3	8	7	3	8
♂ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♂ Max.	3.0	2	2	2			5	5	5.0	2	2	2
♂ Mode	1.0	0	0	0	10		1		1.0	0	2	0
♂ Median	1.00	0.00	0.00	0.00			1.00	2.00	1.00	0.00	2.00	0.00
♂ Mean	1.50	0.50	0.60	0.50			2.14	2.67	1.88	0.57	1.33	0.63
♂ Freq.	(1) 4:6, 66.7%; (2) 1:6, 16.7%; (3) 1:6, 16.7%	(0) 3:4, 75.0%; (2) 1:4, 25.0%	(0) 3:5, 60.0%; (1) 1:5, 20.0%; (2) 1:5, 20.0%	(0) 4:6, 66.7%; (1) 1:6, 16.7%; (2) 1:6, 16.7%	(10) 4:7, 57.1%; (21) 1:7, 14.3%; (41) 1:7, 14.3%; (52) 1:7, 14.3%	(10) 1:3, 33.3%; (22) 1:3, 33.3%; (52) 1:3, 33.3%	(1) 4:7, 57.1%; (2) 1:7, 14.3%; (4) 1:7, 14.3%; (5) 1:7, 14.3%	(1) 1:3, 33.3%; (2) 1:3, 33.3%; (5) 1:3, 33.3%	(1) 5:8, 62.5%; (2) 1:8, 12.5%; (3) 1:8, 12.5%; (5) 1:8, 12.5%	(0) 4:7, 57.1%; (1) 2:7, 28.6%; (2) 1:7, 14.3%	(0) 1:3, 33.3%; (2) 2:3, 66.7%	(0) 5:8, 62.5%; (1) 1:8, 12.5%; (2) 2:8, 25.0%
♀ No.	12	10	8	12	11	10	11	10	13	11	10	13
♀ Min.	1.0	0	0	0			1	1	1.0	0	0	0
♀ Max.	5.0	2	2	2			4	5	4.5	2	2	2
♀ Mode	1.0	1	0	0	10	42	1	2	1.0	2	2	2
♀ Median	2.00	1.00	1.00	1.00			3.00	2.50	3.00	2.00	2.00	2.00
♀ Mean	2.29	1.00	1.00	1.00			2.55	2.70	2.54	1.18	1.40	1.23
♀ Freq.	(1) 4:12, 33.3%; (1.5) 1:12, 8.3%; (2) 2:12, 16.7%; (3) 3:12, 25.0%; (4) 1:12, 8.3%; (5) 1:12, 8.3%	(0) 3:10, 30.0%; (1) 4:10, 40.0%; (2) 3:10, 30.0%	(0) 3:8, 37.5%; (1) 2:8, 25.0%; (2) 3:8, 37.5%	(0) 4:12, 33.3%; (1) 4:12, 33.3%; (2) 4:12, 33.3%	(10) 4:11, 36.4%; (32) 4:11, 36.4%; (41) 1:11, 9.1%; (42) 2:11, 18.2%	(10) 2:10, 20.0%; (21) 2:10, 20.0%; (22) 1:10, 10.0%; (32) 2:10, 20.0%; (42) 2:10, 20.0%; (52) 1:10, 10.0%	(1) 4:11, 36.4%; (3) 4:11, 36.4%; (4) 3:11, 27.3%	(1) 2:10, 20.0%; (2) 3:10, 30.0%; (3) 2:10, 20.0%; (4) 2:10, 20.0%; (5) 1:10, 10.0%	(1) 4:13, 30.8%; (2) 1:13, 7.7%; (2.5) 1:13, 7.7%; (3) 4:13, 30.8%; (4) 2:13, 15.4%; (4.5) 1:13, 7.7%	(0) 4:11, 36.4%; (1) 1:11, 9.1%; (2) 6:11, 54.5%	(0) 2:10, 20.0%; (1) 2:10, 20.0%; (2) 6:10, 60.0%	(0) 4:13, 30.8%; (1) 2:13, 15.4%; (2) 7:13, 53.8%
No.	18	14	13	18	18	13	18	13	21	18	13	21
Min.	1.0	0	0	0			1	1	1.0	0	0	0
Max.	5.0	2	2	2			5	5	5.0	2	2	2
Mode	1.0	0	0	0	10	10	1	2	1.0	0	2	2
Median	1.75	1.00	1.00	1.00			2.50	2.00	2.00	1.00	2.00	1.00
Mean	2.03	0.86	0.85	0.83			2.39	2.69	2.29	0.94	1.38	1.00
Freq.	(1) 8:18, 44.4%; (1.5) 1:18, 5.6%; (2) 3:18, 16.7%; (3) 4:18, 22.2%; (4) 1:18, 5.6%; (5) 1:18, 5.6%	(0) 6:14, 42.9%; (1) 4:14, 28.6%; (2) 4:14, 28.6%	(0) 6:13, 46.2%; (1) 3:13, 23.1%; (2) 4:13, 30.8%	(0) 8:18, 44.4%; (1) 5:18, 27.8%; (2) 5:18, 27.8%	(10) 8:18, 44.4%; (21) 1:18, 5.6%; (32) 4:18, 22.2%; (41) 2:18, 11.1%; (42) 2:18, 11.1%; (52) 1:18, 5.6%	(10) 3:13, 23.1%; (21) 2:13, 15.4%; (22) 2:13, 15.4%; (32) 2:13, 15.4%; (42) 2:13, 15.4%; (52) 2:13, 15.4%	(1) 8:18, 44.4%; (2) 1:18, 5.6%; (3) 4:18, 22.2%; (4) 4:18, 22.2%; (5) 1:18, 5.6%	(1) 3:13, 23.1%; (2) 4:13, 30.8%; (3) 2:13, 15.4%; (4) 2:13, 15.4%; (5) 2:13, 15.4%	(1) 9:21, 42.9%; (2) 2:21, 9.5%; (2.5) 1:21, 4.8%; (3) 5:21, 23.8%; (4) 2:21, 9.5%; (4.5) 1:21, 4.8%; (5) 1:21, 4.8%	(0) 8:18, 44.4%; (1) 3:18, 16.7%; (2) 7:18, 38.9%	(0) 3:13, 23.1%; (1) 2:13, 15.4%; (2) 8:13, 61.5%	(0) 9:21, 42.9%; (1) 3:21, 14.3%; (2) 9:21, 42.9%

	DS031 - Hypoplasia LM3 (l)	DS032 - Hypoplasia LM3 (r)	DS031a - Hypoplasia LM3 (l) - intensity	DS032a - Hypoplasia LM3 (r) - intensity	DS031a/32a - Hypoplasia LM3 (m) - intensity	DS031b - Hypoplasia LM3 (l) - frequency	DS032b - Hypoplasia LM3 (r) - frequency	DS031b/32b - Hypoplasia LM3 (m) - frequency
Abu Tabari 95/2-3								
Abu Tabari 02/1-2		(10)		1	1		0	0
Abu Tabari 02/1-3	(10)		1		1	0		0
Abu Tabari 02/1-5								
Abu Tabari 02/1-6								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8		(10)		1	1		0	0
Abu Tabari 02/28-2								
02/28-2 (*Dentes decidui*)								
Abu Tabari 02/28-3	52	42	5	4	4.5	2	2	2
Abu Tabari 02/28-4								
Abu Tabari 02/28-5	22	32	2	3	2.5	2	2	2
Abu Tabari 02/28-7		(31)		3	3		1	1
Abu Tabari 02/28-8	(32)	(32)	3	3	3	2	2	2
Abu Tabari 02/28-11								
Abu Tabari 02/28-13								
Abu Tabari 02/28-14								
02/28-14 (*Dentes decidui*)								
Abu Tabari 02/28-15	41		4		4	1		1
Abu Tabari 02/28-20	[(32)]	[(10)]	3	1	2	2	0	2
Abu Tabari 02/28-21	22	(22)	2	2	2	2	2	2
Abu Tabari 02/28-22	(21)	(22)	2	2	2	1	2	2
Abu Tabari 02/28-23	(31)	31	3	3	3	1	1	1
Abu Tabari 03/31								
Abu Tabari 03/34-1	(31)	[(31)]	3	3	3	1	1	1
Conical Hill 95/4	[(31)]		3		3	1		1
Conical Hill 95/4-1								
Conical Hill 02/3-4		[(10)]		1	1		0	0
Djabarona 96/1-1	[(32)]		3		3	2		2
Djabarona 96/1-2	[(10)]	[(10)]	1	1	1	0	0	0
Djabarona 96-4								
Djabarona 96/120-3		[(31)]		3	3		1	1
Djabarona 96/120-4	[(10)]	[(10)]	1	1	1	0	0	0
Djabarona 96/120-5								

	DS031	DS032	DS031a	DS032a	DS031a/32a	DS031b	DS032b	DS031b/32b
♂ No.	3	4	3	4	5	3	4	5
♂ Min.			1	1	1.0	0	0	0
♂ Max.			3	1	3.0	2	0	2
♂ Mode		10	3	1	1.0		0	0
♂ Median			3.00	1.00	1.00	1.00	0.00	0.00
♂ Mean			2.33	1.00	1.60	1.00	0.00	0.60
♂ Freq.	(10) 1:3, 33.3%; (31) 1:3, 33.3%; (32) 1:3, 33.3%	(10) 4:4, 100.0%	(1) 1:3, 33.3%; (3) 2:3, 66.7%	(1) 4:4, 100.0%	(1) 3:5, 60.0%; (2) 1:5, 20.0%; (3) 1:5, 20.0%	(0) 1:3, 33.3%; (1) 1:3, 33.3%; (2) 1:3, 33.3%	(0) 4:4, 100.0%	(0) 3:5, 60.0%; (1) 1:5, 20.0%; (2) 1:5, 20.0%
♀ No.	11	11	11	11	14	11	11	14
♀ Min.			1	1	1.0	0	0	0
♀ Max.			5	4	4.5	2	2	2
♀ Mode	10	31	3	3	3.0	2	2	2
♀ Median			3.00	3.00	3.00	1.00	1.00	1.00
♀ Mean			2.64	2.55	2.57	1.27	1.27	1.21
♀ Freq.	(10) 2:11, 18.2%; (21) 1:11, 9.1%; (22) 2:11, 18.2%; (31) 2:11, 18.2%; (32) 2:11, 18.2%; (41) 1:11, 9.1%; (52) 1:11, 9.1%	(10) 2:11, 18.2%; (22) 2:11, 18.2%; (31) 4:11, 36.4%; (32) 2:11, 18.2%; (42) 1:11, 9.1%	(1) 2:11, 18.2%; (2) 3:11, 27.3%; (3) 4:11, 36.4%; (4) 1:11, 9.1%; (5) 1:11, 9.1%	(1) 2:11, 18.2%; (2) 2:11, 18.2%; (3) 6:11, 54.5%; (4) 1:11, 9.1%	(1) 3:14, 21.4%; (2) 2:14, 14.3%; (2.5) 1:14, 7.1%; (3) 6:14, 42.9%; (4) 1:14, 7.1%; (4.5) 1:14, 7.1%	(0) 2:11, 18.2%; (1) 4:11, 36.4%; (2) 5:11, 45.5%	(0) 2:11, 18.2%; (1) 4:11, 36.4%; (2) 5:11, 45.5%	(0) 3:14, 21.4%; (1) 5:14, 35.7%; (2) 6:14, 42.9%
No.	14	15	14	15	19	14	15	19
Min.			1	1	1.0	0	0	0
Max.			5	4	4.5	2	2	2
Mode	10	10	3	1	3.0	2	0	2
Median			3.00	2.00	2.50	1.00	1.00	1.00
Mean			2.57	2.13	2.32	1.21	0.93	1.05
Freq.	(10) 3:14, 21.4%; (21) 1:14, 7.1%; (22) 2:14, 14.3%; (31) 3:14, 21.4%; (32) 3:14, 21.4%; (41) 1:14, 7.1%; (52) 1:14, 7.1%	(10) 6:15, 40.0%; (22) 2:15, 13.3%; (31) 4:15, 26.7%; (32) 2:15, 13.3%; (42) 1:15, 6.7%	(1) 3:14, 21.4%; (2) 3:14, 21.4%; (3) 6:14, 42.9%; (4) 1:14, 7.1%; (5) 1:14, 7.1%	(1) 6:15, 40.0%; (2) 2:15, 13.3%; (3) 6:15, 40.0%; (4) 1:15, 6.7%	(1) 6:19, 31.6%; (2) 3:19, 15.8%; (2.5) 1:19, 5.3%; (3) 7:19, 36.8%; (4) 1:19, 5.3%; (4.5) 1:19, 5.3%	(0) 3:14, 21.4%; (1) 5:14, 35.7%; (2) 6:14, 42.9%	(0) 6:15, 40.0%; (1) 4:15, 26.7%; (2) 5:15, 33.3%	(0) 6:19, 31.6%; (1) 6:19, 31.6%; (2) 7:19, 36.8%

Appendix XXI.B.2. Individual by individual – Intensity

	All individuals (without *Dentes decidui*)	Abu Tabari 95/2-3	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-6	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-2 (*Dentes decidui*)	Abu Tabari 02/28-3	Abu Tabari 02/28-4
No. (without molars)	261	0	16	18	3	0	2	20	11	17	18	0
Min. (without molars)	1		1	1	1		1	1	1	1	1	
Max. (without molars)	6		4	3	1		4	5	3	1	6	
Mode (without molars)	2		1	1	1			3	2	1	2	
Median (without molars)	2.00		1.00	1.00	1.00		2.50	3.00	2.00	1.00	2.50	
Mean (without molars)	2.48		1.44	1.56	1.00		2.50	2.95	1.73	1.00	3.11	
No. (all teeth)	430	0	22	24	4	0	2	31	19	17	28	0
Min. (all teeth)	1		1	1	1		1	1	1	1	1	
Max. (all teeth)	6		4	4	1		4	5	4	1	6	
Mode (all teeth)	1		1	1	1			2	2	1	2	
Median (all teeth)	2.00		1.00	1.00	1.00		2.50	3.00	2.00	1.00	2.00	
Mean (all teeth)	2.41		1.45	1.58	1.00		2.50	2.84	1.79	1.00	2.96	

	Abu Tabari 02/28-5	Abu Tabari 02/28-7	Abu Tabari 02/28-8	Abu Tabari 02/28-11	Abu Tabari 02/28-13	Abu Tabari 02/28-14	Abu Tabari 02/28-14 (*Dentes decidui*)	Abu Tabari 02/28-15	Abu Tabari 02/28-20	Abu Tabari 02/28-21	Abu Tabari 02/28-22	Abu Tabari 02/28-23
No. (without molars)	20	15	16	3	1	20	15	18	4	17	13	12
Min. (without molars)	2	1	1	1	1	1	1	1	1	1	1	2
Max. (without molars)	5	4	4	3	1	6	1	3	3	3	4	5
Mode (without molars)	5	1	2			2	1	1	1	2	3	3
Median (without molars)	4.00	2.00	2.00	2.00	1.00	2.00	1.00	1.50	2.00	2.00	3.00	3.00
Mean (without molars)	3.95	1.80	2.38	2.00	1.00	2.65	1.00	1.61	2.00	1.94	2.46	3.33
No. (all teeth)	32	25	27	3	1	27	15	27	10	25	20	24
Min. (all teeth)	2	1	1	1	1	1	1	1	1	1	1	2
Max. (all teeth)	5	4	5	3	1	6	1	4	3	3	4	5
Mode (all teeth)	3	1	3			2	1	1	1	2	3	3
Median (all teeth)	3.50	2.00	3.00	2.00	1.00	2.00	1.00	1.00	1.00	2.00	3.00	3.00
Mean (all teeth)	3.53	1.88	2.81	2.00	1.00	2.56	1.00	1.56	1.60	1.92	2.50	3.29

	Abu Tabari 03/31	Abu Tabari 03/34-1	Conical Hill 95/4	Conical Hill 95/4-1	Conical Hill 02/3-4	Djabarona 96/1-1	Djabarona 96/1-2	Djabarona 96-4	Djabarona 96/120-3	Djabarona 96/120-4	Djabarona 96/120-5
No. (without molars)	0	16	8	1	1	6	0	0	0	0	2
Min. (without molars)		1	1	1	4	3					1
Max. (without molars)		6	4	1	4	5					1
Mode (without molars)		1	4			3					1
Median (without molars)		3.50	3.50	1.00	4.00	4.00					1.00
Mean (without molars)		3.13	3.25	1.00	4.00	4.00					1.00
No. (all teeth)	0	28	17	2	4	11	8	4	1	2	2
Min. (all teeth)		1	1	1	1	1	1	1	3	1	1
Max. (all teeth)		6	5	1	4	5	2	1	3	1	1
Mode (all teeth)		4	3	1	1	3	1	1		1	1
Median (all teeth)		3.00	3.00	1.00	2.00	3.00	1.00	1.00	3.00	1.00	1.00
Mean (all teeth)		3.11	3.00	1.00	2.25	3.36	1.13	1.00	3.00	1.00	1.00

Appendix XXI.C. Dental caries

	DC001 - Caries UI1 (l)	DC002 - Caries UI1 (r)	DC001a - Caries UI1 (l) - presence	DC002a - Caries UI1 (r) - presence	DC003 - Caries UI2 (l)	DC004 - Caries UI2 (r)	DC003a - Caries UI2 (l) - presence	DC004a - Caries UI2 (r) - presence	DC005 - Caries UC (l)	DC006 - Caries UC (r)	DC005a - Caries UC (l) - presence	DC006a - Caries UC (r) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-3	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-5		(10)		1								
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-2	10	10	1	1	(10)	(10)	1	1		(10)		1
02/28-2 (*Dentes decidui*)	10		1		10	10	1	1	10	10	1	1
Abu Tabari 02/28-3		10		1	10	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-7		10		1					10	10	1	1
Abu Tabari 02/28-8	10	10	1	1					10	10	1	1
Abu Tabari 02/28-11		(10)		1								
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	1	1	10	10	1	1	10	10	1	1
02/28-14 (*Dentes decidui*)									(10)	10	1	1
Abu Tabari 02/28-15	(10)	(10)	1	1	10	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-20		10		1								
Abu Tabari 02/28-21	10	(10)	1	1	10		1		(10)	10	1	1
Abu Tabari 02/28-22	(10)	(10)	1	1					(10)	(10)	1	1
Abu Tabari 02/28-23	(10)		1									
Abu Tabari 03/31												
Abu Tabari 03/34-1	10	10	1	1	10	10	1	1	10	10	1	1
Conical Hill 95/4	(10)		1		(10)	10	1	1	[(10)]	10	1	1
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1	(10)	[(10)]	1	1					10	10	1	1
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DC001	DC002	DC001a	DC002a	DC003	DC004	DC003a	DC004a	DC005	DC006	DC005a	DC006a
♂ No.	5	6	5	6	5	5	5	5	5	6	5	6
♂ Min.			1	1			1	1			1	1
♂ Max.			1	1			1	1			1	1
♂ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♂ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♂ Median			1.00	1.00			1.00	1.00			1.00	1.00
♂ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Freq.	(10) 5:5, 100.0%	(10) 6:6, 100.0%	(1) 5:5, 100.0%	(1) 6:6, 100.0%	(10) 5:5, 100.0%	(10) 5:5, 100.0%	(1) 5:5, 100.0%	(1) 5:5, 100.0%	(10) 5:5, 100.0%	(10) 6:6, 100.0%	(1) 5:5, 100.0%	(1) 6:6, 100.0%
♀ No.	10	11	10	11	7	6	7	6	11	11	11	11
♀ Min.			1	1			1	1			1	1
♀ Max.			1	1			1	1			1	1
♀ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♀ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♀ Median			1.00	1.00			1.00	1.00			1.00	1.00
♀ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Freq.	(10) 10:10, 100.0%	(10) 11:11, 100.0%	(1) 10:10, 100.0%	(1) 11:11, 100.0%	(10) 7:7, 100.0%	(10) 6:6, 100.0%	(1) 7:7, 100.0%	(1) 6:6, 100.0%	(10) 11:11, 100.0%	(10) 11:11, 100.0%	(1) 11:11, 100.0%	(1) 11:11, 100.0%
No.	15	17	15	17	12	11	12	11	16	17	16	17
Min.			1	1			1	1			1	1
Max.			1	1			1	1			1	1
Mode	10	10	1	1	10	10	1	1	10	10	1	1
Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
Median			1.00	1.00			1.00	1.00			1.00	1.00
Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Mean			1.00	1.00			1.00	1.00			1.00	1.00
Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Freq.	(10) 15:15, 100.0%	(10) 17:17, 100.0%	(1) 15:15, 100.0%	(1) 17:17, 100.0%	(10) 12:12, 100.0%	(10) 11:11, 100.0.%	(1) 12:12, 100.0%	(1) 11:11, 100.0.%	(10) 16:16, 100.0%	(10) 17:17, 100.0%	(1) 16:16, 100.0%	(1) 17:17, 100.0%

The normal descriptive statistics were calculated tooth by tooth. A tooth with multiple lesions was only counted once and only its largest lesion was reported. The descriptive statistics followed by the abbreviation (obs) were calculated observation by observation. For example, one tooth without lesions was counted as one observation, one with four lesions as four observations. Milk tooth (*Dens deciduus*) values were included in the descriptive statistics.

	DC007 - Caries UP1 (l)	DC008 - Caries UP1 (r)	DC007a - Caries UP1 (l) - presence	DC008a - Caries UP1 (r) - presence	DC009 - Caries UP2 (l)	DC010 - Caries UP2 (r)	DC009a - Caries UP2 (l) - presence	DC010a - Caries UP2 (r) - presence	DC011 - Caries UM1 (l)	DC012 - Caries UM1 (r)	DC011a - Caries UM1 (l) - presence	DC012a - Caries UM1 (r) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1	(10)	80	1	8	(10)	[(80)]	1	8
Abu Tabari 02/1-3	(10)		1			(10)		1				
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7		(10)		1	(10)		1					
Abu Tabari 02/1-8	(10)	(10)	1	1	(10)	(10)	1	1	10	10	1	1
Abu Tabari 02/28-2		(10)		1					10	10	1	1
02/28-2 (*Dentes decidui*)	10	10	1	1	10	10	1	1				
Abu Tabari 02/28-3	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(10)	(10)	1	1	10	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-7	10	10	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-8	(10)	[(10)]	1	1	(10)	(10)	1	1	(10)	[(10)]	1	1
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	1	1	10	10	1	1	10	10	1	1
02/28-14 (*Dentes decidui*)	(10)	10	1	1	10	10	1	1				
Abu Tabari 02/28-15	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-20												
Abu Tabari 02/28-21	[(10)]	[(10)]	1	1	[(10)]	[(10)]	1	1	[(10)]	[(10)]	1	1
Abu Tabari 02/28-22	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-23	10	10	1	1	10	10	1	1	(10)	(21)	1	2
Abu Tabari 03/31												
Abu Tabari 03/34-1	10	(10)	1	1	10	10	1	1	(10)	(10)	1	1
Conical Hill 95/4	[(10)]	[(10)]	1	1	[(10)]		1		[(10)]	[(10)]	1	1
Conical Hill 95/4-1	10		1									
Conical Hill 02/3-4												
Djabarona 96/1-1	[(10)]		1						(10)		1	
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DC007	DC008	DC007a	DC008a	DC009	DC010	DC009a	DC010a	DC011	DC012	DC011a	DC012a
♂ No.	5	7	5	7	6	4	6	4	4	4	4	4
♂ Min.			1	1			1	1			1	1
♂ Max.			1	1			1	1			1	1
♂ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♂ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♂ Median			1.00	1.00			1.00	1.00			1.00	1.00
♂ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Freq.	(10) 5:5, 100.0%	(10) 7:7, 100.0%	(1) 5:5, 100.0%	(1) 7:7, 100.0%	(10) 6:6, 100.0%	(10) 4:4, 100.0%	(1) 6:6, 100.0%	(1) 4:4, 100.0%	(10) 4:4, 100.0%	(10) 4:4, 100.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%
♀ No.	13	10	13	10	10	11	10	11	11	10	11	10
♀ Min.			1	1			1	1			1	1
♀ Max.			1	1			1	8			1	8
♀ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♀ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♀ Median			1.00	1.00			1.00	1.00			1.00	1.00
♀ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean			1.00	1.00			1.00	1.64			1.00	1.80
♀ Mean (obs)			1.00	1.00			1.00	1.64			1.00	1.80
♀ Freq.	(10) 13:13, 100.0%	(10) 10:10, 100.0%	(1) 13:13, 100.0%	(1) 10:10, 100.0%	(10) 10:10, 100.0%	(10) 10:11, 90.9%; (80) 1:11, 9.1%	(1) 10:10, 100.0%	(1) 10:11, 90.9%; (8) 1:11, 9.1%	(10) 11:11, 100.0%	(10) 8:10, 80.0%; (21) 1:10, 10.0%; (80) 1:10, 10.0%	(1) 11:11, 100.0%	(1) 8:10, 80.0%; (2) 1:10, 10.0%; (8) 1:10, 10.0%
No.	18	17	18	17	16	15	16	15	15	14	15	14
Min.			1	1			1	1			1	1
Max.			1	1			1	8			1	8
Mode	10	10	1	1	10	10	1	1	10	10	1	1
Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
Median			1.00	1.00			1.00	1.00			1.00	1.00
Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Mean			1.00	1.00			1.00	1.47			1.00	1.57
Mean (obs)			1.00	1.00			1.00	1.47			1.00	1.57
Freq.	(10) 18:18, 100.0%	(10) 17:17, 100.0%	(1) 18:18, 100.0%	(1) 17:17, 100.0%	(10) 16:16, 100.0%	(10) 14:15, 93.3%; (80) 1:15, 6.7%	(1) 16:16, 100.0%	(1) 14:15, 93.3%; (8) 1:15, 6.7%	(10) 15:15, 100.0%	(10) 12:14, 85.7%; (21) 1:14, 7.1%; (80) 1:14, 7.1%	(1) 15:15, 100.0%	(1) 12:14, 85.7%; (2) 1:14, 7.1%; (8) 1:14, 7.1%

	DC013 - Caries UM2 (l)	DC014 - Caries UM2 (r)	DC013a - Caries UM2 (l) - presence	DC014a - Caries UM2 (r) - presence	DC015 - Caries UM3 (l)	DC016 - Caries UM3 (r)	DC015a - Caries UM3 (l) - presence	DC016a - Caries UM3 (r) - presence	DC017 - Caries LI1 (l)	DC018 - Caries LI1 (r)	DC017a - Caries LI1 (l) - presence	DC018a - Caries LI1 (r) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1		(10)		1	(10)	(10)	1	1
Abu Tabari 02/1-3					(10)		1		(10)	(10)	1	1
Abu Tabari 02/1-5												
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	10	10	1	1	10	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-2	(10)	(10)	1	1					10	10	1	1
02/28-2 (*Dentes decidui*)												
Abu Tabari 02/28-3	(10)	(10)	1	1					10	10	1	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	(10)	(10)	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-7		10		1	10	10	1	1				
Abu Tabari 02/28-8	10	10	1	1	10	10	1	1				
Abu Tabari 02/28-11									(10)		1	
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	1	1					10	10	1	1
02/28-14 (*Dentes decidui*)										10		1
Abu Tabari 02/28-15	(10)	(10)	1	1	10	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-20	[(10)]		1		10	10	1	1				
Abu Tabari 02/28-21	[(10)]	[(10)]	1	1	10	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-22	(10)	(10)	1	1	10	10	1	1		[(10)]		1
Abu Tabari 02/28-23	21 (7x)	(21)	2 (7x)	2	10	10	1	1	(10)	(10)	1	1
Abu Tabari 03/31												
Abu Tabari 03/34-1	[(21)]	10	2	1	10	10	1	1	(10)	(10)	1	1
Conical Hill 95/4	[(10)]	[(10)]	1	1	10	10	1	1				
Conical Hill 95/4-1						10		1				
Conical Hill 02/3-4												
Djabarona 96/1-1	10		1		10	10	1	1	[(10)]	(10)	1	1
Djabarona 96/1-2	[(10)]	[(10)]	1	1	10	(10)	1	1				
Djabarona 96-4	[(10)]	[(10)]	1	1								
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DC013	DC014	DC013a	DC014a	DC015	DC016	DC015a	DC016a	DC017	DC018	DC017a	DC018a
♂ No.	6	5	6	5	3	3	3	3	4	4	4	4
♂ Min.			1	1			1	1			1	1
♂ Max.			1	1			1	1			1	1
♂ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♂ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♂ Median			1.00	1.00			1.00	1.00			1.00	1.00
♂ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Freq.	(10) 6:6, 100.0%	(10) 5:5, 100.0%	(1) 6:6, 100.0%	(1) 5:5, 100.0%	(10) 3:3, 100.0%	(10) 3:3, 100.0%	(1) 3:3, 100.0%	(1) 3:3, 100.0%	(10) 4:4, 100.0%	(10) 4:4, 100.0%	(1) 4:4, 100.0%	(1) 4:4, 100.0%
♀ No.	11	11	11	11	11	12	11	12	9	10	9	10
♀ Min.			1	1			1	1			1	1
♀ Max.			2	2			1	1			1	1
♀ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♀ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♀ Median			1.00	1.00			1.00	1.00			1.00	1.00
♀ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean			2.27	1.09			1.00	1.00			1.00	1.00
♀ Mean (obs)			1.47	1.09			1.00	1.00			1.00	1.00
♀ Freq.	(10) 9:11, 81.8%; (21) 2:11, 18.2%; [obs: (10) 9:17, 52.9%; (21) 8:17, 47.1%]	(10) 10:11, 90.9%; (21) 1:11, 9.1%	(1) 9:11, 81.8%; (2) 2:11, 18.2%; [obs: (1) 9:17, 52.9%; (2) 8:17, 47.1%]	(1) 10:11, 90.9%; (2) 1:11, 9.1%	(10) 11:11, 100.0%	(10) 12:12, 100.0%	(1) 11:11, 100.0%	(1) 12:12, 100.0%	(10) 9:9, 100.0%	(10) 10:10, 100.0%	(1) 9:9, 100.0%	(1) 10:10, 100.0%
No.	17	16	17	16	14	15	14	15	13	14	13	14
Min.			1	1			1	1			1	1
Max.			2	2			1	1			1	1
Mode	10	10	1	1	10	10	1	1	10	10	1	1
Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
Median			1.00	1.00			1.00	1.00			1.00	1.00
Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Mean			1.82	1.06			1.00	1.00			1.00	1.00
Mean (obs)			1.35	1.06			1.00	1.00			1.00	1.00
Freq.	(10) 15:17, 88.2%; (21) 2:17; 11.8%; [obs: (10) 15:23, 65.2%; (21) 8:23; 34.8%]	(10) 15:16, 93.8%; (21) 1:16, 6.3%	(1) 15:17, 88.2%; (2) 2:17; 11.8%; [obs: (1) 15:23, 65.2%; (2) 8:23; 34.8%]	(1) 15:16, 93.8%; (2) 1:16, 6.3%	(10) 14:14, 100.0%	(10) 15:15, 100.0%	(1) 14:14, 100.0%	(1) 15:15, 100.0%	(10) 13:13, 100.0%	(10) 14:14, 100.0%	(1) 13:13, 100.0%	(1) 14:14, 100.0%

	DC019 - Caries LI2 (l)	DC020 - Caries LI2 (r)	DC019a - Caries LI2 (l) – presence	DC020a - Caries LI2 (r) – presence	DC021 - Caries LC (l)	DC022 - Caries LC (r)	DC021a - Caries LC (l) – presence	DC022a - Caries LC (r) - presence	DC023 - Caries LP1 (l)	DC024 - Caries LP1 (r)	DC023a - Caries LP1 (l) - presence	DC024a - Caries LP1 (r) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-3	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-5					(10)		1					
Abu Tabari 02/1-6												
Abu Tabari 02/1-7												
Abu Tabari 02/1-8	(10)	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-2	(10)	(10)	1	1	(10)	(10)	1	1				
02/28-2 (*Dentes decidui*)	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-3	10	10	1	1	(10)	(10)	1	1	(10)		1	
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	10	10	1	1	10	10	1	1	10	(10)	1	1
Abu Tabari 02/28-7	10	10	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-8	10	10	1	1	(10)	10	1	1	(10)	(10)	1	1
Abu Tabari 02/28-11		(10)		1								
Abu Tabari 02/28-13	(10)		1									
Abu Tabari 02/28-14	10	10	1	1	10	10	1	1	10	10	1	1
02/28-14 (*Dentes decidui*)	(10)	(10)	1	1	10	10	1	1	10	10	1	1
Abu Tabari 02/28-15	10	10	1	1	(10)	10	1	1	(10)		1	
Abu Tabari 02/28-20	10		1			[(10)]		1				
Abu Tabari 02/28-21	(10)	(10)	1	1	(10)	(10)	1	1	(10)		1	
Abu Tabari 02/28-22	[(10)]		1		(10)	(10)	1	1	(10)	[(10)]	1	1
Abu Tabari 02/28-23	(10)		1		41 (3x), (21) (2x)		4 (3x), 2 (2x)		(10)		1	
Abu Tabari 03/31												
Abu Tabari 03/34-1	10	10	1	1	(10)	10	1	1	10	10	1	1
Conical Hill 95/4					[(10)]	10	1	1	10	[(10)]	1	1
Conical Hill 95/4-1												
Conical Hill 02/3-4												
Djabarona 96/1-1					(10)	(10)	1	1	(10)	10	1	1
Djabarona 96/1-2												
Djabarona 96-4												
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5												

	DC019	DC020	DC019a	DC020a	DC021	DC022	DC021a	DC022a	DC023	DC024	DC023a	DC024a
♂ No.	6	6	6	6	7	7	7	7	5	5	5	5
♂ Min.			1	1			1	1			1	1
♂ Max.			1	1			1	1			1	1
♂ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♂ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♂ Median			1.00	1.00			1.00	1.00			1.00	1.00
♂ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Freq.	(10) 6:6, 100.0%	(10) 6:6, 100.0%	(1) 6:6, 100.0%	(1) 6:6, 100.0%	(10) 7:7, 100.0%	(10) 7:7, 100.0%	(1) 7:7, 100.0%	(1) 7:7, 100.0%	(10) 5:5, 100.0%	(10) 5:5, 100.0%	(1) 5:5, 100.0%	(1) 5:5, 100.0%
♀ No.	11	9	11	9	12	11	12	11	12	8	12	8
♀ Min.			1	1			1	1			1	1
♀ Max.			1	1			4	1			1	1
♀ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♀ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♀ Median			1.00	1.00			1.00	1.00			1.00	1.00
♀ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean			1.00	1.00			2.25	1.00			1.00	1.00
♀ Mean (obs)			1.00	1.00			1.69	1.00			1.00	1.00
♀ Freq.	(10) 11:11, 100.0%	(10) 9:9, 100.0%	(1) 11:11, 100.0%	(1) 9:9, 100.0%	(10) 11:12, 91.7%; (41) 1:12, 8.3%; [obs: (10) 11:16, 68.8%; (21) 2:16, 12.5%; (41) 3:16, 18.8%]	(10) 11:11, 100.0%	(1) 11:12, 91.7%; (4) 1:12, 8.3%; [obs: (1) 11:16, 68.8%; (2) 2:16, 12.5%; (4) 3:16, 18.8%]	(1) 11:11, 100.0%	(10) 12:12, 100.0%	(10) 8:8, 100.0%	(1) 12:12, 100.0%	(1) 8:8, 100.0%
No.	18	15	18	15	19	18	19	18	17	13	17	13
Min.			1	1			1	1			1	1
Max.			1	1			4	1			1	1
Mode	10	10	1	1	10	10	1	1	10	10	1	1
Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
Median			1.00	1.00			1.00	1.00			1.00	1.00
Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Mean			1.00	1.00			1.79	1.00			1.00	1.00
Mean (obs)			1.00	1.00			1.48	1.00			1.00	1.00
Freq.	(10) 18:18, 100.0%	(10) 15:15, 100.0%	(1) 18:18, 100.0%	(1) 15:15, 100.0%	(10) 18:19, 94.7%; (41) 1:19, 5.3%; [obs: (10) 18:23, 78.3%; (21) 2:23, 8.7%; (41) 3:23, 13.0%]	(10) 18:18, 100.0%	(1) 18:19, 94.7%; (4) 1:19, 5.3%; [obs: (1) 18:23, 78.3%; (2) 2:23, 8.7%; (4) 3:23, 13.0%]	(1) 18:18, 100.0%	(10) 17:17, 100.0%	(10) 13:13, 100.0%	(1) 17:17, 100.0%	(1) 13:13, 100.0%

	DC025 - Caries LP2 (l)	DC026 - Caries LP2 (r)	DC025a - Caries LP2 (l) - presence	DC026a - Caries LP2 (r) - presence	DC027 - Caries LM1 (l)	DC028 - Caries LM1 (r)	DC027a - Caries LM1 (l) – presence	DC028a - Caries LM1 (r) - presence	DC029 - Caries LM2 (l)	DC030 - Caries LM2 (r)	DC029a - Caries LM2 (l) - presence	DC030a - Caries LM2 (r) - presence
Abu Tabari 95/2-3												
Abu Tabari 02/1-2	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-3	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/1-5	(10)		1		(10)		1		(10)		1	
Abu Tabari 02/1-6												
Abu Tabari 02/1-7					[(10)]		1					
Abu Tabari 02/1-8	10	10	1	1	(10)	(10)	1	1	10	10	1	1
Abu Tabari 02/28-2					10	10	1	1	(10)	(10)	1	1
02/28-2 (*Dentes decidui*)	10	10	1	1								
Abu Tabari 02/28-3	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-4												
Abu Tabari 02/28-5	10	(10)	1	1	(10)	(10)	1	1	(10)	10	1	1
Abu Tabari 02/28-7	(10)	(10)	1	1	(10)	(10)	1	1	10	10	1	1
Abu Tabari 02/28-8	(10)	(10)	1	1	(10)	[(10)]	1	1	10	10	1	1
Abu Tabari 02/28-11												
Abu Tabari 02/28-13												
Abu Tabari 02/28-14	10	10	1	1	10	10	1	1	10		1	
02/28-14 (*Dentes decidui*)	10	10	1	1								
Abu Tabari 02/28-15	10		1		(10)		1		(10)		1	
Abu Tabari 02/28-20		(10)		1					[(10)]		1	
Abu Tabari 02/28-21	[(10)]	[(10)]	1	1	[(10)]	[(10)]	1	1	(10)	(10)	1	1
Abu Tabari 02/28-22	(10)	(10)	1	1	(10)	(10)	1	1	(10)	(10)	1	1
Abu Tabari 02/28-23	21	10	2	1	10	10	1	1	45, 41, 21 (3x)	45, 21 (5x)	4, 4, 2 (3x)	4, 2 (5x)
Abu Tabari 03/31												
Abu Tabari 03/34-1	10	10	1	1	[(21)]	[(10)]	2	1	(10)	(10)	1	1
Conical Hill 95/4	[(10)]		1		[(10)]	[(10)]	1	1	[(10)]	(10)	1	1
Conical Hill 95/4-1												
Conical Hill 02/3-4						[(10)]		1		(10)		1
Djabarona 96/1-1	(10)		1		[(10)]	(10)	1	1	(10)	10	1	1
Djabarona 96/1-2					[(10)]		1			[(21)] (3x)		2 (3x)
Djabarona 96-4						[(10)]		1	[(10)]		1	
Djabarona 96/120-3												
Djabarona 96/120-4												
Djabarona 96/120-5	[(10)]	[(10)]	1	1								

	DC025	DC026	DC025a	DC026a	DC027	DC028	DC027a	DC028a	DC029	DC030	DC029a	DC030a
♂ No.	6	5	6	5	6	6	6	6	7	4	7	4
♂ Min.			1	1			1	1			1	1
♂ Max.			1	1			1	1			1	1
♂ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♂ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♂ Median			1.00	1.00			1.00	1.00			1.00	1.00
♂ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean			1.00	1.00			1.00	1.00			1.00	1.00
♂ Mean (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♂ Freq.	(10) 6:6, 100.0%	(10) 5:5, 100.0%	(1) 6:6, 100.0%	(1) 5:5, 100.0%	(10) 6:6, 100.0%	(10) 6:6, 100.0%	(1) 6:6, 100.0%	(1) 6:6, 100.0%	(10) 7:7, 100.0%	(10) 4:4, 100.0%	(1) 7:7, 100.0%	(1) 4:4, 100.0%
♀ No.	13	11	13	11	13	11	13	11	12	12	12	12
♀ Min.			1	1			1	1			1	1
♀ Max.			2	1			2	1			4	4
♀ Mode	10	10	1	1	10	10	1	1	10	10	1	1
♀ Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
♀ Median			1.00	1.00			1.00	1.00			1.00	1.00
♀ Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
♀ Mean			1.08	1.00			1.08	1.00			2.08	2.50
♀ Mean (obs)			1.08	1.00			1.08	1.00			1.39	1.48
♀ Freq.	(10) 12:13, 92.3%; (21) 1:13, 7.7%	(10) 11:11, 100.0%	(1) 12:13, 92.3%; (2) 1:13, 7.7%	(1) 11:11, 100.0%	(10) 12:13, 92.3%; (21) 1:13, 7.7%	(10) 11:11, 100.0%	(1) 12:13, 92.3%; (2) 1:13, 7.7%	(1) 11:11, 100.0%	(10) 11:12, 91.7%; (45) 1:12, 8.3%; [obs: (10) 11:16, 68.8%; (21) 3:16, 18.8%; (41) 1:16, 6.3%;(45) 1:16, 6.3%]	(10) 10:12, 83.3%; (21) 1:12, 8.3%; (45) 1:12, 8.3%; [obs: (10) 14:19, 73.7%; (21) 8:19, 42.1%; (45) 1:19, 5.3%]	(1) 11:12, 91.7%; (4) 1:12, 8.3%; [obs: (1) 11:16, 68.8%; (2) 3:16, 18.8%; (4) 2:16, 12.5%]	(1) 10:12, 83.3%; (2) 1:12, 8.3%; (4) 1:12, 8.3%; [obs: (1) 14:19, 73.7%; (2) 8:19, 42.1%; (4) 1:19, 5.3%]
No.	19	16	19	16	19	17	19	17	19	16	19	16
Min.			1	1			1	1			1	1
Max.			2	1			2	1			4	1
Mode	10	10	1	1	10	10	1	1	10	10	1	1
Mode (obs)	10	10	1	1	10	10	1	1	10	10	1	1
Median			1.00	1.00			1.00	1.00			1.00	1.00
Median (obs)			1.00	1.00			1.00	1.00			1.00	1.00
Mean			1.05	1.00			1.05	1.00			1.68	2.13
Mean (obs)			1.05	1.00			1.05	1.00			1.39	1.45
Freq.	(10) 18:19, 94.7%; (21) 1:19, 5.3%	(10) 16:16, 100.0%	(1) 18:19, 94.7%; (2) 1:19, 5.3%	(1) 16:16, 100.0%	(10) 18:19, 94.7%; (21) 1:19, 5.3%	(10) 17:17, 100.0%	(1) 18:19, 94.7%; (2) 1:19, 5.3%	(1) 17:17, 100.0%	(10) 18:19, 94.7%; (45) 1:19, 5.3%; [obs: (10) 18:23, 78.3%; (21) 3:23, 13.0%; (41) 1:23, 4.3%;(45) 1:23, 4.3%]	(10) 14:16, 87.5%; (21) 1:16, 6.3%; (45) 1:16, 6.3%; [obs: (10) 14:23, 60.9%; (21) 8:23, 34.8%; (45) 1:23, 4.3%]	(1) 18:19, 94.7%; (4) 1:19, 5.3%; [obs: (1) 18:23, 78.3%; (2) 3:23, 13.0%; (4) 2:23, 8.7%]	(1) 14:16, 87.5%; (2) 1:16, 6.3%; (4) 1:16, 6.3%; [obs: (1) 14:23, 60.9%; (2) 8:23, 34.8%; (4) 1:23, 4.3%]

	DC031 - Caries LM3 (l)	DC032 - Caries LM3 (r)	DC031a - Caries LM3 (l) - presence	DC032a - Caries LM3 (r) – presence
Abu Tabari 95/2-3				
Abu Tabari 02/1-2	(10)	(10)	1	1
Abu Tabari 02/1-3	(10)		1	
Abu Tabari 02/1-5				
Abu Tabari 02/1-6				
Abu Tabari 02/1-7				
Abu Tabari 02/1-8		10		1
Abu Tabari 02/28-2				
02/28-2 (*Dentes decidui*)				
Abu Tabari 02/28-3	10	10	1	1
Abu Tabari 02/28-4				
Abu Tabari 02/28-5	10	10	1	1
Abu Tabari 02/28-7		10		1
Abu Tabari 02/28-8	[(10)]	(41)	1	4
Abu Tabari 02/28-11				
Abu Tabari 02/28-13				
Abu Tabari 02/28-14				
02/28-14 (*Dentes decidui*)				
Abu Tabari 02/28-15	10		1	
Abu Tabari 02/28-20	(10)	[(10)]	1	1
Abu Tabari 02/28-21	10	(10)	1	1
Abu Tabari 02/28-22	(10)	10	1	1
Abu Tabari 02/28-23	31, 21	35, 21 (4x)	3, 2	3, 2 (4x)
Abu Tabari 03/31				
Abu Tabari 03/34-1	(10)	(10)	1	1
Conical Hill 95/4	10	10	1	1
Conical Hill 95/4-1				
Conical Hill 02/3-4		[(10)]		1
Djabarona 96/1-1	10	10	1	1
Djabarona 96/1-2	[(10)]	(10)	1	1
Djabarona 96-4				
Djabarona 96/120-3		[(10)]		1
Djabarona 96/120-4	[(10)]	[(10)]	1	1
Djabarona 96/120-5				

	DC031	DC032	DC031a	DC032a
♂ No.	3	5	3	5
♂ Min.			1	1
♂ Max.			1	1
♂ Mode	10	10	1	1
♂ Mode (obs)	10	10	1	1
♂ Median			1.00	1.00
♂ Median (obs)			1.00	1.00
♂ Mean			1.00	1.00
♂ Mean (obs)			1.00	1.00
♂ Freq.	(10) 3:3, 100.0%	(10) 5:5, 100.0%	(1) 3:3, 100.0%	(1) 5:5, 100.0%
♀ No.	12	12	12	12
♀ Min.			1	1
♀ Max.			3	4
♀ Mode	10	10	1	1
♀ Mode (obs)	10	10	1	1
♀ Median			1.00	1.00
♀ Median (obs)			1.00	1.00
♀ Mean			1.33	2.08
♀ Mean (obs)			1.19	1.43
♀ Freq.	(10) 11:12, 91.7%; (31) 1:12, 8.3%; [obs: (10) 11:13, 84.6%; (21) 1:13, 7.7%; (31) 1:13, 7.7%]	(10) 10:12, 83.3%; (35) 1:12, 8.3%; (41) 1:12, 8.3%; [obs: (10) 10:16, 62.5%; (21) 4:16, 25.0%; (35) 1:16, 6.3%; (41) 1:16, 6.3%]	(1) 11:12, 91.7%; (3) 1:12, 8.3%; [obs: (1) 11:13, 84.6%; (2) 1:13, 7.7%; (3) 1:13, 7.7%]	(1) 10:12, 83.3%; (3) 1:12, 8.3%; (4) 1:12, 8.3%; [obs: (1) 10:16, 62.5%; (2) 4:16, 25.0%; (3) 1:16, 6.3%; (4) 1:16, 6.3%]
No.	15	17	15	17
Min.			1	1
Max.			3	4
Mode	10	10	1	1
Mode (obs)	10	10	1	1
Median			1.00	1.00
Median (obs)			1.00	1.00
Mean			1.27	1.76
Mean (obs)			1.19	1.43
Freq.	(10) 14:15, 93.3%; (31) 1:15, 6.7%; [obs: (10) 14:16, 87.5%; (21) 1:16, 6.3%; (31) 1:16, 6.3%]	(10) 15:17, 88.2%; (35) 1:17, 5.9%; (41) 1:17, 5.9%; [obs: (10) 15:21, 71.4%; (21) 4:21, 19.0%; (35) 1:21, 4.8%; (41) 1:21, 4.8%]	(1) 14:15, 93.3%; (3) 1:15, 6.7%; [obs: (1) 14:16, 87.5%; (2) 1:16, 6.3%; (3) 1:16, 6.3%]	(1) 15:17, 88.2%; (3) 1:17, 5.9%; (4) 1:17, 5.9%; [obs: (1) 15:21, 71.4%; (2) 4:21, 19.0%; (3) 1:21, 4.8%; (4) 1:21, 4.8%]

Appendix XXI.D. *Cribra orbitalia*

	CO001 - *Cribra orbitalia* (l)	CO002 - *Cribra orbitalia* (r)	CO001/2 - *Cribra orbitalia* (m)
Abu Tabari 95/2-3			
Abu Tabari 02/1-2			
Abu Tabari 02/1-3			
Abu Tabari 02/1-5			
Abu Tabari 02/1-6			
Abu Tabari 02/1-7			
Abu Tabari 02/1-8			
Abu Tabari 02/28-2	(1)		1
Abu Tabari 02/28-3			
Abu Tabari 02/28-4			
Abu Tabari 02/28-5	[(2)]	(2)	2
Abu Tabari 02/28-7	(2)	[(2)]	2
Abu Tabari 02/28-8	[(2)]	(2)	2
Abu Tabari 02/28-11	[(1)]	[(1)]	1
Abu Tabari 02/28-13			
Abu Tabari 02/28-14			
Abu Tabari 02/28-15			
Abu Tabari 02/28-20			
Abu Tabari 02/28-21			
Abu Tabari 02/28-22	[(1)]	[(2)]	1.5
Abu Tabari 02/28-23			
Abu Tabari 03/31			
Abu Tabari 03/34-1			
Conical Hill 95/4			
Conical Hill 95/4-1			
Conical Hill 02/3-4			
Djabarona 96/1-1	[(2)]		2
Djabarona 96/1-2			
Djabarona 96-4			
Djabarona 96/120-3			
Djabarona 96/120-4			
Djabarona 96/120-5			

	CO001	CO002	CO001/2
♂ No.	2	1	2
♂ Min.	1	1	1.0
♂ Max.	1	1	1.0
♂ Mode	1		1.0
♂ Median	1.00	1.00	1.00
♂ Mean	1.00	1.00	1.00
♂ Freq.	(1) 2:2, 100.0%	(1) 1:1, 100.0%	(1) 2:2, 100.0%
♀ No.	5	4	5
♀ Min.	1	2	1.5
♀ Max.	2	2	2.0
♀ Mode	2	2	2.0
♀ Median	2.00	2.00	2.00
♀ Mean	1.80	2.00	1.90
♀ Freq.	(1) 1:5, 20.0%; (2) 4:5, 80.0%	(2) 4:4, 100.0%	(1.5) 1:5, 20.0%; (2) 4:5, 80.0%
No.	7	5	7
Min.	1	1	1.0
Max.	2	2	2.0
Mode	2	2	2.0
Median	2.00	2.00	2.00
Mean	1.57	1.80	1.64
Freq.	(1) 3:7, 42.9%; (2) 4:7, 57.1%	(1) 1:5, 20.0%; (2) 4:5, 80.0%	(1) 2:7, 28.6%; (1.5) 1:7, 14.3%; (2) 4:7, 57.1%

The prehistoric inhabitants of the Wadi Howar

An anthropological study of human skeletal remains from the Sudanese part of the Eastern Sahara

Inauguraldissertation

zur Erlangung des Akademischen Grades

eines Dr. phil.,

vorgelegt dem Fachbereich 02

Sozialwissenschaften, Medien und Sport

der Johannes Gutenberg-Universität

Mainz

von

Erik Becker M.A.

aus Darmstadt

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Volume III

Appendix XXII. Intra-observer error

Appendix XXII.A. Overviews

Appendix XXII.A.1. Measurements

Appendix XXII.A.1.a. Cranial measurements

	CM001 - 1. Maximum cranial length	CM002 - 3. *Glabello-Lambda* length	CM003 - 8. Maximum cranial breadth	CM004 - 9. Least frontal breadth	CM007/8 - 13a. Mastoid width (m)	CM010/11 - 19a. Mastoid height (m)	CM020 - 30. *Bregma-Lambda* chord	CM028 - 48(1). *Nasospinale-Prosthion* height	CM030 - *50(1). Interorbital breadth	CM035 - 54. Nasal breadth
Abu Tabari 02/1-2					0.00	0.50		0.50		0.00
Abu Tabari 02/1-3					0.00	0.25		0.00		0.00
Abu Tabari 02/1-5										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8										
Abu Tabari 02/28-2	1.00	0.00	0.00	0.00	0.00	1.50	0.50	0.50		0.00
Abu Tabari 02/28-3										0.00
Abu Tabari 02/28-5			1.00	0.00	0.50	0.00	2.00	0.00	0.50	0.00
No.	1	1	2	2	4	4	2	4	1	5
Min.	1.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00
Max.	1.00	0.00	1.00	0.00	0.50	1.50	2.00	0.50	0.50	0.00
Mean	1.000	0.000	0.500	0.000	0.125	0.563	1.250	0.250	0.500	0.000
Sig. (independent)	U: .000; Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: .500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 7.500; Z: -.147; Point P.: .114 Asymp. Sig. (2-tailed): .883 Exact Sig. (2-tailed): .971 Exact Sig. (1-tailed): .486	U: 7.500; Z: -.145; Point P.: .086 Asymp. Sig. (2-tailed): .885 Exact Sig. (2-tailed): .971 Exact Sig. (1-tailed): .486	U: 2.000; Z: .000; Point P.: .333 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .667	U: 8.000; Z: .000; Point P.: .143 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .571	U: .000; Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 12.500; Z: .000; Point P.: .175 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .587
Sig. (paired)	insufficient data	insufficient data	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -.535; Point P.: .125 Asymp. Sig. (2-tailed): .593 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -.447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750	insufficient data	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	CM042 - *61a(1). Canine alveolar breadth (mx)	CM043 - *61a(1). Canine alveolar breadth (md)	CM045 - *61a(2). 1st premolar alveolar breadth (md)	CM047 - *61a(3). 2nd premolar alveolar breadth (md)	CM049 - *61a(4). 1st moalr alveolar breadth (md)	CM051 - *61a(5). 2nd molar alveolar breadth (md)	CM058 - *62a(3). 3rd internal dental arch length (mx)	CM059 - *62a(3). 3rd internal dental arch length (md)	CM060 - *62a(4). 4th internal dental arch length (mx)	CM061 - *62a(4). 4th internal dental arch length (md)
Abu Tabari 02/1-2	0.00	1.00	0.50	1.00	0.00	0.50	1.50	1.50		1.00
Abu Tabari 02/1-3	0.00	0.50	0.00	0.00	0.50	0.50				
Abu Tabari 02/1-5										
Abu Tabari 02/1-7								0.50		
Abu Tabari 02/1-8										
Abu Tabari 02/28-2										
Abu Tabari 02/28-3										
Abu Tabari 02/28-5	0.00	0.50	0.00	0.50			1.00	0.00	0.50	0.00
No.	3	3	3	3	2	2	2	3	1	2
Min.	0.00	0.50	0.00	0.00	0.00	0.50	1.00	0.00	0.50	0.00
Max.	0.00	1.00	0.50	1.00	0.50	0.50	1.50	1.50	0.50	1.00
Mean	0.000	0.667	0.167	0.500	0.250	0.500	1.250	0.667	0.500	0.500
Sig. (independent)	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700	U: 4.000; Z: -.218; Point P.: .150 Asymp. Sig. (2-tailed): .827 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 3.500; Z: -.471; Point P.: .300 Asymp. Sig. (2-tailed): .637 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.000; Z: -.775; Point P.: .167 Asymp. Sig. (2-tailed): .439 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 2.000; Z: .000; Point P.: .333 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .667	U: 4.000; Z: -.232; Point P.: .150 Asymp. Sig. (2-tailed): .817 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: .000; Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -.447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: 1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	insufficient data	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500

	CM068 - 63(2). Anterior palate breadth (mx)	CM069 - *63(2). Anterior palate breadth (md)	CM070 - *63(2)a. 1st internal dental arch breadth (mx)	CM071 - *63(2)a. 1st internal dental arch breadth (md)	CM072 - *63(2)b. 2nd internal dental arch breadth (mx)	CM073 - *63(2)b. 2nd internal dental arch breadth (md)	CM075 - *63(2)c. 3rd internal dental arch breadth (md)	CM077 - *63(2)d. 4th internal dental arch breadth (md)	CM080 - 66. Bigonial breadth	CM082 - 68. Projective length of the body of the mandible
Abu Tabari 02/1-2	1.50	1.00	0.00	0.50	1.00	1.00	0.00	0.50	0.00	0.50
Abu Tabari 02/1-3	0.00	0.00	0.00	0.00		0.00	0.00	0.50	1.50	0.50
Abu Tabari 02/1-5										
Abu Tabari 02/1-7		0.50				0.00				
Abu Tabari 02/1-8										
Abu Tabari 02/28-2										
Abu Tabari 02/28-3										
Abu Tabari 02/28-5	0.00	0.00	0.00	0.00	0.00	0.00	0.50		0.00	1.00
No.	3	4	3	3	2	4	3	2	3	3
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50
Max.	1.50	1.00	0.00	0.50	1.00	1.00	0.50	0.50	1.50	1.00
Mean	0.500	0.375	0.000	0.167	0.500	0.250	0.167	0.500	0.500	0.667
Sig. (independent)	U: 3.500; Z: -.471; Point P.: .300 Asymp. Sig. (2-tailed): .637 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 7.500; Z: -.149; Point P.: .086 Asymp. Sig. (2-tailed): .882 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 7.500; Z: -.155; Point P.: .171 Asymp. Sig. (2-tailed): .877 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.000; Z: -.775; Point P.: .167 Asymp. Sig. (2-tailed): .439 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.000; Z: -.218; Point P.: .150 Asymp. Sig. (2-tailed): .827 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -.447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625

	CM083 - 69. Height of the mandibular symphysis	CM085 - *69c. Thickness of the mandibular symphysis	CM086/87 - 69(1). Mental foramen height (m)	CM088/89 - 69(2). 2nd molar mandibular body height (m)	CM100/101 - 69(3). Mental foramen body thickness (m)	CM102/103 - 69b. 2nd molar mandibular body thickness (m)	CM122/123 - 71a. Minimum ramus width (m)	CM133 - 80a. Dental arch length of the mandible	CM135 - 80(1). External dental arch width (md)	CM136 - *80(1)a. Canine dental arch breadth (mx)
Abu Tabari 02/1-2	0.00	0.00	0.00	1.00	0.25	0.25	0.00	0.50	0.00	0.00
Abu Tabari 02/1-3	0.50	0.50	0.50	0.75	0.25	0.25		0.50	1.00	0.00
Abu Tabari 02/1-5										
Abu Tabari 02/1-7	0.00	0.00								
Abu Tabari 02/1-8										
Abu Tabari 02/28-2	0.50	0.00	0.25		0.00					
Abu Tabari 02/28-3							0.00			
Abu Tabari 02/28-5	0.00	0.00	0.50		0.50		0.50			0.00
No.	5	5	4	2	4	2	3	2	2	3
Min.	0.00	0.00	0.00	0.75	0.00	0.25	0.00	0.50	0.00	0.00
Max.	0.50	0.50	0.50	1.00	0.50	0.25	0.50	0.50	1.00	0.00
Mean	0.200	0.100	0.313	0.875	0.250	0.250	0.167	0.500	0.500	0.000
Sig. (independent)	U: 11.500; Z: -.211; Point P.: .040 Asymp. Sig. (2-tailed): .833 Exact Sig. (2-tailed): .889 Exact Sig. (1-tailed): .444	U: 11.500; Z: -.219; Point P.: .143 Asymp. Sig. (2-tailed): .827 Exact Sig. (2-tailed): .992 Exact Sig. (1-tailed): .496	U: 7.000; Z: -.292; Point P.: .071 Asymp. Sig. (2-tailed): .770 Exact Sig. (2-tailed): .829 Exact Sig. (1-tailed): .414	U: 1.000; Z: -.775; Point P.: .167 Asymp. Sig. (2-tailed): .439 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 8.000; Z: .000; Point P.: .086 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .543	U: 2.000; Z: .000; Point P.: .333 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .667	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.000; Z: -.775; Point P.: .167 Asymp. Sig. (2-tailed): .439 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700
Sig. (paired)	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.089; Point P.: .125 Asymp. Sig. (2-tailed): .276 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	CM137 - *80(1)a. Canine dental arch breadth (md)	CM141 - *80(1)c. 2nd premolar dental arch breadth (md)	CM143 - *80(1)d. 1st molar dental arch breadth (md)	CM148 - *80(4)a. Canine dental arch length (mx)	CM149 - *80(4)a. Canine dental arch length (md)	CM150 - *80(4)b. 1st premolar dental arch length (mx)	CM153 - *80(4)c. 2nd premolar dental arch length (md)
Abu Tabari 02/1-2	0.00	0.00	0.50	0.00	0.50	0.50	1.0
Abu Tabari 02/1-3	0.00	0.50	1.00		1.50	0.50	2.0
Abu Tabari 02/1-5							
Abu Tabari 02/1-7							
Abu Tabari 02/1-8							
Abu Tabari 02/28-2							
Abu Tabari 02/28-3							
Abu Tabari 02/28-5	0.00	0.00			0.50	0.00	0.5
No.	3	3	2	1	3	3	3
Min.	0.00	0.00	0.50	0.00	0.50	0.00	0.50
Max.	0.00	0.50	1.00	0.00	1.50	0.50	2.00
Mean	0.000	0.167	0.750	0.000	0.833	0.333	1.167
Sig. (independent)	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700	U: 4.000; Z: -.225; Point P.: .200 Asymp. Sig. (2-tailed): .822 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: .500; Z: -1.225; Point P.: .333 Asymp. Sig. (2-tailed): .221 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: .500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 4.000; Z: -.221; Point P.: .100 Asymp. Sig. (2-tailed): .825 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 3.500; Z: -.443; Point P.: .100 Asymp. Sig. (2-tailed): .658 Exact Sig. (2-tailed): .800 Exact Sig. (1-tailed): .400	U: 4.000; Z: -.218; Point P.: .150 Asymp. Sig. (2-tailed): .827 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	insufficient data	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625

	All cranial measurement pairs	Neurocranial measurement pairs	Viscerocranial measurement pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	130	8	122	40	34	0	5	0	13	2	36
Min.	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
Max.	2.00	2.00	2.00	1.50	2.00		0.50		1.50	0.00	2.00
Mean	0.371	0.563	0.359	0.463	0.412		0.200		0.327	0.000	0.292
Sig. (independent)	U: 8.443E3; Z: -.012; Point P.: .000 Asymp. Sig. (2-tailed): .991 Exact Sig. (2-tailed): .991 Exact Sig. (1-tailed): .496	U: 31.000; Z: -.105; Point P.: .019 Asymp. Sig. (2-tailed): .916 Exact Sig. (2-tailed): .945 Exact Sig. (1-tailed): .473 Equal variances (F: .003, Sig.: .959) - t: -.004; Sig. (2-tailed): .997 Unequal variances - t: -.004; Sig. (2-tailed): .997	U: 7434.000; Z: -.015; Point P.: .000 Asymp. Sig. (2-tailed): .988 Exact Sig. (2-tailed): .989 Exact Sig. (1-tailed): .494	U: 791.000; Z: -.087; Point P.: .002; Asymp. Sig. (2-tailed): .931; Exact Sig. (2-tailed): .933; Exact Sig. (1-tailed): .467	U: 576.000; Z: -.025; Point P.: .002; Asymp. Sig. (2-tailed): .980; Exact Sig. (2-tailed): .983; Exact Sig. (1-tailed): .491	no data	U: 12.500; Z: .000; Point P.: .079; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .540 Equal variances (F: .004, Sig.: .952) - t: .000; Sig. (2-tailed): 1.000; Unequal variances - t: -.000; Sig. (2-tailed): 1.000	no data	U: 83.500; Z: -.051; Point P.: .010; Asymp. Sig. (2-tailed): .959; Exact Sig. (2-tailed): .970; Exact Sig. (1-tailed): .485 Equal variances (F: .000, Sig.: .986) - t: -.002; Sig. (2-tailed): .998; Unequal variances - t: -.002; Sig. (2-tailed): .998	U: 2.000; Z: .000; Point P.: .667; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .833	U: 647.000; Z: -.011; Point P.: .002; Asymp. Sig. (2-tailed): .991; Exact Sig. (2-tailed): .993; Exact Sig. (1-tailed): .497
Sig. (paired)	Z: -.186; Point P.: .001 Asymp. Sig. (2-tailed): .853 Exact Sig. (2-tailed): .855 Exact Sig. (1-tailed): .427	Z: -.368; Point P.: .063 Asymp. Sig. (2-tailed): .713 Exact Sig. (2-tailed): .875 Exact Sig. (1-tailed): .438 t: -.188; df: 7; Sig. (2-tailed): .857	Z: -.028; Point P.: .001 Asymp. Sig. (2-tailed): .978 Exact Sig. (2-tailed): .978 Exact Sig. (1-tailed): .489	Z: -1.263; Point P.: .003; Asymp. Sig. (2-tailed): .207; Exact Sig. (2-tailed): .209; Exact Sig. (1-tailed): .104	Z: -1.505; Point P.: .007; Asymp. Sig. (2-tailed): .132; Exact Sig. (2-tailed): .142; Exact Sig. (1-tailed): .071	no data	Z: .000; Point P.: .500; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .750 t: .000; df: 4; Sig. (2-tailed): 1.000	no data	Z: -.742; Point P.: .063; Asymp. Sig. (2-tailed): .458; Exact Sig. (2-tailed): .563; Exact Sig. (1-tailed): .281 t: -.359; df: 12; Sig. (2-tailed): .726	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -.119; Point P.: .042; Asymp. Sig. (2-tailed): .905; Exact Sig. (2-tailed): .969; Exact Sig. (1-tailed): .485

Appendix XXII.A.1.b. Dental measurements

	DM001/2 - 81. Crown length UI1 (m)	DM003/4 - 81. Crown length UI2 (m)	DM005/6 - 81. Crown length UC (m)	DM007/8 - 81. Crown length UP1 (m)	DM009/10 - 81. Crown length UP2 (m)	DM011/12 - 81. Crown length UM1 (m)	DM013/14 - 81. Crown length UM2 (m)	DM015/16 - 81. Crown length UM3 (m)	DM017/18 - 81. Crown length LI1 (m)	DM019/20 - 81. Crown length LI2 (m)
Abu Tabari 02/1-2	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.10	0.00
Abu Tabari 02/1-3								0.00		
Abu Tabari 02/1-5										
Abu Tabari 02/1-7					0.00					
Abu Tabari 02/1-8	0.00	0.00	0.00	0.05	0.00	0.15	0.10	0.15	0.00	0.00
Abu Tabari 02/28-2	0.05	0.10				0.05	0.05		0.00	0.05
Abu Tabari 02/28-3	0.00	0.00	0.05	0.00	0.05	0.05	0.00		0.00	0.00
Abu Tabari 02/28-5	0.00	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.05	0.05
No.	5	5	4	4	5	4	5	4	5	5
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	0.05	0.10	0.05	0.05	0.05	0.15	0.10	0.15	0.10	0.05
Mean	0.010	0.030	0.013	0.025	0.020	0.063	0.040	0.063	0.030	0.020
Sig. (independent)	U: 12.000; Z: -.106; Point P.: .071 Asymp. Sig. (2-tailed): .916 Exact Sig. (2-tailed): .968 Exact Sig. (1-tailed): .484	U: 11.000; Z: -.319; Point P.: .071 Asymp. Sig. (2-tailed): .750 Exact Sig. (2-tailed): .810 Exact Sig. (1-tailed): .405	U: 7.500; Z: -.147; Point P.: .114 Asymp. Sig. (2-tailed): .883 Exact Sig. (2-tailed): .971 Exact Sig. (1-tailed): .486	U: 7.500; Z: -.149; Point P.: .086 Asymp. Sig. (2-tailed): .882 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 11.500; Z: -.211; Point P.: .040 Asymp. Sig. (2-tailed): .833 Exact Sig. (2-tailed): .889 Exact Sig. (1-tailed): .444	U: 6.500; Z: -.436; Point P.: .057 Asymp. Sig. (2-tailed): .663 Exact Sig. (2-tailed): .743 Exact Sig. (1-tailed): .371	U: 11.500; Z: -.212; Point P.: .056 Asymp. Sig. (2-tailed): .832 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452	U: 6.500; Z: -.441; Point P.: .143 Asymp. Sig. (2-tailed): .659 Exact Sig. (2-tailed): .829 Exact Sig. (1-tailed): .414	U: 11.500; Z: -.211; Point P.: .040 Asymp. Sig. (2-tailed): .833 Exact Sig. (2-tailed): .889 Exact Sig. (1-tailed): .444	U: 12.000; Z: -.106; Point P.: .063 Asymp. Sig. (2-tailed): .915 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: -.1000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.1000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.633; Point P.: .125 Asymp. Sig. (2-tailed): .102 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750

	DM021/22 - 81. Crown length LC (m)	DM023/24 - 81. Crown length LP1 (m)	DM025/26 - 81. Crown length LP2 (m)	DM027/28 - 81. Crown length LM1 (m)	DM029/30 - 81. Crown length LM2 (m)	DM031/32 - 81. Crown length LM3 (m)	DM033/34 - 81(1). Crown width UI1 (m)	DM035/36 - 81(1). Crown width UI2 (m)	DM037/38 - 81(1). Crown width UC (m)	DM039/40 - 81(1). Crown width UP1 (m)	DM041/42 - 81(1). Crown width UP2 (m)
Abu Tabari 02/1-2	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00		
Abu Tabari 02/1-3	0.10	0.00	0.05	0.10	0.05	0.10			0.00		0.00
Abu Tabari 02/1-5			0.10		0.00		0.10				
Abu Tabari 02/1-7										0.00	0.10
Abu Tabari 02/1-8	0.05	0.00	0.05	0.05	0.00	0.10	0.05	0.05	0.00	0.00	0.05
Abu Tabari 02/28-2	0.00			0.00	0.00		0.00	0.00			
Abu Tabari 02/28-3	0.05	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05		
Abu Tabari 02/28-5	0.00	0.05	0.00	0.00	0.05	0.00	0.10	0.05	0.00	0.00	0.00
No.	6	5	6	6	7	5	6	5	5	3	4
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	0.10	0.05	0.10	0.10	0.05	0.10	0.10	0.05	0.05	0.00	0.10
Mean	0.033	0.010	0.033	0.025	0.021	0.060	0.042	0.020	0.010	0.000	0.038
Sig. (independent)	U: 17.000; Z: -.162; Point P.: .038 Asymp. Sig. (2-tailed): .871 Exact Sig. (2-tailed): .918 Exact Sig. (1-tailed): .459	U: 11.500; Z: -.213; Point P.: .143 Asymp. Sig. (2-tailed): .831 Exact Sig. (2-tailed): .992 Exact Sig. (1-tailed): .496	U: 16.000; Z: -.324; Point P.: .039 Asymp. Sig. (2-tailed): .746 Exact Sig. (2-tailed): .797 Exact Sig. (1-tailed): .398	U: 17.000; Z: -.161; Point P.: .028 Asymp. Sig. (2-tailed): .872 Exact Sig. (2-tailed): .909 Exact Sig. (1-tailed): .455	U: 24.000; Z: -.064; Point P.: .029 Asymp. Sig. (2-tailed): .949 Exact Sig. (2-tailed): .976 Exact Sig. (1-tailed): .488	U: 12.000; Z: -.105; Point P.: .071 Asymp. Sig. (2-tailed): .916 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 17.500; Z: -.080; Point P.: .041 Asymp. Sig. (2-tailed): .936 Exact Sig. (2-tailed): .974 Exact Sig. (1-tailed): .487	U: 12.500; Z: .000; Point P.: .095 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .548	U: 12.000; Z: -.108; Point P.: .095 Asymp. Sig. (2-tailed): .914 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700	U: 4.500; Z: -1.049; Point P.: .086 Asymp. Sig. (2-tailed): .294 Exact Sig. (2-tailed): .400 Exact Sig. (1-tailed): .200
Sig. (paired)	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.633; Point P.: .125 Asymp. Sig. (2-tailed): .102 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.577; Point P.: .375 Asymp. Sig. (2-tailed): .564 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -.743; Point P.: .063 Asymp. Sig. (2-tailed): .458 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.089; Point P.: .125 Asymp. Sig. (2-tailed): .276 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250

	DM043/44 - 81(1). Crown width UM1 (m)	DM045/46 - 81(1). Crown width UM2 (m)	DM047/48 - 81(1). Crown width UM3 (m)	DM049/50 - 81(1). Crown width LI1 (m)	DM051/52 - 81(1). Crown width LI2 (m)	DM053/54 - 81(1). Crown width LC (m)	DM055/56 - 81(1). Crown width LP1 (m)	DM057/58 - 81(1). Crown width LP2 (m)	DM059/60 - 81(1). Crown width LM1 (m)	DM061/62 - 81(1). Crown width LM2 (m)	DM063/64 - 81(1). Crown width LM3 (m)
Abu Tabari 02/1-2		0.00	0.00	0.05	0.05	0.00	0.05	0.00	0.00	0.00	0.05
Abu Tabari 02/1-3			0.00	0.00	0.10	0.05	0.05	0.05	0.05	0.05	0.00
Abu Tabari 02/1-5								0.00		0.00	
Abu Tabari 02/1-7											
Abu Tabari 02/1-8	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.10
Abu Tabari 02/28-2	0.05	0.00		0.00	0.10	0.00			0.10	0.05	
Abu Tabari 02/28-3				0.05	0.00	0.10		0.10		0.00	0.00
Abu Tabari 02/28-5	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.05
No.	3	4	4	6	6	6	4	6	5	7	5
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	0.10	0.05	0.00	0.05	0.10	0.10	0.05	0.10	0.10	0.05	0.10
Mean	0.050	0.013	0.000	0.017	0.050	0.025	0.025	0.033	0.040	0.014	0.040
Sig. (independent)	U: 3.500; Z: -.443; Point P.: .100 Asymp. Sig. (2-tailed): .658 Exact Sig. (2-tailed): .800 Exact Sig. (1-tailed): .400	U: 7.000; Z: -.300; Point P.: .171 Asymp. Sig. (2-tailed): .765 Exact Sig. (2-tailed): .971 Exact Sig. (1-tailed): .486	U: 8.000; Z: .000; Point P.: .257 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .629	U: 17.000; Z: -.161; Point P.: .026 Asymp. Sig. (2-tailed): .872 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452	U: 17.000; Z: -.161; Point P.: .034 Asymp. Sig. (2-tailed): .872 Exact Sig. (2-tailed): .909 Exact Sig. (1-tailed): .455	U: 17.000; Z: -.161; Point P.: .026 Asymp. Sig. (2-tailed): .872 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452	U: 7.000; Z: -.292; Point P.: .057 Asymp. Sig. (2-tailed): .770 Exact Sig. (2-tailed): .857 Exact Sig. (1-tailed): .429	U: 15.500; Z: -.407; Point P.: .019 Asymp. Sig. (2-tailed): .684 Exact Sig. (2-tailed): .714 Exact Sig. (1-tailed): .357	U: 12.000; Z: -.105; Point P.: .067 Asymp. Sig. (2-tailed): .916 Exact Sig. (2-tailed): .984 Exact Sig. (1-tailed): .492	U: 23.500; Z: -.128; Point P.: .023 Asymp. Sig. (2-tailed): .898 Exact Sig. (2-tailed): .924 Exact Sig. (1-tailed): .462	U: 11.500; Z: -.212; Point P.: .056 Asymp. Sig. (2-tailed): .832 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452
Sig. (paired)	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.300; Point P.: .125 Asymp. Sig. (2-tailed): .194 Exact Sig. (2-tailed): .375 Exact Sig. (1-tailed): .188	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.633; Point P.: .125 Asymp. Sig. (2-tailed): .102 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375

	All measurement pairs	Crown length pairs	Crown width pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	160	81	79	28	18	5	3	32	18	24	32
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	0.15	0.15	0.10	0.10	0.10	0.10	0.10	0.15	0.10	0.10	0.10
Mean	0.028	0.030	0.027	0.013	0.042	0.040	0.033	0.031	0.033	0.025	0.030
Sig. (independent)	U: 1.275E4; Z: -.059; Point P.: - Asymp. Sig. (2-tailed): .953 Exact Sig. (2-tailed): - Exact Sig. (1-tailed): - [insufficient memory to compute exact statistics]	U: 3268.000; Z: -.042; Point P.: .001 Asymp. Sig. (2-tailed): .967 Exact Sig. (2-tailed): .967 Exact Sig. (1-tailed): .484	U: 3098.500; Z: -.077; Point P.: .001 Asymp. Sig. (2-tailed): .939 Exact Sig. (2-tailed): .940 Exact Sig. (1-tailed): .470 Equal variances (F: .000, Sig.: .995) - t: -.038; Sig. (2-tailed): .970 Unequal variances - t: -.038; Sig. (2-tailed): .970	U: 391.500; Z: -.008; Point P.: .003; Asymp. Sig. (2-tailed): .993; Exact Sig. (2-tailed): .997; Exact Sig. (1-tailed): .498 Equal variances (F: .001, Sig.: .975) - t: -.003; Sig. (2-tailed): .997; Unequal variances - t: -.003; Sig. (2-tailed): .997	U: 155.500; Z: -.206; Point P.: .006; Asymp. Sig. (2-tailed): .837; Exact Sig. (2-tailed): .845; Exact Sig. (1-tailed): .422 Equal variances (F: .002, Sig.: .964) - t: -.041; Sig. (2-tailed): .968; Unequal variances - t: -.041; Sig. (2-tailed): .968	U: 12.500; Z: .000; Point P.: .095; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .548 Equal variances (F: .000, Sig.: 1.000) - t: .000; Sig. (2-tailed): 1.000; Unequal variances - t: .000; Sig. (2-tailed): 1.000	U: 4.000; Z: -.225; Point P.: .200; Asymp. Sig. (2-tailed): .822; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	U: 509.500; Z: -.034; Point P.: .003; Asymp. Sig. (2-tailed): .973; Exact Sig. (2-tailed): .976; Exact Sig. (1-tailed): .488 Equal variances (F: .003, Sig.: .955) - t: -.013; Sig. (2-tailed): .990; Unequal variances - t: -.013; Sig. (2-tailed): .990	U: 160.000; Z: -.063; Point P.: .006; Asymp. Sig. (2-tailed): .950; Exact Sig. (2-tailed): .956; Exact Sig. (1-tailed): .478 Equal variances (F: .000, Sig.: .985) - t: -.012; Sig. (2-tailed): .990; Unequal variances - t: -.012; Sig. (2-tailed): .990	U: 287.500; Z: -.010; Point P.: .004; Asymp. Sig. (2-tailed): .992; Exact Sig. (2-tailed): .996; Exact Sig. (1-tailed): .498 Equal variances (F: .002, Sig.: .965) - t: -.017; Sig. (2-tailed): .987; Unequal variances - t: -.017; Sig. (2-tailed): .987	U: 503.500; Z: -.114; Point P.: .003; Asymp. Sig. (2-tailed): .909; Exact Sig. (2-tailed): .912; Exact Sig. (1-tailed): .456 Equal variances (F: .000, Sig.: .998) - t: -.031; Sig. (2-tailed): .975; Unequal variances - t: -.031; Sig. (2-tailed): .975
Sig. (paired)	Z: -2.915; Point P.: .000 Asymp. Sig. (2-tailed): .004 Exact Sig. (2-tailed): .003 Exact Sig. (1-tailed): .002	Z: -1.707; Point P.: .003 Asymp. Sig. (2-tailed): .088 Exact Sig. (2-tailed): .088 Exact Sig. (1-tailed): .044	Z: -2.423; Point P.: .001 Asymp. Sig. (2-tailed): .015 Exact Sig. (2-tailed): .014 Exact Sig. (1-tailed): .007 t: -2.634; df: 78; Sig. (2-tailed): .010	Z: -.333; Point P.: .234; Asymp. Sig. (2-tailed): .739; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500 t: -.328; df: 27; Sig. (2-tailed): .745	Z: -1.793; Point P.: .014; Asymp. Sig. (2-tailed): .073; Exact Sig. (2-tailed): .094; Exact Sig. (1-tailed): .047 t: -2.034; df: 17; Sig. (2-tailed): .058	Z: .000; Point P.: .500; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .750 t: .000; df: 4; Sig. (2-tailed): 1.000	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -.539; Point P.: .026; Asymp. Sig. (2-tailed): .590; Exact Sig. (2-tailed): .631; Exact Sig. (1-tailed): .316 t: -.643; df: 31; Sig. (2-tailed): .525	Z: -.921; Point P.: .088; Asymp. Sig. (2-tailed): .357; Exact Sig. (2-tailed): .480; Exact Sig. (1-tailed): .240 t: -.940; df: 17; Sig. (2-tailed): .361	Z: -1.027; Point P.: .068; Asymp. Sig. (2-tailed): .305; Exact Sig. (2-tailed): .354; Exact Sig. (1-tailed): .177 t: -1.000; df: 23; Sig. (2-tailed): .328	Z: -2.209; Point P.: .011; Asymp. Sig. (2-tailed): .027; Exact Sig. (2-tailed): .035; Exact Sig. (1-tailed): .017 t: -2.350; df: 31; Sig. (2-tailed): .025

Appendix XXII.A.1.c. Postcranial measurements

	PM015/16 - H1. *Humerus* - Maximum length (m)	PM019/20 - H5. Maximum diameter of the mid-shaft (m)	PM021/22 - H6. Minimum diameter of the mid-shaft (m)	PM025/26 - H7a. Mid-shaft circumference (m)	PM031 - *Humerus* - Cortical thickness (ant.)	PM032 - *Humerus* - Cortical thickness (post.)	PM033 - *Humerus* - Cortical thickness (med.)	PM034 - *Humerus* - Cortical thickness (lat.)	PM035 - *Humerus* - Cortical thickness (max.)	PM036 - *Humerus* - Cortical thickness (min.)
Abu Tabari 02/1-2	0.00	0.00	0.00	0.00						
Abu Tabari 02/1-3	12.50	0.25	0.25	1.00						
Abu Tabari 02/1-5	0.00	0.50	0.50	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Abu Tabari 02/1-7	10.00	0.50	0.50	1.00	0.00	0.00	0.00	0.50	0.00	0.50
Abu Tabari 02/1-8										
Abu Tabari 02/28-2	1.00	0.00	0.25	0.50						
Abu Tabari 02/28-3	10.00	0.25	0.00	0.25						
Abu Tabari 02/28-5										
No.	6	6	6	6	2	2	2	2	2	2
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	12.50	0.50	0.50	1.00	0.00	0.00	0.00	0.50	0.00	0.50
Mean	5.583	0.250	0.250	0.625	0.000	0.000	0.000	0.250	0.000	0.250
Sig. (independent)	U: 15.000; Z: -.483; Point P.: .025 Asymp. Sig. (2-tailed): .629 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 18.000; Z: .000; Point P.: .032 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .516	U: 17.500; Z: -.081; Point P.: .035 Asymp. Sig. (2-tailed): .935 Exact Sig. (2-tailed): .972 Exact Sig. (1-tailed): .486	U: 18.000; Z: .000; Point P.: .058 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .529	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 2.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 2.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: -1.841; Point P.: .063 Asymp. Sig. (2-tailed): .066 Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): .063	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625	Z: -.137; Point P.: .094 Asymp. Sig. (2-tailed): .891 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500

	PM065/66 - U1. *Ulna* - Maximum length (m)	PM067/68 - U3. Least circumference (m)	PM071/72 - *U3c. Crest circumference (m)	PM073/74 - U11. Dorso-ventral shaft diameter (m)	PM075/76 - U12. Transverse shaft diameter (m)	PM077/78 - *U18. Longitudinal *Tuberositas ulnae* diameter (m)	PM079/80 - *U19. Transverse *Tuberositas ulnae* diameter (m)	PM093/94 - F6. Anterior-posterior mid-shaft diameter (m)	PM095/96 - F7. Medio-lateral mid-shaft diameter (m)	PM097/98 - F8. Mid-shaft circumference (m)
Abu Tabari 02/1-2	0.00	0.25	0.50	0.00	0.00	0.25	0.50	0.25	0.00	0.50
Abu Tabari 02/1-3	5.00	1.00	1.50	0.50	0.50	0.50	0.00	1.00	0.00	2.00
Abu Tabari 02/1-5	5.00	0.50	1.00	0.00	0.50	0.50	0.00	0.50	0.25	0.25
Abu Tabari 02/1-7								0.00	0.50	1.00
Abu Tabari 02/1-8								0.25	0.00	0.50
Abu Tabari 02/28-2	0.00	0.25	0.00	0.00	0.25			0.25	0.25	0.50
Abu Tabari 02/28-3	10.00	1.00	1.00	0.00	0.25		0.50	0.25	0.25	0.50
Abu Tabari 02/28-5										
No.	5	5	5	5	5	3	4	7	7	7
Min.	0.00	0.25	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.25
Max.	10.00	1.00	1.50	0.50	0.50	0.50	0.50	1.00	0.50	2.00
Mean	4.000	0.600	0.800	0.100	0.300	0.417	0.250	0.357	0.179	0.750
Sig. (independent)	U: 10.000; Z: -.527; Point P.: .052 Asymp. Sig. (2-tailed): .598 Exact Sig. (2-tailed): .659 Exact Sig. (1-tailed): .329	U: 10.500; Z: -.424; Point P.: .040 Asymp. Sig. (2-tailed): .671 Exact Sig. (2-tailed): .722 Exact Sig. (1-tailed): .361	U: 12.500; Z: .000; Point P.: .063 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .532	U: 11.000; Z: -.323; Point P.: .143 Asymp. Sig. (2-tailed): .746 Exact Sig. (2-tailed): .881 Exact Sig. (1-tailed): .440	U: 8.500; Z: -.865; Point P.: .063 Asymp. Sig. (2-tailed): .387 Exact Sig. (2-tailed): .468 Exact Sig. (1-tailed): .234	U: 4.000; Z: -.221; Point P.: .100 Asymp. Sig. (2-tailed): .825 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 7.000; Z: -.292; Point P.: .071 Asymp. Sig. (2-tailed): .770 Exact Sig. (2-tailed): .857 Exact Sig. (1-tailed): .429	U: 22.000; Z: -.320; Point P.: .026 Asymp. Sig. (2-tailed): .749 Exact Sig. (2-tailed): .782 Exact Sig. (1-tailed): .391	U: 23.500; Z: -.129; Point P.: .024 Asymp. Sig. (2-tailed): .897 Exact Sig. (2-tailed): .928 Exact Sig. (1-tailed): .464	U: 23.000; Z: -.192; Point P.: .048 Asymp. Sig. (2-tailed): .848 Exact Sig. (2-tailed): .902 Exact Sig. (1-tailed): .451
Sig. (paired)	Z: -1.633; Point P.: .125 Asymp. Sig. (2-tailed): .102 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -.816; Point P.: .125 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .563 Exact Sig. (1-tailed): .281	Z: -.552; Point P.: .125 Asymp. Sig. (2-tailed): .581 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.857; Point P.: .063 Asymp. Sig. (2-tailed): .063 Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): .063	Z: -1.089; Point P.: .125 Asymp. Sig. (2-tailed): .276 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.186; Point P.: .109 Asymp. Sig. (2-tailed): .236 Exact Sig. (2-tailed): .375 Exact Sig. (1-tailed): .188	Z: -.378; Point P.: .250 Asymp. Sig. (2-tailed): .705 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -.172; Point P.: .055 Asymp. Sig. (2-tailed): .863 Exact Sig. (2-tailed): .891 Exact Sig. (1-tailed): .445

	PM099/100 - F9. Subtrochanteric transverse diameter (m)	PM101/102 - F10. Subtrochanteric sagittal diameter (m)	PM103/104 - *F10(1). Subtrochanteric circumference (m)	PM117/118 - *F34. *Linea aspera* breadth (m)	PM121 - *Femur* - Cortical thickness (ant.)	PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)	PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)	PM124 - *Femur* - Cortical thickness (med.)
Abu Tabari 02/1-2	0.00	0.00	0.25	0.00	0.00	0.00	0.50	0.00
Abu Tabari 02/1-3	0.00	0.00	1.50	0.00	0.00	1.00	0.00	0.00
Abu Tabari 02/1-5	0.25	0.50	1.00	0.25	0.00	0.50	0.00	0.00
Abu Tabari 02/1-7	0.00	0.50	1.00		0.00	0.00	0.00	0.00
Abu Tabari 02/1-8	0.00	0.50	1.00	0.00	0.00	0.00	0.00	0.00
Abu Tabari 02/28-2	0.00	0.00	1.00					
Abu Tabari 02/28-3	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.50
Abu Tabari 02/28-5								
No.	7	7	7	5	6	6	6	6
Min.	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
Max.	0.25	0.50	1.50	0.25	0.00	1.00	0.50	0.50
Mean	0.071	0.214	0.857	0.050	0.000	0.250	0.083	0.083
Sig. (independent)	U: 23.500; Z: -.128; Point P.: .023 Asymp. Sig. (2-tailed): .898 Exact Sig. (2-tailed): .924 Exact Sig. (1-tailed): .462	U: 24.000; Z: -.064; Point P.: .032 Asymp. Sig. (2-tailed): .949 Exact Sig. (2-tailed): .981 Exact Sig. (1-tailed): .491	U: 23.000; Z: -.192; Point P.: .048 Asymp. Sig. (2-tailed): .848 Exact Sig. (2-tailed): .902 Exact Sig. (1-tailed): .451	U: 12.000; Z: -.108; Point P.: .095 Asymp. Sig. (2-tailed): .914 Exact Sig. (2-tailed): .984 Exact Sig. (1-tailed): .492	U: 18.000; Z: .000; Point P.: .134 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .567	U: 18.000; Z: .000; Point P.: .082 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .541	U: 17.500; Z: -.082; Point P.: .061 Asymp. Sig. (2-tailed): .935 Exact Sig. (2-tailed): .978 Exact Sig. (1-tailed): .489	U: 17.000; Z: -.162; Point P.: .078 Asymp. Sig. (2-tailed): .871 Exact Sig. (2-tailed): .957 Exact Sig. (1-tailed): .478
Sig. (paired)	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.577; Point P.: .375 Asymp. Sig. (2-tailed): .564 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.380; Point P.: .063 Asymp. Sig. (2-tailed): .168 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -.447; Point P.: .250 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500

	PM125 - *Femur* - Cortical thickness (lat.)	PM126 - *Femur* - Cortical thickness (max.)	PM127 - *Femur* - Cortical thickness (min.)	PM130/131 - T1a. *Tibia* - Maximum length (m)	PM138/139 - T8. Sagittal mid-shaft diameter (m)	PM142/143 - T9. Transverse mid-shaft diameter (m)	PM146/147 - T10. Mid-shaft circumference (m)	PM150/151 - T10b. Minimum shaft circumference (m)
Abu Tabari 02/1-2	0.00	0.00	0.00	20.00	0.25	0.00	0.25	1.25
Abu Tabari 02/1-3	0.00	0.00	0.00	5.00	0.00	0.00	1.00	1.00
Abu Tabari 02/1-5	0.00	0.50	0.00		0.00	0.00	2.00	0.50
Abu Tabari 02/1-7	0.00	0.00	0.00	10.00	0.50	1.00	2.00	
Abu Tabari 02/1-8	0.00	0.00	0.00	25.00	0.50	0.50	0.50	0.00
Abu Tabari 02/28-2				0.00	0.00	0.00	0.50	0.75
Abu Tabari 02/28-3	0.50	0.00	0.00	10.00	0.00	0.00	1.00	0.00
Abu Tabari 02/28-5								
No.	6	6	6	6	7	7	7	6
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00
Max.	0.50	0.50	0.00	25.00	0.50	1.00	2.00	1.25
Mean	0.083	0.083	0.000	11.667	0.179	0.214	1.036	0.583
Sig. (independent)	U: 17.500; Z: -.082; Point P.: .056 Asymp. Sig. (2-tailed): .935 Exact Sig. (2-tailed): .987 Exact Sig. (1-tailed): .494	U: 17.000; Z: -.165; Point P.: .078 Asymp. Sig. (2-tailed): .869 Exact Sig. (2-tailed): .961 Exact Sig. (1-tailed): .481	U: 18.000; Z: .000; Point P.: .199 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .600	U: 13.500; Z: -.723; Point P.: .026 Asymp. Sig. (2-tailed): .470 Exact Sig. (2-tailed): .511 Exact Sig. (1-tailed): .255	U: 22.500; Z: -.258; Point P.: .018 Asymp. Sig. (2-tailed): .797 Exact Sig. (2-tailed): .819 Exact Sig. (1-tailed): .409	U: 23.000; Z: -.195; Point P.: .035 Asymp. Sig. (2-tailed): .845 Exact Sig. (2-tailed): .883 Exact Sig. (1-tailed): .441	U: 23.500; Z: -.128; Point P.: .024 Asymp. Sig. (2-tailed): .898 Exact Sig. (2-tailed): .926 Exact Sig. (1-tailed): .463	U: 14.000; Z: -.653; Point P.: .032 Asymp. Sig. (2-tailed): .514 Exact Sig. (2-tailed): .563 Exact Sig. (1-tailed): .281
Sig. (paired)	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -2.032; Point P.: .031 Asymp. Sig. (2-tailed): .042 Exact Sig. (2-tailed): .063 Exact Sig. (1-tailed): .031	Z: -1.633; Point P.: .125 Asymp. Sig. (2-tailed): .102 Exact Sig. (2-tailed): .250 Exact Sig. (1-tailed): .125	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -.085; Point P.: .063 Asymp. Sig. (2-tailed): .932 Exact Sig. (2-tailed): .984 Exact Sig. (1-tailed): .492	Z: -1.826; Point P.: .063 Asymp. Sig. (2-tailed): .068 Exact Sig. (2-tailed): .125 Exact Sig. (1-tailed): .063

	All postcranial measurement pairs	All postcranial measurement pairs (without long bone length pairs)	Long bone length measurement pairs	All postcranial measurement pairs (without long bone length and cortical thickness pairs)	Cortical thickness measurement pairs	Circumference measurement pairs
No.	190	173	17	119	54	43
Min.	0.00	0.00	0.00	0.00	0.00	0.00
Max.	25.00	2.00	25.00	2.00	1.00	2.00
Mean	0.930	0.308	7.265	0.410	0.083	0.762
Sig. (independent)	U: 1.802E4; Z: -.030; Point P.: - Asymp. Sig. (2-tailed): .976 Exact Sig. (2-tailed): - Exact Sig. (1-tailed): - [insufficient memory to compute exact statistics]	U: 14944.000; Z: -.022; Point P.: - Asymp. Sig. (2-tailed): .982 Exact Sig. (2-tailed): - Exact Sig. (1-tailed): - [insufficient memory to compute exact statistics]	U: 132.500; Z: -.414; Point P.: .006 Asymp. Sig. (2-tailed): .679 Exact Sig. (2-tailed): .689 Exact Sig. (1-tailed): .345 Equal variances (F: .012, Sig.: .915) - t: -.294; Sig. (2-tailed): .771 Unequal variances - t: -.294; Sig. (2-tailed): .771	U: 7064.500; Z: -.030; Point P.: .000 Asymp. Sig. (2-tailed): .976 Exact Sig. (2-tailed): .976 Exact Sig. (1-tailed): .488	U: 1452.000; Z: -.037; Point P.: .001 Asymp. Sig. (2-tailed): .970 Exact Sig. (2-tailed): .972 Exact Sig. (1-tailed): .486	U: 921.000; Z: -.030; Point P.: .002 Asymp. Sig. (2-tailed): .976 Exact Sig. (2-tailed): .978 Exact Sig. (1-tailed): .489 Equal variances (F: .002, Sig.: .963) - t: -.008; Sig. (2-tailed): .994 Unequal variances - t: -.008; Sig. (2-tailed): .994
Sig. (paired)	Z: -2.902; Point P.: .000 Asymp. Sig. (2-tailed): .004 Exact Sig. (2-tailed): .003 Exact Sig. (1-tailed): .002	Z: -1.141; Point P.: .001 Asymp. Sig. (2-tailed): .254 Exact Sig. (2-tailed): .256 Exact Sig. (1-tailed): .128	Z: -3.088; Point P.: .000 Asymp. Sig. (2-tailed): .002 Exact Sig. (2-tailed): .000 Exact Sig. (1-tailed): .000 t: -4.085; df: 16; Sig. (2-tailed): .001	Z: -.920; Point P.: .001 Asymp. Sig. (2-tailed): .358 Exact Sig. (2-tailed): .361 Exact Sig. (1-tailed): .180	Z: -.905; Point P.: .164 Asymp. Sig. (2-tailed): .366 Exact Sig. (2-tailed): .563 Exact Sig. (1-tailed): .281	Z: -.162; Point P.: .002 Asymp. Sig. (2-tailed): .871 Exact Sig. (2-tailed): .876 Exact Sig. (1-tailed): .438 t: -.204; df: 42; Sig. (2-tailed): .839

	Abu Tabari 02/1-2 (without long bone length pairs)	Abu Tabari 02/1-3 (without long bone length pairs)	Abu Tabari 02/1-5 (without long bone length pairs)	Abu Tabari 02/1-7 (without long bone length pairs)	Abu Tabari 02/1-8 (without long bone length pairs)	Abu Tabari 02/28-2 (without long bone length pairs)	Abu Tabari 02/28-3 (without long bone length pairs)	Abu Tabari 02/28-5 (without long bone length pairs)
No.	27	27	33	25	18	17	26	0
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Max.	1.25	2.00	2.00	2.00	1.00	1.00	1.00	
Mean	0.176	0.481	0.333	0.380	0.208	0.265	0.260	
Sig. (independent)	U: 362.500; Z: -.035; Point P.: .003; Asymp. Sig. (2-tailed): .972; Exact Sig. (2-tailed): .976; Exact Sig. (1-tailed): .488	U: 362.000; Z: -.043; Point P.: .003; Asymp. Sig. (2-tailed): .965; Exact Sig. (2-tailed): .969; Exact Sig. (1-tailed): .485	U: 538.000; Z: -.084; Point P.: .003; Asymp. Sig. (2-tailed): .933; Exact Sig. (2-tailed): .936; Exact Sig. (1-tailed): .468	U: 305.500; Z: -.136; Point P.: .004; Asymp. Sig. (2-tailed): .892; Exact Sig. (2-tailed): .897; Exact Sig. (1-tailed): .448	U: 158.500; Z: -.111; Point P.: .006; Asymp. Sig. (2-tailed): .911; Exact Sig. (2-tailed): .919; Exact Sig. (1-tailed): .459	U: 142.500; Z: -.069; Point P.: .007; Asymp. Sig. (2-tailed): .945; Exact Sig. (2-tailed): .953; Exact Sig. (1-tailed): .476 Equal variances (F: .001, Sig.: .975) - t: .016; Sig. (2-tailed): .987; Unequal variances - t: .016; Sig. (2-tailed): .987	U: 336.500; Z: -.027; Point P.: .004; Asymp. Sig. (2-tailed): .978; Exact Sig. (2-tailed): .982; Exact Sig. (1-tailed): .491	no data
Sig. (paired)	Z: -.500; Point P.: .059; Asymp. Sig. (2-tailed): .617; Exact Sig. (2-tailed): .700; Exact Sig. (1-tailed): .350	Z: -1.554; Point P.: .007; Asymp. Sig. (2-tailed): .120; Exact Sig. (2-tailed): .132; Exact Sig. (1-tailed): .066	Z: -1.001; Point P.: .006; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): .331; Exact Sig. (1-tailed): .166	Z: -2.818; Point P.: .002; Asymp. Sig. (2-tailed): .005; Exact Sig. (2-tailed): .004; Exact Sig. (1-tailed): .002	Z: -.526; Point P.: .039; Asymp. Sig. (2-tailed): .599; Exact Sig. (2-tailed): .609; Exact Sig. (1-tailed): .305	Z: -1.191; Point P.: .042; Asymp. Sig. (2-tailed): .234; Exact Sig. (2-tailed): .289; Exact Sig. (1-tailed): .145 t: .922; df: 16; Sig. (2-tailed): .370	Z: -.032; Point P.: .023; Asymp. Sig. (2-tailed): .975; Exact Sig. (2-tailed): .997; Exact Sig. (1-tailed): .498	no data

	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	30	30	35	27	19	20	29	0
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Max.	20.00	12.50	5.00	10.00	25.00	1.00	10.00	
Mean	0.825	1.183	0.457	1.093	1.513	0.275	1.267	
Sig. (independent)	U: 447.500; Z: -.037; Point P.: .003; Asymp. Sig. (2-tailed): .970; Exact Sig. (2-tailed): .974; Exact Sig. (1-tailed): .487	U: 446.000; Z: -.059; Point P.: .003; Asymp. Sig. (2-tailed): .953; Exact Sig. (2-tailed): .956; Exact Sig. (1-tailed): .478	U: 606.500; Z: -.071; Point P.: .002; Asymp. Sig. (2-tailed): .944; Exact Sig. (2-tailed): .946; Exact Sig. (1-tailed): .473	U: 356.500; Z: -.139; Point P.: .003; Asymp. Sig. (2-tailed): .890; Exact Sig. (2-tailed): .894; Exact Sig. (1-tailed): .447	U: 176.500; Z: -.117; Point P.: .006; Asymp. Sig. (2-tailed): .907; Exact Sig. (2-tailed): .914; Exact Sig. (1-tailed): .457	U: 198.500; Z: -.041; Point P.: .005; Asymp. Sig. (2-tailed): .968; Exact Sig. (2-tailed): .973; Exact Sig. (1-tailed): .487	U: 417.500; Z: -.047; Point P.: .003; Asymp. Sig. (2-tailed): .963; Exact Sig. (2-tailed): .966; Exact Sig. (1-tailed): .483	no data
Sig. (paired)	Z: -.040; Point P.: .044; Asymp. Sig. (2-tailed): .968; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -2.310; Point P.: .001; Asymp. Sig. (2-tailed): .021; Exact Sig. (2-tailed): .019; Exact Sig. (1-tailed): .010	Z: -.533; Point P.: .010; Asymp. Sig. (2-tailed): .594; Exact Sig. (2-tailed): .612; Exact Sig. (1-tailed): .306	Z: -3.096; Point P.: .000; Asymp. Sig. (2-tailed): .002; Exact Sig. (2-tailed): .001; Exact Sig. (1-tailed): .000	Z: -1.005; Point P.: .020; Asymp. Sig. (2-tailed): .315; Exact Sig. (2-tailed): .320; Exact Sig. (1-tailed): .160	Z: -.540; Point P.: .010; Asymp. Sig. (2-tailed): .589; Exact Sig. (2-tailed): .630; Exact Sig. (1-tailed): .315	Z: -1.124; Point P.: .005; Asymp. Sig. (2-tailed): .261; Exact Sig. (2-tailed): .272; Exact Sig. (1-tailed): .136	no data

Appendix XXII.A.2. Cranial morphological traits

Appendix XXII.A.2.a. Non-dichotomised traits

	CN001 - Cranial length (*Norma verticalis*)	CN004 - Cranial height (*Norma occipitalis*)	CN006a - Occipital bunning - degree	CN007a - Sagittal keeling - degree	CN016 - Interorbital breadth	CN019 - Orientation of the *Processus frontales maxillae*	CN024 - Alveolar prognathism	CN028 - Symphyseal height	CN031 - Ramus inversion	CN032 - Ramus angle
Abu Tabari 02/1-2							0	0	0	0
Abu Tabari 02/1-3			1			0	0	0		0
Abu Tabari 02/1-5										
Abu Tabari 02/1-7							1	0		
Abu Tabari 02/1-8								0		
Abu Tabari 02/28-2	0	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-3						0	0	0	0	0
Abu Tabari 02/28-5	0	1		0	0	1	0	0	0	0
No.	2	2	2	2	2	4	6	7	4	5
Min.	0	0	0	0	0	0	0	0	0	0
Max.	0	1	1	0	0	1	1	0	0	0
Mean	0.000	0.500	0.500	0.000	0.000	0.250	0.167	0.000	0.000	0.000
Sig. (independent)	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 6.500; Z: -.500; Point P.: .286 Asymp. Sig. (2-tailed): .617 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 15.000; Z: -.561; Point P.: .379 Asymp. Sig. (2-tailed): .575 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 24.500; Z: .000; Point P.: .103 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .551	U: 8.000; Z: .000; Point P.: .257 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .629	U: 12.500; Z: .000; Point P.: .317 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .659
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	36	4	5	0	2	1	10	5	9
Min.	0	0	0		0	0	0	0	0
Max.	1	0	1		1	0	0	0	1
Mean	0.111	0.000	0.200		0.500	0.000	0.000	0.000	0.222
Sig. (independent)	U: 641.500; Z: -.074; Point P.: .002 Asymp. Sig. (2-tailed): .941 Exact Sig. (2-tailed): .943 Exact Sig. (1-tailed): .472	U: 8.000; Z: .000; Point P.: .257; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .629	U: 11.500; Z: -.213; Point P.: .119; Asymp. Sig. (2-tailed): .831; Exact Sig. (2-tailed): .976; Exact Sig. (1-tailed): .488	no data	U: 1.500; Z: -.408; Point P.: .333; Asymp. Sig. (2-tailed): .683; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	U: .500; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	U: 50.000; Z: .000; Point P.: .111; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .556	U: 12.500; Z: .000; Point P.: .190; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .595	U: 38.000; Z: -.228; Point P.: .020; Asymp. Sig. (2-tailed): .820; Exact Sig. (2-tailed): .845; Exact Sig. (1-tailed): .423
Sig. (paired)	Z: .000; Point P.: .375 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .688	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	data	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	insufficient data	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250
Remarks	4 (11.1%) of 36 pairs of scores differed by 1								

Appendix XXII.A.2.b. Dichotomised traits

	CN001 - Cranial length (*Norma verticalis*)	CN002a - Cranial shape (*Norma verticalis*) - main	CN002b - Cranial shape (*Norma verticalis*) - additional tendency	CN004 - Cranial height (*Norma occipitalis*)	CN005a - Cranial shape (*Norma occipitalis*) - main	CN005b - Cranial shape (*Norma occipitalis*) - additional tendency	CN006a - Occipital bunning - degree	CN006b - Occipital bunning - shape	CN007a - Sagittal keeling - degree	CN007b - Sagittal keeling - shape
Abu Tabari 02/1-2										
Abu Tabari 02/1-3							0	0		
Abu Tabari 02/1-5										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8										
Abu Tabari 02/28-2	0	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-3										
Abu Tabari 02/28-5	0			1					0	0
No.	2	1	1	2	1	1	2	2	2	2
No. of differences	0	0	0	1 (50.0%)	0	0	0	0	0	0
Sig. (independent)	no differences	no differences	no differences	Pearson's χ^2: 2.000; df: 1; not significant; Yates's χ^2: 0.500; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences

	CN016 - Interorbital breadth	CN017a - Shape of the *Sella nasi* - main	CN017b - Shape of the *Sella nasi* - additional tendency/superstructure	CN019 - Orientation of the *Processus frontales maxillae*	CN023a - *Margo infranasalis* - main	CN023b - *Margo infranasalis* - additional tendency/degree	CN024 - Alveolar prognathism	CN028 - Symphyseal height	CN031 - Ramus inversion	CN032 - Ramus angle
Abu Tabari 02/1-2					0	0	0	0	0	0
Abu Tabari 02/1-3		0	0	0	0	0	0	0		0
Abu Tabari 02/1-5										
Abu Tabari 02/1-7							1	0		
Abu Tabari 02/1-8								0		
Abu Tabari 02/28-2	0			0	0	0	0	0	0	0
Abu Tabari 02/28-3		0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-5	0	0	0	0	0	0	0	0	0	0
No.	2	3	3	4	5	5	6	7	4	5
No. of differences	0	0	0	0	0	0	1 (16.7%)	0	0	0
Sig. (independent)	no differences	no differences	no differences	no differences	no differences	no differences	Pearson's χ^2: 0.753; df: 1; not significant; Yates's χ^2: 0.189; df: 1; not significant	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	60	6	10	0	2	1	18	9	14
No. of differences	2 (3.3%)	0	0		1 (50.0%)	0	0	0	1 (7.1%)
Sig. (independent)	Pearson's χ^2: 0.000; df: 1; not significant; Yates's χ^2: 0.016; df: 1; not significant	no differences	no differences	no data	Pearson's χ^2: 0.500; df: 1; not significant; Yates's χ^2: 0.125; df: 1; not significant	no differences	no differences	no differences	Pearson's χ^2: 0.312; df: 1; not significant; Yates's χ^2: 0.078; df: 1; not significant
Sig. (paired)	McNemar's χ^2: 0.5; df: 1; not significant	no differences	no differences	no data	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant

Appendix XXII.A.3. Epigenetic traits

Appendix XXII.A.3.a. Cranial epigenetic traits

Appendix XXII.A.3.a.1. Non-dichotomised traits

	CE001 - *Ossa suturae coronalis*	CE003 - *Ossa suturae lambdoideae*	CE014 - *Os incae*	CE015 - *Os incisivum*/*Sutura incisiva*	CE021 - *Sutura metopica*	CE040b/41b - *Foramen zygomaticofaciale* (m) - number	CE054a/54b - **Foramina paranasalia* (m)	CE057b/58b - *Foramen mentale accessorium* (m) - number
Abu Tabari 02/1-2	0			0		0	0	0
Abu Tabari 02/1-3			0	0	0	0		0
Abu Tabari 02/1-5								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8								
Abu Tabari 02/28-2	0	0	0	0	0	0	0	0
Abu Tabari 02/28-3						0		
Abu Tabari 02/28-5	0	0			0	0	0	0
No.	3	2	2	3	3	5	3	4
Min.	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	0	0
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sig. (independent)	U: 4.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 4.500; Z: .000; Point P.: .600 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .800	U: 4.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 12.500; Z: .000; Point P.: .317 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .659	U: 4.500; Z: .000; Point P.: .600 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .800	U: 8.000; Z: .000; Point P.: .571 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .786
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	25	5	5	0	0	0	8	1	6
Min.	0	0	0				0	0	0
Max.	0	0	0				0	0	0
Mean	0.000	0.000	0.000				0.000	0.000	0.000
Sig. (independent)	U: 312.500; Z: .000; Point P.: .049 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .525	U: 12.500; Z: .000; Point P.: .556; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .778	U: 12.500; Z: .000; Point P.: .556; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .778	no data	no data	no data	U: 32.000; Z: .000; Point P.: .218; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .609	U: .500; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	U: 18.000; Z: .000; Point P.: .433; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .716
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	no data	no data	no data	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000
Remarks	0 (0.0%) of 25 pairs of scores differed								

Appendix XXII.A.3.a.2. Dichotomised traits

	CE001 - *Ossa suturae coronalis*	CE003 - *Ossa suturae lambdoideae*	CE014 - *Os incae*	CE015 - *Os incisivum*/*Sutura incisiva*	CE021 - *Sutura metopica*	CE040b/41b - *Foramen zygomaticofaciale* (m) - number	CE054a/54b - **Foramina paranasalia* (m)	CE057b/58b - *Foramen mentale accessorium* (m) - number
Abu Tabari 02/1-2	0			0		0	0	0
Abu Tabari 02/1-3			0	0	0	0		0
Abu Tabari 02/1-5								
Abu Tabari 02/1-7								
Abu Tabari 02/1-8								
Abu Tabari 02/28-2	0	0	0	0	0	0	0	0
Abu Tabari 02/28-3						0		
Abu Tabari 02/28-5	0	0			0	0	0	0
No.	3	2	2	3	3	5	3	4
No. of differences	0	0	0	0	0	0	0	0
Sig. (independent)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	25	5	5	0	0	0	8	1	6
No. of differences	0 (0.0%)	0	0				0	0	0
Sig. (independent)	no differences	no differences	no differences	no data	no data	no data	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	no data	no data	no data	no differences	no differences	no differences

Appendix XXII.C.3.b. Dental epigenetic traits

Appendix XXII.C.3.b.1. Continuous non-dichotomised traits

	DE005/6 - Shovel UI1 (m)	DE007/8 - Double shovel UI1 (m)	DE011/12 - *Tuberculum dentale* UI2 (m)	DE013/14 - Canine mesial ridge (“Bushman canine”) UC (m)	DE015/16 - Distal accessory ridge UC (m)	DE017/18 - Premol. mesial & distal access. cusps UP1 (m)	DE019/20 - Premol. mesial & distal access. cusps UP2 (m)	DE027/28 – Hypocone UM2 (m)	DE029/30 - Cusp 5 (metaconule) UM1 (m)	DE031/32 - Carabelli’s trait UM1 (m)
Abu Tabari 02/1-2								0.5		
Abu Tabari 02/1-3										
Abu Tabari 02/1-5										
Abu Tabari 02/1-7										
Abu Tabari 02/1-8	0	0	0	0	0	0	0	0.0	0	0
Abu Tabari 02/28-2	0	0	0			0		0.0	0	0
Abu Tabari 02/28-3	0	0	0					0.0		
Abu Tabari 02/28-5	0	0	0				0	0.0		0
No.	4	4	4	1	1	2	2	5	2	3
Min.	0	0	0	0	0	0	0	0.0	0	0
Max.	0	0	0	0	0	0	0	0.5	0	0
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000
Sig. (independent)	U: 8.000; Z: .000; Point P.: .343 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .671	U: 8.000; Z: .000; Point P.: .371 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .686	U: 8.000; Z: .000; Point P.: .371 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .686	U: .500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: .500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 2.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 2.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 11.000; Z: -.337; Point P.: .159 Asymp. Sig. (2-tailed): .736 Exact Sig. (2-tailed): .921 Exact Sig. (1-tailed): .460	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 4.500; Z: .000; Point P.: .400 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .700
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	insufficient data	insufficient data	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	DE033/34 - Parastyle UM2 (m)	DE035/36 - Parastyle UM3 (m)	DE039/40 - Premolar root number UP1 (m)	DE041/42 - Upper molar root number UM2 (m)	DE043/44 - Peg-shaped incisor UI2 (m)	DE045/46 - Peg-shaped molar UM3 (m)	DE047/48 - Congenital absence UM3 (m)	DE049/50 - Premol. lingual cusps LP2 (m)	DE055/56 - Cusp number LM1 (m)	DE057/58 - Cusp number LM2 (m)
Abu Tabari 02/1-2	0	0	0	0	0	0		0	0.0	
Abu Tabari 02/1-3		0	0		0	0	0		0.0	0.0
Abu Tabari 02/1-5								0	0.0	0.0
Abu Tabari 02/1-7			0		0					
Abu Tabari 02/1-8	0	0	0	0	0	0	0	0	0.0	0.0
Abu Tabari 02/28-2	0				0				0.0	0.0
Abu Tabari 02/28-3	0		0	0	0					0.0
Abu Tabari 02/28-5	0	0	0	0	0	0	0		0.0	0.0
No.	5	4	6	4	7	4	3	3	6	6
Min.	0	0	0	0	0	0	0	0	0.0	0.0
Max.	0	0	0	0	0	0	0	0	0.0	0.0
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sig. (independent)	U: 12.500; Z: .000; Point P.: .556 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .778	U: 8.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 18.000; Z: .000; Point P.: .545 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .773	U: 8.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 24.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 8.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 4.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 4.500; Z: .000; Point P.: .600 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .800	U: 18.000; Z: .000; Point P.: .545 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .773	U: 18.000; Z: .000; Point P.: .545 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .773
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	DE059/60 - Deflecting wrinkle LM1 (m)	DE063/64 - Protostylid LM1 (m)	DE065/66 - Cusp 7 LM1 (m)	DE069/70 - Canine root number LC (m)	DE071/72 - Lower molar root number LM1 (m)	DE073/74 - Lower molar root number LM2 (m)	DE077 - Midline diastema	DE078 - Palatine torus	DE079/80 - Mandibular torus (m)	DE081 - Rocker jaw
Abu Tabari 02/1-2		0	0.0	0	0	0	0	0	0	0
Abu Tabari 02/1-3		0		0	0	0	0	0	0	0
Abu Tabari 02/1-5			0.0	0						
Abu Tabari 02/1-7				0	0				0	
Abu Tabari 02/1-8		0	0.0	0	0	0	0		0	
Abu Tabari 02/28-2	0	0	0.0		0			0	0	0
Abu Tabari 02/28-3			0.0	0	0	0				0
Abu Tabari 02/28-5		0	0.0	0	0	0	0		0	0
No.	1	5	6	7	7	5	4	3	6	5
Min.	0	0	0.0	0	0	0	0	0	0	0
Max.	0	0	0.0	0	0	0	0	0	0	0
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sig. (independent)	U: .500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 12.500; Z: .000; Point P.: .556 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .778	U: 18.000; Z: .000; Point P.: .268 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .634	U: 24.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 24.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 12.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 8.000; Z: .000; Point P.: .571 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .786	U: 4.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 18.000; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	U: 12.500; Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000
Sig. (paired)	insufficient data	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	125	18	15	5	5	27	18	14	23
Min.	0	0	0	0	0	0	0	0	0
Max.	0.5	0.5	0	0	0	0	0	0	0
Mean	0.004	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sig. (independent)	U: 7.806E3; Z: -.013; Point P.: .000 Asymp. Sig. (2-tailed): .990 Exact Sig. (2-tailed): .990 Exact Sig. (1-tailed): .495	U: 178.500; Z: -.062; Point P.: .012; Asymp. Sig. (2-tailed): .951; Exact Sig. (2-tailed): .961; Exact Sig. (1-tailed): .481	U: 128.000; Z: .000; Point P.: .042; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .521	U: 12.500; Z: .000; Point P.: .190; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .595	U: 12.500; Z: .000; Point P.: .286; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .643	U: 392.000; Z: .000; Point P.: .009; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .504	U: 162.000; Z: .000; Point P.: .015; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .507	U: 98.000; Z: .000; Point P.: .023; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .511	U: 288.000; Z: .000; Point P.: .009; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .505
Sig. (paired)	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000
Remarks	1 (0.8%) of 125 pairs of scores differed by 0.5								

Appendix XXII.C.3.b.2. Discontinuous traits

	DE001/2 - Winging UI1 (m)	DE009/10 - Interruption groove UI2 (m)	DE053/54 - Groove pattern LM2 (m)
Abu Tabari 02/1-2	0	0	
Abu Tabari 02/1-3	0		0
Abu Tabari 02/1-5			0
Abu Tabari 02/1-7			
Abu Tabari 02/1-8	0	0	0
Abu Tabari 02/28-2		1 (2 not 0)	0
Abu Tabari 02/28-3		0	0
Abu Tabari 02/28-5	0	0	0
No.	4	5	6
No. of differences	0	1 (20.0%)	0
Sig. (independent)	no differences	Pearson's χ^2: 1.500; df: 3; not significant; Yates's χ^2: 0.875; df: 3; not significant	no differences
Sig. (paired)	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences

Appendix XXII.C.3.b.3. Dichotomised traits

	DE001/2 - Winging UI1 (m)	DE005/6 - Shovel UI1 (m)	DE007/8 - Double shovel UI1 (m)	DE009/10 - Interruption groove UI2 (m)	DE011/12 - *Tuberculum dentale* UI2 (m)	DE013/14 - Canine mesial ridge ("Bushman canine") UC (m)	DE015/16 - Distal accessory ridge UC (m)	DE017/18 - Premol. mesial & distal access. cusps UP1 (m)	DE019/20 - Premol. mesial & distal access. cusps UP2 (m)	DE027/28 – Hypocone UM2 (m)	DE029/30 - Cusp 5 (metaconule) UM1 (m)
Abu Tabari 02/1-2	0			0						0	
Abu Tabari 02/1-3	0										
Abu Tabari 02/1-5											
Abu Tabari 02/1-7											
Abu Tabari 02/1-8	0	0	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-2		0	0	1	0			0		0	0
Abu Tabari 02/28-3		0	0	0	0					0	
Abu Tabari 02/28-5	0	0	0	0	0				0	0	
No.	4	4	4	5	4	1	1	2	2	5	2
No. of differences	0	0	0	1 (20.0%)	0	0	0	0	0	0	0
Sig. (independent)	no differences	no differences	no differences	Pearson's χ^2: 1.250; df: 1; not significant; Yates's χ^2: 0.313; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences	no differences

	DE031/32 - Carabelli's trait UM1 (m)	DE033/34 - Parastyle UM2 (m)	DE035/36 - Parastyle UM3 (m)	DE039/40 - Premolar root number UP1 (m)	DE041/42 - Upper molar root number UM2 (m)	DE043/44 - Peg-shaped incisor UI2 (m)	DE045/46 - Peg-shaped molar UM3 (m)	DE047/48 - Congenital absence UM3 (m)	DE049/50 - Premol. lingual cusps LP2 (m)	DE053/54 - Groove pattern LM2 (m)	DE055/56 - Cusp number LM1 (m)
Abu Tabari 02/1-2		0	0	0	0	0	0		0		0
Abu Tabari 02/1-3			0	0		0	0	0		0	0
Abu Tabari 02/1-5									0	0	0
Abu Tabari 02/1-7				0		0					
Abu Tabari 02/1-8	0	0	0	0	0	0	0	0	0	0	0
Abu Tabari 02/28-2	0	0				0				0	0
Abu Tabari 02/28-3		0		0	0	0				0	
Abu Tabari 02/28-5	0	0	0	0	0	0	0	0		0	0
No.	3	5	4	6	4	7	4	3	3	6	6
No. of differences	0	0	0	0	0	0	0	0	0	0	0
Sig. (independent)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences

	DE057/58 - Cusp number LM2 (m)	DE059/60 - Deflecting wrinkle LM1 (m)	DE063/64 - Protostylid LM1 (m)	DE065/66 - Cusp 7 LM1 (m)	DE069/70 - Canine root number LC (m)	DE071/72 - Lower molar root number LM1 (m)	DE073/74 - Lower molar root number LM2 (m)	DE077 - Midline diastema	DE078 - Palatine torus	DE079/80 - Mandibular torus (m)	DE081 - Rocker jaw
Abu Tabari 02/1-2			0	0	0	0	0	0	0	0	0
Abu Tabari 02/1-3	0		0		0	0	0	0	0	0	0
Abu Tabari 02/1-5	0			0	0						
Abu Tabari 02/1-7					0	0				0	
Abu Tabari 02/1-8	0		0	0	0	0	0	0		0	
Abu Tabari 02/28-2	0	0	0	0		0			0	0	0
Abu Tabari 02/28-3	0			0	0	0	0				0
Abu Tabari 02/28-5	0		0	0	0	0	0	0		0	0
No.	6	1	5	6	7	7	5	4	3	6	5
No. of differences	0	0	0	0	0	0	0	0	0	0	0
Sig. (independent)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences
Sig. (paired)	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences	no differences

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	140	20	17	6	5	30	20	16	26
No. of differences	1 (0.7%)	0	0	0	0	0	1 (5.0%)	0	0
Sig. (independent)	Pearson's χ^2: 0.029; df: 1; not significant; Yates's χ^2: 0.014; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	Pearson's χ^2: 0.202; df: 1; not significant; Yates's χ^2: 0.073; df: 1; not significant	no differences	no differences
Sig. (paired)	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences

Appendix XXII.A.4. Robusticity traits

Appendix XXII.A.4.a. Continuous traits

	CR001 - Relief of the *Planum nuchale*	CR003 - *Processus mastoideus*	CR006 - *Arcus superciliaris*	CR010 - *Trigonum mandibulae/Mentum osseum*	CR011 - Corpus thickness	CR012 - *Angulus mandibulae* (gonial eversion)	PR007/8 - Ulnar shaft bowing (m)	PR009/10 - Ulnar *Margo interosseus* size (m)	PR011b/12b - Femoral shaft bowing (m) - degree	PR013/14 - Pilasterism (m)
Abu Tabari 02/1-2		0.0		0.0	0.0	0.0	0.0	0.5	0.0	0.5
Abu Tabari 02/1-3	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Abu Tabari 02/1-5							0.0	0.0	0.0	0.0
Abu Tabari 02/1-7				0.0					0.0	0.0
Abu Tabari 02/1-8									0.0	0.0
Abu Tabari 02/28-2	0.0	1.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Abu Tabari 02/28-3				0.0	1.0	0.0	0.0		0.0	0.0
Abu Tabari 02/28-5		1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.5
No.	2	4	2	6	5	5	6	5	8	8
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.5	0.0	0.5
Mean	0.500	0.500	0.000	0.000	0.400	0.000	0.167	0.200	0.000	0.125
Sig. (independent)	U: 1.500; Z: -.408; Point P.: .333 Asymp. Sig. (2-tailed): .683 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 6.000; Z: -.661; Point P.: .143 Asymp. Sig. (2-tailed): .508 Exact Sig. (2-tailed): .714 Exact Sig. (1-tailed): .357	U: 2.000; Z: .000; Point P.: .667 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .833	U: 18.000; Z: .000; Point P.: .190 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .595	U: 10.500; Z: -.430; Point P.: .071 Asymp. Sig. (2-tailed): .667 Exact Sig. (2-tailed): .810 Exact Sig. (1-tailed): .405	U: 12.500; Z: .000; Point P.: .286 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .643	U: 17.500; Z: -.081; Point P.: .043 Asymp. Sig. (2-tailed): .936 Exact Sig. (2-tailed): .957 Exact Sig. (1-tailed): .478	U: 11.000; Z: -.319; Point P.: .087 Asymp. Sig. (2-tailed): .750 Exact Sig. (2-tailed): .857 Exact Sig. (1-tailed): .429	U: 32.000; Z: .000; Point P.: .194 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .597	U: 30.500; Z: -.160; Point P.: .037 Asymp. Sig. (2-tailed): .873 Exact Sig. (2-tailed): .907 Exact Sig. (1-tailed): .453
Sig. (paired)	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250

	All robusticity score pairs	All cranial robusticity score pairs	All postcranial robusticity score pairs
No.	51	24	27
Min.	0.0	0	0.0
Max.	1.0	1	1.0
Mean	0.157	0.208	0.111
Sig. (independent)	U: 1.296E3; Z: -.027; Point P.: .001 Asymp. Sig. (2-tailed): .978 Exact Sig. (2-tailed): .980 Exact Sig. (1-tailed): .490	U: 282.500; Z: -.115; Point P.: .005 Asymp. Sig. (2-tailed): .908 Exact Sig. (2-tailed): .914 Exact Sig. (1-tailed): .457	U: 353.500; Z: -.192; Point P.: .003 Asymp. Sig. (2-tailed): .848 Exact Sig. (2-tailed): .853 Exact Sig. (1-tailed): .426
Sig. (paired)	Z: -.525; Point P.: .078 Asymp. Sig. (2-tailed): .599 Exact Sig. (2-tailed): .697 Exact Sig. (1-tailed): .349	Z: -.447; Point P.: .313 Asymp. Sig. (2-tailed): .655 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -2.121; Point P.: .031 Asymp. Sig. (2-tailed): .034 Exact Sig. (2-tailed): .063 Exact Sig. (1-tailed): .031
Remarks	4 (7.8%) of 51 pairs of scores differed by 0.5; 6 (11.8%) of 51 pairs of scores differed by 1; 10 (19.6%) of 51 pairs of scores differed	5 (20.8%) of 24 pairs of scores differed by 1	4 (14.8%) of 27 pairs of scores differed by 0.5; 1 (3.7%) of 27 pairs of scores differed by 1; 5 (18.5%) of 27 pairs of scores differed

	Abu Tabari 02/1-2 (all score pairs)	Abu Tabari 02/1-3 (all score pairs)	Abu Tabari 02/1-5 (all score pairs)	Abu Tabari 02/1-7 (all score pairs)	Abu Tabari 02/1-8 (all score pairs)	Abu Tabari 02/28-2 (all score pairs)	Abu Tabari 02/28-3 (all score pairs)	Abu Tabari 02/28-5 (all score pairs)
No.	8	10	4	3	2	9	6	9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	0.5	1.0	0.0	0.0	0.0	1.0	1.0	1.0
Mean	0.125	0.200	0.000	0.000	0.000	0.111	0.167	0.333
Sig. (independent)	U: 31.000; Z: -.109; Point P.: .034; Asymp. Sig. (2-tailed): .913; Exact Sig. (2-tailed): .951; Exact Sig. (1-tailed): .476	U: 48.500; Z: -.115; Point P.: .033; Asymp. Sig. (2-tailed): .908; Exact Sig. (2-tailed): .943; Exact Sig. (1-tailed): .472	U: 8.000; Z: .000; Point P.: .343; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .671	U: 4.500; Z: .000; Point P.: .400; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .700	U: 2.000; Z: .000; Point P.: .667; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .833	U: 39.500; Z: -.090; Point P.: .030; Asymp. Sig. (2-tailed): .928; Exact Sig. (2-tailed): .978; Exact Sig. (1-tailed): .489	U: 17.000; Z: -.165; Point P.: .097; Asymp. Sig. (2-tailed): .869; Exact Sig. (2-tailed): .974; Exact Sig. (1-tailed): .487	U: 39.500; Z: -.090; Point P.: .012; Asymp. Sig. (2-tailed): .929; Exact Sig. (2-tailed): .941; Exact Sig. (1-tailed): .470
Sig. (paired)	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: .000; Point P.: .500; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .750	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -.557; Point P.: .125; Asymp. Sig. (2-tailed): .577; Exact Sig. (2-tailed): .750; Exact Sig. (1-tailed): .375

	Abu Tabari 02/1-2 (cranial score pairs)	Abu Tabari 02/1-3 (cranial score pairs)	Abu Tabari 02/1-5 (cranial score pairs)	Abu Tabari 02/1-7 (cranial score pairs)	Abu Tabari 02/1-8 (cranial score pairs)	Abu Tabari 02/28-2 (cranial score pairs)	Abu Tabari 02/28-3 (cranial score pairs)	Abu Tabari 02/28-5 (cranial score pairs)
No.	4	6	0	1	0	5	3	5
Min.	0	0		0		0	0	0
Max.	0	1		0		1	1	1
Mean	0.000	0.167		0.000		0.200	0.333	0.400
Sig. (independent)	U: 8.000; Z: .000; Point P.: .514; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .757	U: 17.000; Z: -.165; Point P.: .097; Asymp. Sig. (2-tailed): .869; Exact Sig. (2-tailed): .974; Exact Sig. (1-tailed): .487	no data	U: .500; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	no data	U: 12.000; Z: -.108; Point P.: .095; Asymp. Sig. (2-tailed): .914; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	U: 4.000; Z: -.225; Point P.: .200; Asymp. Sig. (2-tailed): .822; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	U: 11.500; Z: -.215; Point P.: .095; Asymp. Sig. (2-tailed): .830; Exact Sig. (2-tailed): .976; Exact Sig. (1-tailed): .488
Sig. (paired)	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	no data	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	no data	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: .000; Point P.: .500; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .750

	Abu Tabari 02/1-2 (postcranial score pairs)	Abu Tabari 02/1-3 (postcranial score pairs)	Abu Tabari 02/1-5 (postcranial score pairs)	Abu Tabari 02/1-7 (postcranial score pairs)	Abu Tabari 02/1-8 (postcranial score pairs)	Abu Tabari 02/28-2 (postcranial score pairs)	Abu Tabari 02/28-3 (postcranial score pairs)	Abu Tabari 02/28-5 (postcranial score pairs)
No.	4	4	4	2	2	4	3	4
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.5
Mean	0.250	0.250	0.000	0.000	0.000	0.000	0.000	0.250
Sig. (independent)	U: 7.000; Z: -.292; Point P.: .057; Asymp. Sig. (2-tailed): .770; Exact Sig. (2-tailed): .857; Exact Sig. (1-tailed): .429	U: 7.000; Z: -.300; Point P.: .214; Asymp. Sig. (2-tailed): .765; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	U: 8.000; Z: .000; Point P.: .343; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .671	U: 2.000; Z: .000; Point P.: .667; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .833	U: 2.000; Z: .000; Point P.: .667; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .833	U: 8.000; Z: .000; Point P.: .257; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .629	U: 4.500; Z: .000; Point P.: .400; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .700	U: 7.000; Z: -.292; Point P.: .071; Asymp. Sig. (2-tailed): .770; Exact Sig. (2-tailed): .857; Exact Sig. (1-tailed): .429
Sig. (paired)	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250

Appendix XXII.A.4.b. Discontinuous traits

	PR011a/12a - Femoral shaft bowing (m) - shape
Abu Tabari 02/1-2	0
Abu Tabari 02/1-3	0
Abu Tabari 02/1-5	0
Abu Tabari 02/1-7	0
Abu Tabari 02/1-8	0
Abu Tabari 02/28-2	0
Abu Tabari 02/28-3	0
Abu Tabari 02/28-5	0
No.	8
No. of differences	0
Sig. (independent)	no differences
Sig. (paired)	no differences

Appendix XXII.A.5. Musculoskeletal stress traits

	CS004/5 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (m)	PS001/2 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (m)	PS003/4 - *Humerus*; *Musculus deltoideus* (*Insertio*) (m)	PS007/8 - *Ulna; Musculus brachialis* (*Insertio*) (m)	PS011/12 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (m)	PS015/16 - *Tibia*; *Musculus soleus* (*Origo*) (m)
Abu Tabari 02/1-2	0.0	0.0	0.0	0.5	0.0	0.0
Abu Tabari 02/1-3	0.0	0.5	0.0	0.0	0.0	0.0
Abu Tabari 02/1-5		0.0	0.0	0.5	0.5	
Abu Tabari 02/1-7					0.0	
Abu Tabari 02/1-8					0.0	
Abu Tabari 02/28-2	1.0	0.0	0.5	0.0	0.0	0.0
Abu Tabari 02/28-3			1.0	1.0		0.0
Abu Tabari 02/28-5	0.5	0.5	0.0	0.0	0.0	1.0
No.	4	5	6	6	7	5
Min.	0.0	0.0	0.0	0.0	0.0	0.0
Max.	1.0	0.5	1.0	1.0	0.5	1.0
Mean	0.375	0.200	0.250	0.333	0.071	0.200
Sig. (independent)	U: 7.000; Z: -.308; Point P.: .086 Asymp. Sig. (2-tailed): .758 Exact Sig. (2-tailed): .800 Exact Sig. (1-tailed): .400	U: 10.500; Z: -.427; Point P.: .103 Asymp. Sig. (2-tailed): .669 Exact Sig. (2-tailed): .802 Exact Sig. (1-tailed): .401	U: 13.500; Z: -.742; Point P.: .065 Asymp. Sig. (2-tailed): .458 Exact Sig. (2-tailed): .537 Exact Sig. (1-tailed): .268	U: 17.000; Z: -.165; Point P.: .045 Asymp. Sig. (2-tailed): .869 Exact Sig. (2-tailed): .920 Exact Sig. (1-tailed): .460	U: 23.000; Z: -.196; Point P.: .063 Asymp. Sig. (2-tailed): .845 Exact Sig. (2-tailed): .913 Exact Sig. (1-tailed): .456	U: 11.500; Z: -.213; Point P.: .119 Asymp. Sig. (2-tailed): .831 Exact Sig. (2-tailed): .960 Exact Sig. (1-tailed): .480
Sig. (paired)	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.342; Point P.: .250 Asymp. Sig. (2-tailed): .180 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: .000; Point P.: .250 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .625	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	33	6	6	4	1	1	6	3	6
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	1.0	0.5	0.5	0.5	0.0	0.0	1.0	1.0	1.0
Mean	0.227	0.1	0.1	0.3	0.0	0.0	0.3	0.7	0.3
Sig. (independent)	U: 538.500; Z: -.077; Point P.: .003 Asymp. Sig. (2-tailed): .938 Exact Sig. (2-tailed): .941 Exact Sig. (1-tailed): .471	U: 17.000; Z: -.167; Point P.: .117; Asymp. Sig. (2-tailed): .867; Exact Sig. (2-tailed): .965; Exact Sig. (1-tailed): .483	U: 17.000; Z: -.162; Point P.: .078; Asymp. Sig. (2-tailed): .871; Exact Sig. (2-tailed): .957; Exact Sig. (1-tailed): .478	U: 7.000; Z: -.292; Point P.: .057; Asymp. Sig. (2-tailed): .770; Exact Sig. (2-tailed): .857; Exact Sig. (1-tailed): .429	U: .500; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	U: .500; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	U: 17.500; Z: -.083; Point P.: .082; Asymp. Sig. (2-tailed): .934; Exact Sig. (2-tailed): .965; Exact Sig. (1-tailed): .483	U: 2.500; Z: -.913; Point P.: .200; Asymp. Sig. (2-tailed): .361; Exact Sig. (2-tailed): .600; Exact Sig. (1-tailed): .300	U: 18.000; Z: .000; Point P.: .043; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .522
Sig. (paired)	Z: -.046; Point P.: .014 Asymp. Sig. (2-tailed): .963 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	insufficient data	insufficient data	Z: -.447; Point P.: .250; Asymp. Sig. (2-tailed): .655; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: .000; Point P.: .250; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .625
Remarks	7 (21.2%) of 33 pairs of scores differed by 0.5; 4 (12.1%) of 33 pairs of scores differed by 1; 11 (33.3%) of 33 pairs of scores differed								

Appendix XXII.A.6. Enamel hypoplasia

Appendix XXII.A.6.a. Intensity

	DS001a/2a - Hypoplasia UI1 (m) - intensity	DS003a/4a - Hypoplasia UI2 (m) - intensity	DS005a/6a - Hypoplasia UC (m) - intensity	DS007a/8a - Hypoplasia UP1 (m) - intensity	DS009a/10a - Hypoplasia UP2 (m) - intensity	DS011a/12a - Hypoplasia UM1 (m) - intensity	DS013a/14a - Hypoplasia UM2 (m) - intensity	DS015a/16a - Hypoplasia UM3 (m) - intensity
Abu Tabari 02/1-2	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Abu Tabari 02/1-3	0.0	0.0	0.0	0.0	0.0			1.0
Abu Tabari 02/1-5	0.0							
Abu Tabari 02/1-7				0.0	0.0			
Abu Tabari 02/1-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Abu Tabari 02/28-2	0.0	1.0	0.0			0.0	0.0	
Abu Tabari 02/28-3	0.0	0.0	0.0	0.5	0.0	0.0	0.0	
Abu Tabari 02/28-5	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.5
No.	7	6	6	6	6	4	5	4
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	0.0	1.0	0.0	0.5	1.5	0.0	0.0	1.0
Mean	0.000	0.167	0.000	0.083	0.250	0.000	0.000	0.500
Sig. (independent)	U: 24.500; Z: .000; Point P.: .157 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .579	U: 16.500; Z: -.250; Point P.: .087 Asymp. Sig. (2-tailed): .802 Exact Sig. (2-tailed): .892 Exact Sig. (1-tailed): .446	U: 18.000; Z: .000; Point P.: .117 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .558	U: 17.500; Z: -.086; Point P.: .087 Asymp. Sig. (2-tailed): .932 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 15.500; Z: -.417; Point P.: .108 Asymp. Sig. (2-tailed): .676 Exact Sig. (2-tailed): .805 Exact Sig. (1-tailed): .403	U: 8.000; Z: .000; Point P.: .571 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .786	U: 12.500; Z: .000; Point P.: .175 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .587	U: 7.500; Z: -.146; Point P.: .086 Asymp. Sig. (2-tailed): .884 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500
Sig. (paired)	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: -.816; Point P.: .250 Asymp. Sig. (2-tailed): .414 Exact Sig. (2-tailed): .750 Exact Sig. (1-tailed): .375

	DS017a/18a - Hypoplasia LI1 (m) - intensity	DS019a/20a - Hypoplasia LI2 (m) - intensity	DS021a/22a - Hypoplasia LC (m) - intensity	DS023a/24a - Hypoplasia LP1 (m) - intensity	DS025a/26a - Hypoplasia LP2 (m) - intensity	DS027a/28a - Hypoplasia LM1 (m) - intensity	DS029a/30a - Hypoplasia LM2 (m) - intensity	DS031a/32a - Hypoplasia LM3 (m) - intensity
Abu Tabari 02/1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Abu Tabari 02/1-3	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Abu Tabari 02/1-5			0.0		0.0		0.0	
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Abu Tabari 02/28-2	0.0	0.0	0.0			0.0	1.0	
Abu Tabari 02/28-3	0.5	0.5	0.0	0.0	0.5	0.0	0.0	0.0
Abu Tabari 02/28-5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
No.	6	6	7	5	6	6	7	5
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	0.5	0.5	0.0	0.0	0.5	0.5	1.0	1.0
Mean	0.167	0.083	0.000	0.000	0.167	0.083	0.143	0.200
Sig. (independent)	U: 13.000; Z: -.957; Point P.: .121 Asymp. Sig. (2-tailed): .338 Exact Sig. (2-tailed): .545 Exact Sig. (1-tailed): .273	U: 17.500; Z: -.083; Point P.: .082 Asymp. Sig. (2-tailed): .934 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 24.500; Z: .000; Point P.: .101 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .551	U: 12.500; Z: .000; Point P.: .190 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .595	U: 17.000; Z: -.167; Point P.: .065 Asymp. Sig. (2-tailed): .867 Exact Sig. (2-tailed): .935 Exact Sig. (1-tailed): .468	U: 17.500; Z: -.086; Point P.: .087 Asymp. Sig. (2-tailed): .932 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	U: 23.500; Z: -.130; Point P.: .073 Asymp. Sig. (2-tailed): .896 Exact Sig. (2-tailed): .983 Exact Sig. (1-tailed): .491	U: 11.000; Z: -.337; Point P.: .159 Asymp. Sig. (2-tailed): .736 Exact Sig. (2-tailed): .921 Exact Sig. (1-tailed): .460
Sig. (paired)	Z: -1.414; Point P.: .250 Asymp. Sig. (2-tailed): .157 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: .500 Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .750	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500	Z: -1.000; Point P.: .500 Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .500

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	92	15	14	4	2	16	10	15	16
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	1.5	1.0	1.0	0.0	0.0	0.5	1.0	0.5	1.5
Mean	0.109	0.067	0.107	0.000	0.000	0.063	0.200	0.133	0.156
Sig. (independent)	U: 4.130E3; Z: -.288; Point P.: .001 Asymp. Sig. (2-tailed): .773 Exact Sig. (2-tailed): .774 Exact Sig. (1-tailed): .387	U: 105.000; Z: -.337; Point P.: .044; Asymp. Sig. (2-tailed): .736; Exact Sig. (2-tailed): .801; Exact Sig. (1-tailed): .401	U: 96.000; Z: -.102; Point P.: .024; Asymp. Sig. (2-tailed): .919; Exact Sig. (2-tailed): .941; Exact Sig. (1-tailed): .470	U: 8.000; Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	U: 2.000; Z: .000; Point P.: .667; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .833	U: 123.500; Z: -.171; Point P.: .008; Asymp. Sig. (2-tailed): .864; Exact Sig. (2-tailed): .874; Exact Sig. (1-tailed): .437	U: 43.000; Z: -.564; Point P.: .082; Asymp. Sig. (2-tailed): .573; Exact Sig. (2-tailed): .663; Exact Sig. (1-tailed): .331	U: 112.500; Z: .000; Point P.: .008; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .504	U: 124.500; Z: -.134; Point P.: .008; Asymp. Sig. (2-tailed): .894; Exact Sig. (2-tailed): .904; Exact Sig. (1-tailed): .452
Sig. (paired)	Z: -1.363; Point P.: .031 Asymp. Sig. (2-tailed): .173 Exact Sig. (2-tailed): .210 Exact Sig. (1-tailed): .105	Z: -1.000; Point P.: .500; Asymp. Sig. (2-tailed): .317; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .500	Z: -1.342; Point P.: .250; Asymp. Sig. (2-tailed): .180; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: .000; Point P.: 1.000; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): 1.000	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: -1.414; Point P.: .250; Asymp. Sig. (2-tailed): .157; Exact Sig. (2-tailed): .500; Exact Sig. (1-tailed): .250	Z: .000; Point P.: .375; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .688	Z: .000; Point P.: .250; Asymp. Sig. (2-tailed): 1.000; Exact Sig. (2-tailed): 1.000; Exact Sig. (1-tailed): .625
Remarks	9 (9.8%) of 92 pairs of scores differ by 0.5; 4 (4.3%) of 92 pairs of scores differ by 1; 1 (1.1%) of 92 pairs of scores differs by 1.5; 14 (15.2%) of 92 pairs of scores differ								

Appendix XXII.A.6.b. Presence

	DS001a/2a - Hypoplasia UI1 (m) - presence	DS003a/4a - Hypoplasia UI2 (m) - presence	DS005a/6a - Hypoplasia UC (m) - presence	DS007a/8a - Hypoplasia UP1 (m) - presence	DS009a/10a - Hypoplasia UP2 (m) - presence	DS011a/12a - Hypoplasia UM1 (m) - presence	DS013a/14a - Hypoplasia UM2 (m) - presence	DS015a/16a - Hypoplasia UM3 (m) - presence
Abu Tabari 02/1-2	0	0	0	0	0		0	0
Abu Tabari 02/1-3	0	0	0	0	0			0
Abu Tabari 02/1-5	0							0
Abu Tabari 02/1-7				0	0			
Abu Tabari 02/1-8	0	0	0	0	0	0	0	0
Abu Tabari 02/28-2	0	1	0			0	0	
Abu Tabari 02/28-3	0	0	0	0	0	0	0	
Abu Tabari 02/28-5	0	0	0	0	1	0	0	0
No.	7	6	6	6	6	4	5	4
No. of differences	0	1 (16.7%)	0	0	1 (16.7%)	0	0	0
Sig. (independent)	no differences	Pearson's χ^2: 0.753; df: 1;not significant; Yates's χ^2: 0.189; df: 1; not significant	no differences	no differences	Pearson's χ^2: 0.753; df: 1; not significant; Yates's χ^2: 0.189; df: 1; not significant	no differences	no differences	no differences
Sig. (paired)	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences

	DS017a/18a - Hypoplasia LI1 (m) - presence	DS019a/20a - Hypoplasia LI2 (m) - presence	DS021a/22a - Hypoplasia LC (m) - presence	DS023a/24a - Hypoplasia LP1 (m) - presence	DS025a/26a - Hypoplasia LP2 (m) - presence	DS027a/28a - Hypoplasia LM1 (m) - presence	DS029a/30a - Hypoplasia LM2 (m) - presence	DS031a/32a - Hypoplasia LM3 (m) - presence
Abu Tabari 02/1-2	0	0	0	0	0	0	0	1
Abu Tabari 02/1-3	0	0	0	0	0	0	0	0
Abu Tabari 02/1-5			0		0		0	
Abu Tabari 02/1-7								
Abu Tabari 02/1-8	1	0	0	0	0	0	0	0
Abu Tabari 02/28-2	0	0	0			0	0	
Abu Tabari 02/28-3	0	0	0	0	0	0	0	0
Abu Tabari 02/28-5	0	0	0	0	0	0	0	0
No.	6	6	7	5	6	6	7	5
No. of differences	1 (16.7%)	0	0	0	0	0	0	1 (20.0%)
Sig. (independent)	Pearson's χ^2: 2.667; df: 1; not significant; Yates's χ^2: 1.500; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences	Pearson's χ^2: 0.833; df: 1; not significant; Yates's χ^2: 0.208; df: 1; not significant
Sig. (paired)	McNemar's χ^2: 0.5; df: 1; not significant	no differences	no differences	no differences	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant

	All score pairs	Abu Tabari 02/1-2	Abu Tabari 02/1-3	Abu Tabari 02/1-5	Abu Tabari 02/1-7	Abu Tabari 02/1-8	Abu Tabari 02/28-2	Abu Tabari 02/28-3	Abu Tabari 02/28-5
No.	92	15	14	4	2	16	10	15	16
No. of differences	4 (4.3%)	1 (6.7%)	0	0	0	1 (6.3%)	1 (10.0%)	0	1 (6.3%)
Sig. (independent)	Pearson's χ^2: 0.437; df: 1; not significant; Yates's χ^2: 0.242; df: 1; not significant	Pearson's χ^2: 0.303; df: 1; not significant; Yates's χ^2: 0.077; df: 1; not significant	no differences	no differences	no differences	Pearson's χ^2: 0.405; df: 1; not significant; Yates's χ^2: 0.100; df: 1; not significant	Pearson's χ^2: 0.417; df: 1; not significant; Yates's χ^2: 0.104; df: 1; not significant	no differences	Pearson's χ^2: 0.063; df: 1; not significant; Yates's χ^2: 0.016; df: 1; not significant
Sig. (paired)	McNemar's χ^2: 1; df: 1; not significant	McNemar's χ^2: 0; df: 1; not significant	no differences	no differences	no differences	McNemar's χ^2: 0; df: 1; not significant	McNemar's χ^2: 0; df: 1; not significant	no differences	McNemar's χ^2: 0; df: 1; not significant

Appendix XXII.B. χ^2 tests

Appendix XXII.B.1. Dichotomised cranial morphological traits

CN004 - Cranial height (*Norma occipitalis*)

expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((0.000 - 1.000)^2 / 1.000) + ((2 - 1.000)^2 / 1.000) = 1.000 + 1.000 = 2.000$

not significant (Cranial height score frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|0.000 - 1.000| - 0.5)^2 / 1.000) + ((|2.000 - 1.000| - 0.5)^2 / 1.000) = 0.250 + 0.250 = 0.500$

not significant (Cranial height score frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|1 - 0| - 1)^2 / (1 + 0)) = 0 / 1 = 0$

not significant (Cranial height score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	1	0.500
(1)	1	0.500
All	2	1.000

expected (0) frequency for the original scores based on the control scores:	0.000	(2 · 0.000 = 0.000)
expected (1) frequency for the original scores based on the control scores:	2.000	(2 · 1.000 = 2.000)

control scores:

	f	p
(0)	0	0.000
(1)	2	1.000
All	2	1.000

expected (0) frequency for the control scores based on the original scores:	1.000	(2 · 0.500 = 1.000)
expected (1) frequency for the control scores based on the original scores:	1.000	(2 · 0.500 = 1.000)

CN024 - Alveolar prognathism

expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((3 - 1.998)^2 / 1.998) + ((3 - 4.002)^2 / 4.002) = 0.503 + 0.251 = 0.753$

not significant (Alveolar prognathism score frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|3 - 1.998| - 0.5)^2 / 1.998) + ((|3 - 4.002| - 0.5)^2 / 4.002) = 0.126 + 0.063 = 0.189$

not significant (Alveolar prognathism score frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|0 - 1| - 1)^2 / (0 + 1)) = 0 / 1 = 0$

not significant (Alveolar prognathism score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	2	0.333
(1)	4	0.667
All	6	1.000

expected (0) frequency for the original scores based on the control scores:	3.000	(6 · 0.500 = 3.000)
expected (1) frequency for the original scores based on the control scores:	3.000	(6 · 0.500 = 3.000)

control scores:

	f	p
(0)	3	0.500
(1)	3	0.500
All	6	1.000

expected (0) frequency for the control scores based on the original scores:	1.998	(6 · 0.333 = 1.998)
expected (1) frequency for the control scores based on the original scores:	4.002	(6 · 0.667 = 4.002)

All cranial morphological score pairs

expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((35 - 34.980)^2 / 34.980) + ((25 - 25.020)^2 / 25.020) = 0.000 + 0.000 = 0.000$

not significant (Cranial morphological score frequencies do not differ significantly)
- Yates's: $\chi^2 = ((|35 - 34.980| - 0.5)^2 / 34.980) + ((|25 - 25.020| - 0.5)^2 / 25.020) = 0.007 + 0.009 = 0.016$

not significant (Cranial morphological score frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|1 - 1| - 1)^2 / (1 + 1)) = 1 / 2 = 0.5$

not significant (Cranial morphological score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	35	0.583
(1)	25	0.417
All	60	1.000

expected (0) frequency for the original scores based on the control scores:	34.980	(60 · 0.583 = 34.980)
expected (1) frequency for the original scores based on the control scores:	25.020	(60 · 0.417 = 25.020)

control scores:

	f	p
(0)	35	0.583
(1)	25	0.417
All	60	1.000

expected (0) frequency for the control scores based on the original scores:	34.980	(60 · 0.583 = 34.980)
expected (1) frequency for the control scores based on the original scores:	25.020	(60 · 0.417 = 25.020)

Abu Tabari 02/1-7
expected frequencies based on the original scores:
- Pearson's: χ^2 = ((1 – 0.000)^2 / 0.000) + ((1 – 2.000)^2 / 2.000) = 0.000 + 0.500 = 0.500
not significant (Abu Tabari 02/1-7's cranial non-metric frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: χ^2 = ((|1 – 0.000| – 0.5)^2 / 0.000) + ((|1 – 2.000| – 0.5)^2 / 2.000) = 0.000 + 0.125 = 0.125
not significant (Abu Tabari 02/1-7's cranial morphological score frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0
not significant (Abu Tabari 02/1-7's cranial morphological score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	0	0.000
(1)	2	1.000
All	2	1.000

expected (0) frequency for the original scores based on the control scores: 1.000 (2 · 0.500 = 1.000)
expected (1) frequency for the original scores based on the control scores: 1.000 (2 · 0.500 = 1.000)
control scores:

	f	p
(0)	1	0.500
(1)	1	0.500
All	2	1.000

expected (0) frequency for the control scores based on the original scores: 0.000 (2 · 0.000 = 0.000)
expected (1) frequency for the control scores based on the original scores: 2.000 (2 · 1.000 = 2.000)

Abu Tabari 02/28-5
expected frequencies based on the original scores:
- Pearson's: χ^2 = ((8 – 9.002)^2 / 9.002) + ((6 – 4.998)^2 / 4.998) = 0.112 + 0.201 = 0.312
not significant (Abu Tabari 02/28-5's cranial morphological score frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|8 – 9.002| – 0.5)^2 / 9.002) + ((|6 – 4.998| – 0.5)^2 / 4.998) = 0.028 + 0.050 = 0.078
not significant (Abu Tabari 02/28-5's cranial morphological score frequencies do not differ significantly)
- McNemar's: χ^2 = ((|1 – 0| – 1)^2 / (1 + 0)) = 0 / 1 = 0
not significant (Abu Tabari 02/28-5's cranial morphological score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	9	0.643
(1)	5	0.357
All	14	1.000

expected (0) frequency for the original scores based on the control scores: 7.994 (14 · 0.571 = 7.994)
expected (1) frequency for the original scores based on the control scores: 6.006 (14 · 0.429 = 6.006)
control scores:

	f	p
(0)	8	0.571
(1)	6	0.429
All	14	1.000

expected (0) frequency for the control scores based on the original scores: 9.002 (14 · 0.643 = 9.002)
expected (1) frequency for the control scores based on the original scores: 4.998 (14 · 0.357 = 4.998)

Appendix XXII.B.2. Dichotomised dental epigenetic traits

DE009/10 - Interruption groove UI2
expected frequencies based on the original scores:
- Pearson's: χ^2 = ((2 – 1.000)^2 / 1.000) + ((3 – 4.000)^2 / 4.000) = 1.000 + 0.250 = 1.250
not significant (Interruption groove UI2 score frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: χ^2 = ((|2 – 1.000| – 0.5)^2 / 1.000) + ((|3 – 4.000| – 0.5)^2 / 4.000) = 0.250 + 0.063 = 0.313
not significant (Interruption groove UI2 score frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0
not significant (Interruption groove UI2 score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	1	0.200
(1)	4	0.800
All	5	1.000

expected (0) frequency for the original scores based on the control scores: 2.000 (5 · 0.400 = 2.000)
expected (1) frequency for the original scores based on the control scores: 3.000 (5 · 0.600 = 3.000)
control scores:

	f	p
(0)	2	0.400
(1)	3	0.600
All	5	1.000

expected (0) frequency for the control scores based on the original scores: 1.000 (5 · 0.200 = 1.000)
expected (1) frequency for the control scores based on the original scores: 4.000 (5 · 0.800 = 4.000)

All dental epigenetic score pairs
expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((78 – 77.000)^2 / 77.000) + ((62 – 63.000)^2 / 63.000) = 0.013 + 0.016 = 0.029$
not significant (Dental epigenetic score frequencies do not differ significantly)
- Yates's: $\chi^2 = ((|78 – 77.000| – 0.5)^2 / 77.000) + ((|62 – 63.000| – 0.5)^2 / 63.000) = 0.006 + 0.008 = 0.014$
not significant (Dental epigenetic score frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0$
not significant (Dental epigenetic score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	77	0.550
(1)	63	0.450
All	140	1.000

expected (0) frequency for the original scores based on the control scores: 77.980 (140 · 0.557 = 77.980)
expected (1) frequency for the original scores based on the control scores: 62.020 (140 · 0.443 = 62.020)
control scores:

	f	p
(0)	78	0.557
(1)	62	0.443
All	140	1.000

expected (0) frequency for the control scores based on the original scores: 77.000 (140 · 0.550 = 77.000)
expected (1) frequency for the control scores based on the original scores: 63.000 (140 · 0.450 = 63.000)

Abu Tabari 02/28-2
expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((10 – 9.000)^2 / 9.000) + ((10 – 11.000)^2 / 11.000) = 0.111 + 0.091 = 0.202$
not significant (Abu Tabari 02/28-2's dental epigenetic score frequencies do not differ significantly)
- Yates's: $\chi^2 = ((|10 – 9.000| – 0.5)^2 / 9.000) + ((|10 – 11.000| – 0.5)^2 / 11.000) = 0.0278 + 0.045 = 0.073$
not significant (Abu Tabari 02/28-2's dental epigenetic score frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0$
not significant (Abu Tabari 02/28-2's dental epigenetic score frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	9	0.450
(1)	11	0.550
All	20	1.000

expected (0) frequency for the original scores based on the control scores: 10.000 (20 · 0.500 = 10.000)
expected (1) frequency for the original scores based on the control scores: 10.000 (20 · 0.500 = 10.000)
control scores:

	f	p
(0)	10	0.500
(1)	10	0.500
All	20	1.000

expected (0) frequency for the control scores based on the original scores: 9.000 (20 · 0.450 = 9.000)
expected (1) frequency for the control scores based on the original scores: 11.000 (20 · 0.550 = 11.000)

Appendix XXII.B.3. Enamel hypoplasia presence

DS003a/4a - Hypoplasia UI2 - presence
expected frequencies based on the original scores:
- Pearson's: $\chi^2 = ((3 – 1.998)^2 / 1.998) + ((3 – 4.002)^2 / 4.002) = 0.503 + 0.251 = 0.753$
not significant (UI2's hypoplasia presence frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|3 – 1.998| – 0.5)^2 / 1.998) + ((|3 – 4.002| – 0.5)^2 / 4.002) = 0.126 + 0.063 = 0.189$
not significant (UI2's hypoplasia presence frequencies do not differ significantly)
- McNemar's: $\chi^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0$
not significant (UI2's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	2	0.333
(1)	4	0.667
All	6	1.000

expected (0) frequency for the original scores based on the control scores: 3.000 (6 · 0.500 = 3.000)
expected (1) frequency for the original scores based on the control scores: 3.000 (6 · 0.500 = 3.000)
control scores:

	f	p
(0)	3	0.500
(1)	3	0.500
All	6	1.000

expected (0) frequency for the control scores based on the original scores: 1.998 (6 · 0.333 = 1.998)
expected (1) frequency for the control scores based on the original scores: 4.002 (6 · 0.667 = 4.002)

DS009a/10a - Hypoplasia UP2 - presence

- Pearson's: χ^2 = ((3 – 1.998)^2 / 1.998) + ((3 – 4.002)^2 / 4.002) = 0.503 + 0.251 = 0.753
not significant (UP2's hypoplasia presence frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: χ^2 = ((|3 – 1.998| – 0.5)^2 / 1.998) + ((|3 – 4.002| – 0.5)^2 / 4.002) = 0.126 + 0.063 = 0.189
not significant (UP2's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0
not significant (UP2's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	2	0.333
(1)	4	0.667
All	6	1.000

expected (0) frequency for the original scores based on the control scores: 3.000 (6 · 0.500 = 3.000)
expected (1) frequency for the original scores based on the control scores: 3.000 (6 · 0.500 = 3.000)
control scores:

	f	p
(0)	3	0.500
(1)	3	0.500
All	6	1.000

expected (0) frequency for the control scores based on the original scores: 1.998 (6 · 0.333 = 1.998)
expected (1) frequency for the control scores based on the original scores: 4.002 (6 · 0.667 = 4.002)

DS017a/18a - Hypoplasia LI1 - presence

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((5 – 3.000)^2 / 3.000) + ((1 – 3.000)^2 / 3.000) = 1.333 + 1.333 = 2.667
not significant (LI1's hypoplasia presence frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: χ^2 = ((|5 – 3.000| – 0.5)^2 / 3.000) + ((|1 – 3.000| – 0.5)^2 / 3.000) = 0.750 + 0.750 = 1.500
not significant (LI1's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 2| – 1)^2 / (0 + 2)) = 1 / 2 = 0.5
not significant (LI1's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	3	0.500
(1)	3	0.500
All	6	1.000

expected (0) frequency for the original scores based on the control scores: 4.998 (6 · 0.833 = 4.998)
expected (1) frequency for the original scores based on the control scores: 1.002 (6 · 0.167 = 1.002)
control scores:

	f	p
(0)	5	0.833
(1)	1	0.167
All	6	1.000

expected (0) frequency for the control scores based on the original scores: 3.000 (6 · 0.500 = 3.000)
expected (1) frequency for the control scores based on the original scores: 3.000 (6 · 0.500 = 3.000)

DS031a/32a - Hypoplasia LM3 - presence

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((2 – 3.000)^2 / 3.000) + ((3 – 2.000)^2 / 2.000) = 0.333 + 0.500 = 0.833
not significant (LM3's hypoplasia presence frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: χ^2 = ((|2 – 3.000| – 0.5)^2 / 3.000) + ((|3 – 2.000| – 0.5)^2 / 2.000) = 0.083 + 0.125 = 0.208
not significant (LM3's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|1 – 0| – 1)^2 / (1 + 0)) = 0 / 1 = 0
not significant (LM3's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	3	0.600
(1)	2	0.400
All	5	1.000

expected (0) frequency for the original scores based on the control scores: 2.000 (5 · 0.400 = 2.000)
expected (1) frequency for the original scores based on the control scores: 3.000 (5 · 0.600 = 3.000)
control scores:

	f	p
(0)	2	0.400
(1)	3	0.600
All	5	1.000

expected (0) frequency for the control scores based on the original scores: 3.000 (5 · 0.600 = 3.000)
expected (1) frequency for the control scores based on the original scores: 2.000 (5 · 0.400 = 2.000)

All enamel hypoplasia presence scores

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((34 – 31.004)^2 / 31.004) + ((58 – 60.996)^2 / 60.996) = 0.290 + 0.147 = 0.437

not significant (Hypoplasia presence frequencies do not differ significantly)
- Yates's: χ^2 = ((|34 – 31.004| – 0.5)^2 / 31.004) + ((|58 – 60.996| – 0.5)^2 / 60.996) = 0.201 + 0.041 = 0.242

not significant (Hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|1 – 3| – 1)^2 / (1 + 3)) = 4 / 4 = 1

not significant (Hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	31	0.337
(1)	61	0.663
All	92	1.000

expected (0) frequency for the original scores based on the control scores:	34.040	(92 · 0.370 = 34.040)
expected (1) frequency for the original scores based on the control scores:	57.960	(92 · 0.630 = 57.960)

control scores:

	f	p
(0)	34	0.370
(1)	58	0.630
All	92	1.000

expected (0) frequency for the control scores based on the original scores:	31.004	(92 · 0.337 = 31.004)
expected (1) frequency for the control scores based on the original scores:	60.996	(92 · 0.633 = 60.996)

Abu Tabari 02/1-2

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((9 – 10.005)^2 / 10.005) + ((6 – 4.995)^2 / 4.995) = 0.101 + 0.202 = 0.303

not significant (Abu Tabari 02/1-2's hypoplasia presence frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|9 – 10.005| – 0.5)^2 / 10.005) + ((|6 – 4.995| – 0.5)^2 / 4.995) = 0.025 + 0.051 = 0.077

not significant (Abu Tabari 02/1-2's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|1 – 0| – 1)^2 / (1 + 0)) = 0 / 1 = 0

not significant (Abu Tabari 02/1-2's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	10	0.667
(1)	5	0.333
All	15	1.000

expected (0) frequency for the original scores based on the control scores:	9.000	(15 · 0.600 = 9.000)
expected (1) frequency for the original scores based on the control scores:	6.000	(15 · 0.400 = 6.000)

control scores:

	f	p
(0)	9	0.600
(1)	6	0.400
All	15	1.000

expected (0) frequency for the control scores based on the original scores:	10.005	(15 · 0.667 = 10.005)
expected (1) frequency for the control scores based on the original scores:	4.995	(15 · 0.333 = 4.995)

Abu Tabari 02/1-8

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((4 – 3.008)^2 / 3.008) + ((12 – 13.008)^2 / 13.008) = 0.327 + 0.078 = 0.405

not significant (Abu Tabari 02/1-8's hypoplasia presence frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|4 – 3.008| – 0.5)^2 / 3.008) + ((|12 – 13.008| – 0.5)^2 / 13.008) = 0.080 + 0.020 = 0.100

not significant (Abu Tabari 02/1-8's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0

not significant (Abu Tabari 02/1-8's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
original scores:

	f	p
(0)	3	0.188
(1)	13	0.813
All	16	1.000

expected (0) frequency for the original scores based on the control scores:	4.000	(16 · 0.250 = 4.000)
expected (1) frequency for the original scores based on the control scores:	12.000	(16 · 0.750 = 12.000)

control scores:

	f	p
(0)	4	0.250
(1)	12	0.750
All	16	1.000

expected (0) frequency for the control scores based on the original scores:	3.008	(16 · 0.188 = 3.008)
expected (1) frequency for the control scores based on the original scores:	13.008	(16 · 0.813 = 13.008)

Abu Tabari 02/28-2

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((5 – 4.000)^2 / 4.000) + ((5 – 6.000)^2 / 6.000) = 0.250 + 0.167 = 0.417

not significant (Abu Tabari 02/28-2's hypoplasia presence frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|5 – 4.000| – 0.5)^2 / 4.000) + ((|5 – 6.000| – 0.5)^2 / 6.000) = 0.063 + 0.042 = 0.104

not significant (Abu Tabari 02/28-2's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0

not significant (Abu Tabari 02/28-2's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

original scores:

	f	p
(0)	4	0.400
(1)	6	0.600
All	10	1.000

expected (0) frequency for the original scores based on the control scores: 5.000 (10 · 0.500 = 5.000)
expected (1) frequency for the original scores based on the control scores: 5.000 (10 · 0.500 = 5.000)

control scores:

	f	p
(0)	5	0.500
(1)	5	0.500
All	10	1.000

expected (0) frequency for the control scores based on the original scores: 4.000 (10 · 0.400 = 4.000)
expected (1) frequency for the control scores based on the original scores: 6.000 (10 · 0.600 = 6.000)

Abu Tabari 02/28-5

expected frequencies based on the original scores:
- Pearson's: χ^2 = ((1 – 0.000)^2 / 0.000) + ((15 – 16.000)^2 / 16.000) = 0.000 + 0.063 = 0.063

not significant (Abu Tabari 02/28-5's hypoplasia presence frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|1 – 0.000| – 0.5)^2 / 0.000) + ((|15 – 16.000| – 0.5)^2 / 16.000) = 0.000 + 0.016 = 0.016

not significant (Abu Tabari 02/28-5's hypoplasia presence frequencies do not differ significantly)
- McNemar's: χ^2 = ((|0 – 1| – 1)^2 / (0 + 1)) = 0 / 1 = 0

not significant (Abu Tabari 02/28-5's hypoplasia presence frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

original scores:

	f	p
(0)	0	0.000
(1)	16	1.000
All	16	1.000

expected (0) frequency for the original scores based on the control scores: 1.008 (16 · 0.063 = 1.008)
expected (1) frequency for the original scores based on the control scores: 15.008 (16 · 0.938 = 15.008)

control scores:

	f	p
(0)	1	0.063
(1)	15	0.938
All	16	1.000

expected (0) frequency for the control scores based on the original scores: 0.000 (16 · 0.000 = 0.000)
expected (1) frequency for the control scores based on the original scores: 16.000 (16 · 1.000 = 16.000)

Appendix XXIII. Diachronic differences

Appendix XXIII.A. Overviews

Appendix XXIII.A.1. Measurements

	CM127 - *74a. Alternative subnasal angle	CM129/130 - 79. Mandibular ramus angle (m)	CM 168 - Cranial thickness (max.)	CM 169 - Cranial thickness (min.)	CM 168/169 - Cranial thickness (max., min.)	PM015/16 - H1. *Humerus* - Maximum length (m)	PM035 - *Humerus* - Cortical thickness (max.)	PM036 - *Humerus* - Cortical thickness (min.)	PM035/36 - *Humerus* - Cortical thickness (max., min.)	PM037/38 - R1. *Radius* - Maximum length (m)
pre-Leiterband - No.	4	2	4	4	8	4	4	4	8	2
pre-Leiterband - Min.	53.00	110.00	7.50	2.00	2.00	310.00	4.00	3.50	3.50	247.50
pre-Leiterband - Max.	59.50	117.00	10.00	8.50	10.00	345.00	6.00	5.00	6.00	260.00
pre-Leiterband - Mode			10.00		10.00		6.00	4.00	4.00	
pre-Leiterband - Median	55.00	113.50	9.00	7.75	8.00	336.25	5.75	4.00	4.50	253.75
pre-Leiterband - Mean	55.63	113.50	8.88	6.50	7.69	331.88	5.38	4.13	4.75	253.75
pre-Leiterband - S.D.	2.87	4.95	1.31	3.03	2.51	15.46	0.95	0.63	1.00	8.84
Leiterband - No.	9	8	12	12	24	9	13	13	26	7
Leiterband - Min.	49.00	117.00	4.50	1.50	1.50	270.00	3.50	3.00	3.00	220.00
Leiterband - Max.	60.00	137.00	13.00	6.00	13.00	330.00	8.00	5.50	8.00	265.00
Leiterband - Mode	54.00		8.00	4.00	4.00	330.00	4.00	3.00	3.50	
Leiterband - Median	54.00	122.13	6.75	3.00	4.50	300.00	4.50	3.50	4.00	240.00
Leiterband - Mean	54.33	123.53	7.33	3.33	5.33	300.00	4.77	3.77	4.27	240.00
Leiterband - S.D.	3.13	6.44	2.76	1.17	2.91	21.94	1.24	0.86	1.16	15.28
Significance	U: 14.000; Z: -.621; Point P.: .048; Asymp. Sig. (2-tailed): .535 Exact Sig. (2-tailed): .603 Exact Sig. (1-tailed): .299	U: .500; Z: -1.964; Point P.: .049; Asymp. Sig. (2-tailed): .044 Exact Sig. (2-tailed): .067 Exact Sig. (1-tailed): .044	U: 13.000; Z: -1.348; Point P.: .009; Asymp. Sig. (2-tailed): .178 Exact Sig. (2-tailed): .193 Exact Sig. (1-tailed): .096	U: 10.500; Z: -1.663; Point P.: .003; Asymp. Sig. (2-tailed): .096 Exact Sig. (2-tailed): .111 Exact Sig. (1-tailed): .051	Asymp. Sig. (2-tailed): .030	U: 3.000; Z: -2.331; Point P.: .006; Asymp. Sig. (2-tailed): .020 Exact Sig. (2-tailed): .020 Exact Sig. (1-tailed): .010	U: 14.500; Z: -1.327; Point P.: .023; Asymp. Sig. (2-tailed): .185 Exact Sig. (2-tailed): .208 Exact Sig. (1-tailed): .104	U: 17.000; Z: -1.042; Point P.: .016; Asymp. Sig. (2-tailed): .297 Exact Sig. (2-tailed): .334 Exact Sig. (1-tailed): .164	Asymp. Sig. (2-tailed): 175	U: 3.000; Z: -1.171; Point P.: .056; Asymp. Sig. (2-tailed): .242 Exact Sig. (2-tailed): .333 Exact Sig. (1-tailed): .167

	PM063 - *Radius* - Cortical thickness (max.)	PM064 - *Radius* - Cortical thickness (min.)	PM063/64 - *Radius* - Cortical thickness (max., min.)	PM065/66 - U1. *Ulna* - Maximum length (m)	PM085 - *Ulna* - Cortical thickness (max.)	PM086 - *Ulna* - Cortical thickness (min.)	PM085/86 - *Ulna* - Cortical thickness (max., min.)	PM089/90 - F1. *Femur* - Maximum length (m)	PM126 - *Femur* - Cortical thickness (max.)	PM127 - *Femur* - Cortical thickness (min.)
pre-Leiterband - No.	3	3	6	3	3	3	6	4	4	4
pre-Leiterband - Min.	3.50	3.50	3.50	265.00	2.50	2.50	2.50	380.00	9.00	4.00
pre-Leiterband - Max.	6.00	4.00	6.00	275.00	6.00	3.50	6.00	480.00	10.50	6.50
pre-Leiterband - Mode		3.50	3.50		6.00		6.00		9.00	4.00
pre-Leiterband - Median	5.50	3.50	3.75	266.25	6.00	3.00	3.25	442.50	9.50	4.50
pre-Leiterband - Mean	5.00	3.67	4.33	268.75	4.83	3.00	3.92	436.25	9.63	4.88
pre-Leiterband - S.D.	1.32	0.29	1.13	5.45	2.02	0.50	1.66	42.70	0.75	1.18
Leiterband - No.	10	10	20	9	8	8	16	13	14	14
Leiterband - Min.	2.50	2.50	2.50	230.00	3.00	3.00	3.00	360.00	5.00	3.00
Leiterband - Max.	5.00	4.00	5.00	280.00	6.50	4.50	6.50	510.00	13.00	9.00
Leiterband - Mode	4.50	3.00	3.00	260.00	4.50	3.00	4.50	460.00	9.00	4.00
Leiterband - Median	4.00	3.25	3.50	260.00	4.50	3.50	3.75	450.00	9.50	5.00
Leiterband - Mean	3.90	3.30	3.60	254.44	4.69	3.50	4.09	443.08	9.36	5.21
Leiterband - S.D.	0.77	0.48	0.70	16.85	1.13	0.53	1.05	38.70	1.99	1.53
Significance	U: 7.000; Z: -1.369; Point P.: .021; Asymp. Sig. (2-tailed): .171 Exact Sig. (2-tailed): .192 Exact Sig. (1-tailed): .098	U: 8.000; Z: -1.243; Point P.: .105; Asymp. Sig. (2-tailed): .214 Exact Sig. (2-tailed): .266 Exact Sig. (1-tailed): .161	Asymp. Sig. (2-tailed): .161	U: 5.500; Z: -1.484; Point P.: .018; Asymp. Sig. (2-tailed): .138 Exact Sig. (2-tailed): .164 Exact Sig. (1-tailed): .082	U: 10.000; Z: -.414; Point P.: .048; Asymp. Sig. (2-tailed): .679 Exact Sig. (2-tailed): .727 Exact Sig. (1-tailed): .364	U: 6.000; Z: -1.285; Point P.: .095; Asymp. Sig. (2-tailed): .199 Exact Sig. (2-tailed): .279 Exact Sig. (1-tailed): .158	Asymp. Sig. (2-tailed): .454	U: 24.000; Z: -.227; Point P.: .025; Asymp. Sig. (2-tailed): .820 Exact Sig. (2-tailed): .851 Exact Sig. (1-tailed): .426	U: 26.500; Z: -.162; Point P.: .051; Asymp. Sig. (2-tailed): .871 Exact Sig. (2-tailed): .919 Exact Sig. (1-tailed): .463	U: 25.000; Z: -.326; Point P.: .064; Asymp. Sig. (2-tailed): .744 Exact Sig. (2-tailed): .787 Exact Sig. (1-tailed): .414

	PM126/127 - *Femur* - Cortical thickness (max., min.)	PM130/131 - T1a. *Tibia* - Maximum length (m)	PM162 - *Tibia* - Cortical thickness (max.)	PM163 - *Tibia* - Cortical thickness (min.)	PM162/163 - *Tibia* - Cortical thickness (max., min.)	PM - Cort. thickness (*Rad.*, *Ul.* - max., min.)	PM - Cort. thickness (*Hum.*, *Rad.*, *Ul.* - max., min.)	PM - Cort. thickness (*Fem.*, *Tib.* - max., min.)	PM - Cort. thickness (*Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* - max., min.)
pre-Leiterband - No.	8	3	3	3	6	12	20	14	34
pre-Leiterband - Min.	4.00	330.00	3.50	3.00	3.00	2.50	2.50	3.00	2.50
pre-Leiterband - Max.	10.50	420.00	11.50	4.50	11.50	6.00	6.00	11.50	11.50
pre-Leiterband - Mode	9.00				3.50	3.50	6.00	9.00	3.50
pre-Leiterband - Median	7.75	385.00	9.50	3.50	4.00	3.50	4.00	5.75	4.25
pre-Leiterband - Mean	7.25	378.33	8.17	3.67	5.92	4.13	4.38	6.68	5.32
pre-Leiterband - S.D.	2.70	45.37	4.16	0.76	3.64	1.37	1.24	3.08	2.44
Leiterband - No.	28	10	11	11	22	36	62	50	112
Leiterband - Min.	3.00	310.00	4.00	3.00	3.00	2.50	2.50	3.00	2.50
Leiterband - Max.	13.00	430.00	19.00	8.00	19.00	6.50	8.00	19.00	19.00
Leiterband - Mode	9.00	400.00	8.00	4.00	4.00	3.00	3.50	4.00	4.00
Leiterband - Median	6.75	382.50	8.00	4.00	4.75	3.50	4.00	6.00	4.50
Leiterband - Mean	7.29	376.00	7.77	4.36	6.07	3.82	4.01	6.75	5.23
Leiterband - S.D.	2.74	34.62	4.26	1.38	3.55	0.90	1.03	3.15	2.61
Significance	Asymp. Sig. (2-tailed): .969	U: 15.000; Z: .000; Point P.: .038; Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .517	U: 13.500; Z: -.472; Point P.: .022; Asymp. Sig. (2-tailed): .637 Exact Sig. (2-tailed): .681 Exact Sig. (1-tailed): .335	U: 11.000; Z: -.873; Point P.: .082; Asymp. Sig. (2-tailed): .383 Exact Sig. (2-tailed): .451 Exact Sig. (1-tailed): .253	Asymp. Sig. (2-tailed): .651	Asymp. Sig. (2-tailed): .698	Asymp. Sig. (2-tailed): .229	Asymp. Sig. (2-tailed): .935	Asymp. Sig. (2-tailed): .727

Appendix XXIII.A.2. Scaled measurements

	SCM 168 - Cranial thickness (max.)	SCM 169 - Cranial thickness (min.)	SCM 168/169 - Cranial thickness (max., min.)	SPM035 - *Humerus* - Cortical thickness (max.)	SPM036 - *Humerus* - Cortical thickness (min.)	SPM035/36 - *Humerus* - Cortical thickness (max., min.)	SPM063 - *Radius* - Cortical thickness (max.)	SPM064 - *Radius* - Cortical thickness (min.)	SPM063/64 - *Radius* - Cortical thickness (max., min.)	SPM077/78 - *U18. Longitudinal *Tub. ulnae* diam. (m)
pre-Leiterband - No.	4	4	8	3	3	6	3	3	6	3
pre-Leiterband - Min.	0.6383	0.1905	0.1905	0.3810	0.3361	0.3361	0.3333	0.2941	0.2941	1.2381
pre-Leiterband - Max.	0.9524	0.6723	0.9524	0.5042	0.4255	0.5042	0.5042	0.3404	0.5042	1.3191
pre-Leiterband - Mode			0.6383			0.3810			0.3333	
pre-Leiterband - Median	0.7298	0.6538	0.6708	0.4681	0.3810	0.4032	0.4681	0.3333	0.3369	1.3025
pre-Leiterband - Mean	0.7626	0.5426	0.6526	0.4511	0.3809	0.4160	0.4352	0.3226	0.3789	1.2866
pre-Leiterband - S.D.	0.1417	0.2352	0.2148	0.0634	0.0447	0.0623	0.0901	0.0249	0.0854	0.0428
Leiterband - No.	11	11	22	10	10	20	8	8	16	4
Leiterband - Min.	0.3750	0.1357	0.1357	0.2966	0.2500	0.2500	0.2304	0.2304	0.2304	1.1521
Leiterband - Max.	1.2121	0.5505	1.2121	0.5000	0.4286	0.5000	0.4545	0.4040	0.4545	1.5385
Leiterband - Mode	0.7339		0.7339			0.2966			0.2542	
Leiterband - Median	0.6410	0.2857	0.4094	0.3678	0.2866	0.3315	0.3527	0.2753	0.3072	1.2959
Leiterband - Mean	0.6826	0.3138	0.4982	0.3881	0.3047	0.3464	0.3502	0.2930	0.3216	1.3206
Leiterband - S.D.	0.2889	0.1083	0.2845	0.0660	0.0553	0.0731	0.0856	0.0559	0.0758	0.1758
Significance	U: 15.000; Z: -.915; Point P.: .018; Asymp. Sig. (2-tailed): .360 Exact Sig. (2-tailed): .396 Exact Sig. (1-tailed): .197	U: 10.000; Z: -1.567; Point P.: .117; Asymp. Sig. (2-tailed): .117 Exact Sig. (2-tailed): .138 Exact Sig. (1-tailed): .069	Asymp. Sig. (2-tailed): .091	U: 5.000; Z: -1.690; Point P.: .017; Asymp. Sig. (2-tailed): .091 Exact Sig. (2-tailed): .112 Exact Sig. (1-tailed): .056	U: 4.000; Z: -1.859; Point P.: .014; Asymp. Sig. (2-tailed): .063 Exact Sig. (2-tailed): .077 Exact Sig. (1-tailed): .038	Asymp. Sig. (2-tailed): .038	U: 4.500; Z: -1.534; Point P.: .012; Asymp. Sig. (2-tailed): .125 Exact Sig. (2-tailed): .139 Exact Sig. (1-tailed): .073	U: 5.500; Z: -1.330; Point P.: .024; Asymp. Sig. (2-tailed): .184 Exact Sig. (2-tailed): .212 Exact Sig. (1-tailed): .109	Asymp. Sig. (2-tailed): .104	U: 6.000; Z: .000; Point P.: .143; Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .571

	SPM079/80 - *U19. Transverse *Tub. ulnae* diam. (m)	SPM085 - *Ulna* - Cortical thickness (max.)	SPM086 - *Ulna* - Cortical thickness (min.)	SPM085/86 - *Ulna* - Cortical thickness (max., min.)	SPM117/118 - *F34. *Linea aspera* breadth (m)	SPM126 - *Femur* - Cortical thickness (max.)	SPM127 - *Femur* - Cortical thickness (min.)	SPM126/127 - *Femur* - Cortical thickness (max., min.)	SPM162 - *Tibia* - Cortical thickness (max.)	SPM163 - *Tibia* - Cortical thickness (min.)
pre-Leiterband - No.	3	3	3	6	3	3	3	6	3	3
pre-Leiterband - Min.	0.5462	0.2381	0.2381	0.2381	0.3992	0.7563	0.3810	0.3810	0.3333	0.2857
pre-Leiterband - Max.	0.7234	0.5106	0.2979	0.5106	0.5532	0.8571	0.5532	0.8571	0.9787	0.3830
pre-Leiterband - Mode				0.2381						
pre-Leiterband - Median	0.7143	0.5042	0.2521	0.2750	0.5238	0.8511	0.4202	0.6547	0.7983	0.2941
pre-Leiterband - Mean	0.6613	0.4176	0.2627	0.3402	0.4921	0.8215	0.4514	0.6365	0.7035	0.3209
pre-Leiterband - S.D.	0.0998	0.1555	0.0313	0.1314	0.0818	0.0565	0.0903	0.2136	0.3330	0.0539
Leiterband - No.	5	6	6	12	7	10	10	20	9	9
Leiterband - Min.	0.5297	0.2500	0.2500	0.2500	0.4128	0.4651	0.2500	0.2500	0.3670	0.2542
Leiterband - Max.	0.9009	0.6566	0.4040	0.6566	0.6393	1.1504	0.5963	1.1504	1.6814	0.4425
Leiterband - Mode				0.2500					0.3670	
Leiterband - Median	0.7373	0.4167	0.3109	0.3241	0.5297	0.8543	0.4094	0.5415	0.6780	0.3670
Leiterband - Mean	0.7262	0.4209	0.3119	0.3664	0.5223	0.8319	0.4107	0.6213	0.7222	0.3512
Leiterband - S.D.	0.1579	0.1403	0.0539	0.1162	0.0847	0.2101	0.0926	0.2677	0.4072	0.0595
Significance	U: 5.000; Z: -.745; Point P.: .089; Asymp. Sig. (2-tailed): .456 Exact Sig. (2-tailed): .571 Exact Sig. (1-tailed): .286	U: 8.000; Z: -.258; Point P.: .095; Asymp. Sig. (2-tailed): .796 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452	U: 3.000; Z: -1.549; Point P.: .036; Asymp. Sig. (2-tailed): .121 Exact Sig. (2-tailed): .167 Exact Sig. (1-tailed): .083	Asymp. Sig. (2-tailed): .399	U: 8.000; Z: -.570; Point P.: .075; Asymp. Sig. (2-tailed): .569 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 14.000; Z: -.169; Point P.: .063; Asymp. Sig. (2-tailed): .866 Exact Sig. (2-tailed): .937 Exact Sig. (1-tailed): .469	U: 11.000; Z: -.676; Point P.: .052; Asymp. Sig. (2-tailed): .499 Exact Sig. (2-tailed): .573 Exact Sig. (1-tailed): .287	Asymp. Sig. (2-tailed): .808	U: 13.000; Z: -.093; Point P.: .036; Asymp. Sig. (2-tailed): .926 Exact Sig. (2-tailed): .964 Exact Sig. (1-tailed): .482	U: 11.000; Z: -.462; Point P.: .064; Asymp. Sig. (2-tailed): .644 Exact Sig. (2-tailed): .727 Exact Sig. (1-tailed): .364

	SPM162/163 - *Tibia* - Cortical thickness (max., min.)	SPM - Cort. thickness (*Rad.*, *Ul.* - max., min.)	SPM - Cort. thickness (*Hum.*, *Rad.*, *Ul.* - max., min.)	SPM - Cort. thickness (*Fem.*, *Tib.* - max., min.)	SPM - Cort. thickness (*Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* - max., min.)
pre-Leiterband - No.	6	12	18	12	30
pre-Leiterband - Min.	0.2857	0.2381	0.2381	0.2857	0.2381
pre-Leiterband - Max.	0.9787	0.5106	0.5106	0.9787	0.9787
pre-Leiterband - Mode		0.3333	0.5042		0.3810
pre-Leiterband - Median	0.3582	0.3333	0.3607	0.4867	0.3820
pre-Leiterband - Mean	0.5122	0.3595	0.3784	0.5743	0.4567
pre-Leiterband - S.D.	0.2990	0.1076	0.0969	0.2561	0.1998
Leiterband - No.	18	28	48	38	86
Leiterband - Min.	0.2542	0.2304	0.2304	0.2500	0.2304
Leiterband - Max.	1.6814	0.6566	0.6566	1.6814	1.6814
Leiterband - Mode	0.3670	0.2542	0.3153	0.3670	0.3670
Leiterband - Median	0.3765	0.3189	0.3218	0.4495	0.3687
Leiterband - Mean	0.5367	0.3408	0.3431	0.5812	0.4483
Leiterband - S.D.	0.3408	0.0959	0.0863	0.3033	0.2415
Significance	Asymp. Sig. (2-tailed): .739	Asymp. Sig. (2-tailed): .575	Asymp. Sig. (2-tailed): .134	Asymp. Sig. (2-tailed): .919	Asymp. Sig. (2-tailed): .421

Appendix XXIII.A.3. Indices

	ICM003 - *I51(1). Naso-palatal index	ICM004 - *I54b. Palato-alveolar index	ICM006 - *I62b. Mandibular length-breadth index	ICM007 - *I62c. Ant. mandibular length-breadth index	ICM008 - I62(1). Mandibular height index	ICM010 - *I66b. Ht.-b. index of the *Corp. mand.* at M2	ICM011 - *I66c. Symphyseal index	ICM012 - *I66d. Symphyseal height index	ICM013 - Cranial thickness index
pre-Leiterband - No.	3	3	2	2	3	3	3	3	4
pre-Leiterband - Min.	86.21	75.86	76.11	43.40	73.91	43.55	32.89	147.17	57.14
pre-Leiterband - Max.	110.34	100.00	93.33	48.89	81.58	63.55	35.90	160.00	72.83
pre-Leiterband - Mode									
pre-Leiterband - Median	87.50	79.31	84.72	46.14	74.31	52.94	34.72	149.02	65.53
pre-Leiterband - Mean	94.68	85.06	84.72	46.14	76.60	53.35	34.50	152.06	65.26
pre-Leiterband - S.D.	13.58	13.05	12.18	3.88	4.32	10.01	1.51	6.94	6.56
Leiterband - No.	5	5	5	4	6	6	7	5	11
Leiterband - Min.	62.86	45.71	70.21	30.19	62.50	52.46	34.29	117.86	29.41
Leiterband - Max.	104.35	82.61	93.08	42.31	87.14	73.91	46.67	146.15	80.81
Leiterband - Mode									
Leiterband - Median	75.76	69.70	76.29	31.46	78.49	58.88	39.39	130.77	44.87
Leiterband - Mean	78.95	66.93	77.72	33.85	76.29	61.80	39.37	130.83	49.82
Leiterband - S.D.	15.41	13.71	8.98	5.70	8.85	9.56	3.75	10.21	16.35
Significance	U: 2.000; Z: -1.640; Point P.: .036; Asymp. Sig. (2-tailed): .101 Exact Sig. (2-tailed): .143 Exact Sig. (1-tailed): .071	U: 2.000; Z: -1.640; Point P.: .036; Asymp. Sig. (2-tailed): .101 Exact Sig. (2-tailed): .143 Exact Sig. (1-tailed): .071	U: 3.000; Z: -.775; Point P.: .095; Asymp. Sig. (2-tailed): .439 Exact Sig. (2-tailed): .571 Exact Sig. (1-tailed): .286	U: .000; Z: -1.852; Point P.: .067; Asymp. Sig. (2-tailed): .064 Exact Sig. (2-tailed): .133 Exact Sig. (1-tailed): .067	U: 9.000; Z: .000; Point P.: .095; Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .548	U: 5.000; Z: -1.033; Point P.: .060; Asymp. Sig. (2-tailed): .302 Exact Sig. (2-tailed): .381 Exact Sig. (1-tailed): .190	U: 2.000; Z: -1.937; Point P.: .017; Asymp. Sig. (2-tailed): .053 Exact Sig. (2-tailed): .067 Exact Sig. (1-tailed): .033	U: .000; Z: -2.236; Point P.: .018; Asymp. Sig. (2-tailed): .025 Exact Sig. (2-tailed): .036 Exact Sig. (1-tailed): .018	U: 9.000; Z: -1.697; Point P.: .013; Asymp. Sig. (2-tailed): .090 Exact Sig. (2-tailed): .104 Exact Sig. (1-tailed): .052

	IDM - Asymmetry index (All teeth)	IDM - Asymmetry index (Molars)	IDM - Asymmetry index (Incisors)	IDM - Asymmetry index (Canines and premolars)	IPM001 - HI1 Robusticity index	IPM002 - *HI1b. Modified robusticity index	IPM003 - *IH1c. Pearson's robusticity index	IPM004 - HI2. Diaphyseal index	IPM005 - Humeral cortical thickness index	IPM006 - *RI1b. Modified robusticity index
pre-Leiterband - No.	30	12	8	10	3	4	4	4	4	2
pre-Leiterband - Min.	0.0000000	0.0083682	0.0000000	0.0053619	16.18	16.91	10.15	72.09	13.91	14.23
pre-Leiterband - Max.	0.0512821	0.0318907	0.0366300	0.0512821	16.52	18.06	11.29	79.49	18.26	14.95
pre-Leiterband - Mode										
pre-Leiterband - Median	0.0173189	0.0137778	0.0234158	0.0251911	16.24	17.34	10.51	75.16	16.82	14.59
pre-Leiterband - Mean	0.0213943	0.0165096	0.0223821	0.0264656	16.31	17.42	10.62	75.48	16.45	14.59
pre-Leiterband - S.D.	0.0127843	0.0071565	0.0135802	0.0161040	0.18	0.48	0.51	3.07	1.83	0.51
Leiterband - No.	118	46	27	45	7	8	8	12	12	5
Leiterband - Min.	0.0000000	0.0041237	0.0000000	0.0000000	16.97	17.59	10.34	68.09	11.20	14.34
Leiterband - Max.	0.1273101	0.1273101	0.0786026	0.0776119	20.36	22.18	13.91	91.89	17.24	16.22
Leiterband - Mode	0.0000000	0.0392157	0.0000000	0.0000000				84.21		
Leiterband - Median	0.0184729	0.0225087	0.0162602	0.0176991	18.25	19.67	12.13	83.07	14.42	15.20
Leiterband - Mean	0.0243585	0.0277693	0.0223700	0.0220651	18.61	19.54	12.01	80.69	14.26	15.30
Leiterband - S.D.	0.0201260	0.0232169	0.0185019	0.0174228	1.24	1.48	1.06	8.26	2.18	0.72
Significance	U: 1745.500; Z: -.117; Point P.: .001; Asymp. Sig. (2-tailed): .907 Exact Sig. (2-tailed): .908 Exact Sig. (1-tailed): .454	U: 181.500; Z: -1.814; Point P.: .001; Asymp. Sig. (2-tailed): .070 Exact Sig. (2-tailed): .070 Exact Sig. (1-tailed): .035	U: 100.000; Z: -.314; Point P.: .010; Asymp. Sig. (2-tailed): .753 Exact Sig. (2-tailed): .767 Exact Sig. (1-tailed): .384	U: 181.500; Z: -.949; Point P.: .003; Asymp. Sig. (2-tailed): .342 Exact Sig. (2-tailed): .351 Exact Sig. (1-tailed): .175	U: .000; Z: -2.393; Point P.: .008; Asymp. Sig. (2-tailed): .017 Exact Sig. (2-tailed): .017 Exact Sig. (1-tailed): .008	U: 2.000; Z: -2.378; Point P.: .004; Asymp. Sig. (2-tailed): .017 Exact Sig. (2-tailed): .016 Exact Sig. (1-tailed): .008	U: 3.000; Z: -2.208; Point P.: .006; Asymp. Sig. (2-tailed): .027 Exact Sig. (2-tailed): .028 Exact Sig. (1-tailed): .014	U: 14.000; Z: -1.214; Point P.: .016; Asymp. Sig. (2-tailed): .225 Exact Sig. (2-tailed): .251 Exact Sig. (1-tailed): .126	U: 10.000; Z: -1.698; Point P.: .013; Asymp. Sig. (2-tailed): .090 Exact Sig. (2-tailed): .103 Exact Sig. (1-tailed): .052	U: 1.000; Z: -1.549; Point P.: .048; Asymp. Sig. (2-tailed): .121 Exact Sig. (2-tailed): .190 Exact Sig. (1-tailed): .095

	IPM007 - RI2. Diaphyseal index	IPM009 - Radial cortical thickness index	IPM010 - *UI1b. Modified robusticity index	IPM011 - *UI1c Pearson’s robusticity index	IPM012 - UI6. Diaphyseal index	IPM013 - *UI10. Crest circumference length index	IPM014 - Ulnar cortical thickness index	IPM015 - *FI1b. Modified length index	IPM016 - *FI2b. Pearson’s robusticity index	IPM017 - FI3. *Index pilastericus*
pre-Leiterband - No.	2	2	3	3	3	3	3	4	4	4
pre-Leiterband - Min.	79.31	17.50	12.45	10.55	73.53	16.36	15.15	17.14	11.26	115.22
pre-Leiterband - Max.	85.71	24.36	12.68	11.27	76.47	18.22	28.15	20.00	13.03	130.43
pre-Leiterband - Mode										
pre-Leiterband - Median	82.51	20.93	12.55	11.13	75.76	17.92	26.09	18.32	11.87	119.83
pre-Leiterband - Mean	82.51	20.93	12.56	10.98	75.25	17.50	23.13	18.45	12.01	121.33
pre-Leiterband - S.D.	4.53	4.85	0.11	0.38	1.53	1.00	6.99	1.25	0.83	6.90
Leiterband - No.	6	7	7	9	9	7	6	13	13	15
Leiterband - Min.	66.13	15.09	11.73	9.42	64.71	16.79	19.12	15.11	9.67	105.45
Leiterband - Max.	75.00	20.24	15.93	11.70	133.33	18.75	29.17	20.87	13.41	133.33
Leiterband - Mode										
Leiterband - Median	69.13	18.42	13.46	11.10	81.48	17.50	22.61	18.48	11.68	121.05
Leiterband - Mean	69.58	17.97	13.73	11.02	85.46	17.53	23.20	18.40	11.95	120.85
Leiterband - S.D.	3.32	1.99	1.48	0.73	19.82	0.73	3.88	1.57	1.00	9.38
Significance	U: .000; Z: -2.000; Point P.: .036; Asymp. Sig. (2-tailed): .046 Exact Sig. (2-tailed): .071 Exact Sig. (1-tailed): .036	U: 4.000; Z: -.878; Point P.: .083; Asymp. Sig. (2-tailed): .308 Exact Sig. (2-tailed): .500 Exact Sig. (1-tailed): .250	U: 3.000; Z: -1.709; Point P.: .025; Asymp. Sig. (2-tailed): .087 Exact Sig. (2-tailed): .117 Exact Sig. (1-tailed): .058	U: 12.000; Z: -.277; Point P.: .068; Asymp. Sig. (2-tailed): .782 Exact Sig. (2-tailed): .864 Exact Sig. (1-tailed): .432	U: 7.000; Z: -1.202; Point P.: .036; Asymp. Sig. (2-tailed): .229 Exact Sig. (2-tailed): .282 Exact Sig. (1-tailed): .141	U: 10.000; Z: -.114; Point P.: .033; Asymp. Sig. (2-tailed): .909 Exact Sig. (2-tailed): .950 Exact Sig. (1-tailed): .475	U: 8.000; Z: -258; Point P.: .095; Asymp. Sig. (2-tailed): .796 Exact Sig. (2-tailed): .905 Exact Sig. (1-tailed): .452	U: 25.000; Z: -.113; Point P.: .043; Asymp. Sig. (2-tailed): .910 Exact Sig. (2-tailed): .956 Exact Sig. (1-tailed): .478	U: 23.000; Z: -.340; Point P.: .041; Asymp. Sig. (2-tailed): .734 Exact Sig. (2-tailed): .785 Exact Sig. (1-tailed): .392	U: 29.500; Z: -.050; Point P.: .014; Asymp. Sig. (2-tailed): .960 Exact Sig. (2-tailed): .976 Exact Sig. (1-tailed): .488

	IPM018 - FI4. *Index platymericus*	IPM019 - *FI16. Subtrochanteric index	IPM020 - *FI17. Subtrochanteric robusticity index	IPM021 - *FI18. *Linea aspera* index	IPM022 - Femoral cortical thickness index	IPM023 - 2nd femoral cortical thickness index	IPM024 - TI1. Mid-shaft diameter index	IPM026 - *TI3b. Modified length index	IPM027 - *TI5. Modified robusticity index
pre-Leiterband - No.	4	4	4	3	4	4	4	2	3
pre-Leiterband - Min.	69.39	16.88	10.36	20.65	16.05	33.95	65.52	16.07	11.25
pre-Leiterband - Max.	91.35	18.02	11.43	25.74	19.30	37.43	73.39	16.36	13.18
pre-Leiterband - Mode									
pre-Leiterband - Median	84.17	17.63	10.98	23.91	18.51	35.72	68.63	16.22	12.47
pre-Leiterband - Mean	82.27	17.54	10.94	23.44	18.09	35.70	69.04	16.22	12.30
pre-Leiterband - S.D.	10.07	0.53	0.44	2.58	1.49	1.47	3.62	0.21	0.98
Leiterband - No.	13	11	12	7	14	12	10	6	10
Leiterband - Min.	71.43	14.89	9.61	18.87	12.86	26.88	62.69	14.65	10.17
Leiterband - Max.	90.91	19.02	12.35	35.90	21.76	39.61	93.02	18.51	14.53
Leiterband - Mode	88.89				17.07	37.50			
Leiterband - Median	80.77	17.93	11.42	21.82	17.62	35.73	77.83	16.77	12.94
Leiterband - Mean	80.81	17.89	11.34	23.91	17.79	34.28	78.51	16.85	12.69
Leiterband - S.D.	6.74	1.17	0.71	5.66	2.32	3.84	9.74	1.43	1.38
Significance	U: 21.000; Z: -.566; Point P.: .020; Asymp. Sig. (2-tailed): .571 Exact Sig. (2-tailed): .608 Exact Sig. (1-tailed): .303	U: 13.000; Z: -1.175; Point P.: .027; Asymp. Sig. (2-tailed): .240 Exact Sig. (2-tailed): .280 Exact Sig. (1-tailed): .140	U: 11.500; Z: -1.517; Point P.: .005; Asymp. Sig. (2-tailed): .129 Exact Sig. (2-tailed): .140 Exact Sig. (1-tailed): .069	U: 8.000; Z: -.570; Point P.: .075; Asymp. Sig. (2-tailed): .569 Exact Sig. (2-tailed): .667 Exact Sig. (1-tailed): .333	U: 24.000; Z: -.425; Point P.: .025; Asymp. Sig. (2-tailed): .671 Exact Sig. (2-tailed): .706 Exact Sig. (1-tailed): .354	U: 22.000; Z: -.243; Point P.: .024; Asymp. Sig. (2-tailed): .808 Exact Sig. (2-tailed): .841 Exact Sig. (1-tailed): .420	U: 6.500; Z: -1.911; Point P.: .006; Asymp. Sig. (2-tailed): .056 Exact Sig. (2-tailed): .057 Exact Sig. (1-tailed): .030	U: 3.000; Z: -1.000; Point P.: .071; Asymp. Sig. (2-tailed): .317 Exact Sig. (2-tailed): .429 Exact Sig. (1-tailed): .214	U: 12.000; Z: -.507; Point P.: .059; Asymp. Sig. (2-tailed): .612 Exact Sig. (2-tailed): .692 Exact Sig. (1-tailed): .346

	IPM028 - Tibial cortical thickness index	IPM - Cort. thick. - *Radius*, *Ulna* (IPM009, 14)	IPM - Cort. thick. - *Hum.*, *Rad.*, *Ul.* (IPM005, 9, 14)	IPM - Cort. thick. - *Femur*, *Tibia* (IPM022, 28)	IPM - Cort. thick. - *Hum.*, *Rad.*, *Ul.*, *Fem.*, *Tib.* (IPM005, 9, 14, 22, 28)	IPM - Radio-humeral index (brachial index)	IPM - Tibio-femoral index (crural index)	ISPM - *Tub. ulnae* area (SPM077/78·79/80)
pre-Leiterband - No.	3	5	9	7	16	2	3	3
pre-Leiterband - Min.	8.44	15.15	13.91	8.44	8.44	72.79	86.84	0.7115
pre-Leiterband - Max.	21.48	28.15	28.15	21.48	28.15	75.36	89.53	0.9543
pre-Leiterband - Mode								
pre-Leiterband - Median	18.57	24.36	17.50	18.57	18.10	74.08	87.50	0.8844
pre-Leiterband - Mean	16.16	22.25	19.67	17.27	18.62	74.08	87.96	0.8500
pre-Leiterband - S.D.	6.84	5.63	5.14	4.22	4.77	1.82	1.40	0.1250
Leiterband - No.	9	13	25	23	48	5	10	4
Leiterband - Min.	10.77	15.09	11.20	10.77	10.77	75.76	84.78	0.6396
Leiterband - Max.	27.91	29.17	29.17	27.91	29.17	81.82	88.24	1.3149
Leiterband - Mode				18.75	18.75		86.96	
Leiterband - Median	16.67	19.51	16.92	17.42	17.16	79.03	86.53	0.8457
Leiterband - Mean	17.00	20.38	17.45	17.48	17.46	79.10	86.50	0.9115
Leiterband - S.D.	4.77	3.95	4.44	3.41	3.94	2.60	1.21	0.2860
Significance	U: 12.000; Z: -.277; Point P.: .068; Asymp. Sig. (2-tailed): .782 Exact Sig. (2-tailed): .864 Exact Sig. (1-tailed): .432	Asymp. Sig. (2-tailed): .522	Asymp. Sig. (2-tailed): .301	Asymp. Sig. (2-tailed): .418	Asymp. Sig. (2-tailed): .317	U: .000; Z: -1.936; Point P.: .048; Asymp. Sig. (2-tailed): .053 Exact Sig. (2-tailed): .095 Exact Sig. (1-tailed): .048	U: 8.000; Z: -1.185; Point P.: .024; Asymp. Sig. (2-tailed): .236 Exact Sig. (2-tailed): .273 Exact Sig. (1-tailed): .140	U: 5.000; Z: -.354; Point P.: .114; Asymp. Sig. (2-tailed): .724 Exact Sig. (2-tailed): .857 Exact Sig. (1-tailed): .429

Appendix XXIII.A.4. Cranial morphological traits

	CN006a - Occipital bunning - degree	CN024 - Alveolar prognathism	CN025 - Dental arch breadth	CN028 - Symphyseal height	CN031 - Ramus inversion	CN032 - Ramus angle
pre-Leiterband - No.	2	4	3	4	2	3
pre-Leiterband - Min.	3	7	5	6	1	4
pre-Leiterband - Max.	7	8	7	9	8	5
pre-Leiterband - Mode		8		9		5
pre-Leiterband - Median	5.00	7.50	6.00	8.50	4.50	5.00
pre-Leiterband - Mean	5.00	7.50	6.00	8.00	4.50	4.67
Leiterband - No.	6	10	9	9	9	8
Leiterband - Min.	1	7	1	5	4	5
Leiterband - Max.	8	8	9	9	9	9
Leiterband - Mode	7	8	3	8	4	5
Leiterband - Median	7.00	8.00	4.00	8.00	6.00	6.00
Leiterband - Mean	5.17	7.70	4.67	7.33	6.00	6.25
Significance	U: 5.500; Z: -.179; Point P.: .143; Asymp. Sig. (2-tailed): .858 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .536	U: 16.000; Z: -.680; Point P.: .360; Asymp. Sig. (2-tailed): .497 Exact Sig. (2-tailed): .580 Exact Sig. (1-tailed): .455	U: 9.000; Z: -.836; Point P.: .055; Asymp. Sig. (2-tailed): .403 Exact Sig. (2-tailed): .473 Exact Sig. (1-tailed): .236	U: 11.500; Z: -1.063; Point P.: .109; Asymp. Sig. (2-tailed): .288 Exact Sig. (2-tailed): .368 Exact Sig. (1-tailed): .211	U: 7.500; Z: -.357; Point P.: .073; Asymp. Sig. (2-tailed): .721 Exact Sig. (2-tailed): .782 Exact Sig. (1-tailed): .382	U: 3.000; Z: -1.936; Point P.: .061; Asymp. Sig. (2-tailed): .053 Exact Sig. (2-tailed): .091 Exact Sig. (1-tailed): .061

Appendix XXIII.A.5. Postcranial epigenetic traits

	PE007a/8a - *Fossa hypotrochanterica* (m) - presence
pre-Leiterband - No.	4
pre-Leiterband - Mode	1
pre-Leiterband - Median	1.00
pre-Leiterband - Mean	1.00
pre-Leiterband - Frequ.	(0) 4:4, 100.0%; (1) 0:4, 0.0%
Leiterband - No.	9
Leiterband - Mode	1
Leiterband - Median	1.00
Leiterband - Mean	1.44
Leiterband - Frequ.	(0) 5:9, 55.6%; (1) 4:9, 44.4%
Significance	Pearson's χ^2: 3.194; df: 1; not significant (different in tendency); Yates's χ^2: 1.649; df: 1; not significant

	PE007b/8b - *Fossa hypotrochanterica* (m) - degree
pre-Leiterband - No.	4
pre-Leiterband - Min.	0.0
pre-Leiterband - Max.	0.0
pre-Leiterband - Mode	0.0
pre-Leiterband - Median	0.00
pre-Leiterband - Mean	0.00
Leiterband - No.	9
Leiterband - Min.	0.0
Leiterband - Max.	2.5
Leiterband - Mode	0.0
Leiterband - Median	0.00
Leiterband - Mean	0.94
Significance	U: 10.000; Z: -1.520; Point P.: .176; Asymp. Sig. (2-tailed): .128 Exact Sig. (2-tailed): .228 Exact Sig. (1-tailed): .176

Appendix XXIII.A.6. Robusticity traits

	CR001 - Relief of the *Planum nuchale*	CR002 - *Inion* (*Protuberantia occipitalis externa*)	CR003 - *Processus mastoideus*	CR010 - *Trigonum mandibulae/Mentum osseum*	CR011 - Corpus thickness	CR012 - *Angulus mandibulae* (gonial eversion)	PR001/2 - Humeral shaft bowing (m)	PR003/4 - Radial shaft bowing (m)	PR005/6 - Radial *Margo interosseus* size (m)
pre-Leiterband - No.	2	2	3	4	3	3	4	3	3
pre-Leiterband - Min.	5	6	2	2	3	4	4.5	1.0	6.0
pre-Leiterband - Max.	7	7	9	8	9	7	8.0	7.0	7.0
pre-Leiterband - Mode			2						7.0
pre-Leiterband - Median	6.00	6.50	2.00	5.50	4.00	5.00	6.00	4.00	7.00
pre-Leiterband - Mean	6.00	6.50	4.33	5.25	5.33	5.33	6.13	4.00	6.67
Leiterband - No.	6	8	4	10	9	9	10	10	8
Leiterband - Min.	2	1	1	4	4	3	3.0	2.0	3.0
Leiterband - Max.	8	7	8	8	8	7	6.0	7.0	7.0
Leiterband - Mode	4	2	8	4	5	6	4.0	5.0	5.0
Leiterband - Median	4.50	3.00	5.50	5.00	5.00	5.00	4.75	5.25	5.25
Leiterband - Mean	4.67	3.38	5.00	5.30	5.67	4.78	4.70	5.20	5.31
Significance	U: 3.000; Z: -1.031; Point P.: .107; Asymp. Sig. (2-tailed): .302 Exact Sig. (2-tailed): .464 Exact Sig. (1-tailed): .250	U: 1.500; Z: -1.718; Point P.: .044; Asymp. Sig. (2-tailed): .086 Exact Sig. (2-tailed): .089 Exact Sig. (1-tailed): .067	U: 6.000; Z: .000; Point P.: .200; Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .600	U: 20.000; Z: .000; Point P.: .020; Asymp. Sig. (2-tailed): 1.000 Exact Sig. (2-tailed): 1.000 Exact Sig. (1-tailed): .515	U: 10.000; Z: -.658; Point P.: .014; Asymp. Sig. (2-tailed): .511 Exact Sig. (2-tailed): .573 Exact Sig. (1-tailed): .277	U: 10.500; Z: -.566; Point P.: .145; Asymp. Sig. (2-tailed): .572 Exact Sig. (2-tailed): .668 Exact Sig. (1-tailed): .368	U: 9.500; Z: -1.502; Point P.: .012; Asymp. Sig. (2-tailed): .133 Exact Sig. (2-tailed): .155 Exact Sig. (1-tailed): .076	U: 11.000; Z: -.683; Point P.: .014; Asymp. Sig. (2-tailed): .495 Exact Sig. (2-tailed): .531 Exact Sig. (1-tailed): .262	U: 3.000; Z: -1.889; Point P.: .055; Asymp. Sig. (2-tailed): .059 Exact Sig. (2-tailed): .103 Exact Sig. (1-tailed): .061

	PR007/8 - Ulnar shaft bowing (m)	PR009/10 - Ulnar *Margo interosseus* size (m)	PR011b/12b - Femoral shaft bowing (m) - degree	PR013/14 - Pilasterism (m)	CR - Cranial robusticity (CR001, 2, 3, 10, 11, 12)	CR - Occipital robusticity (CR001, 2)	CR - Mandibular robusticity (CR010, 11, 12)	PR - Radial & ulnar shaft bowing - (PR003/4, 7/8)	PR - Radial & ulnar *Margo* size (PR005/6, 9/10)
pre-Leiterband - No.	3	3	4	4	17	4	10	6	6
pre-Leiterband - Min.	5.0	6.0	4.0	5.5	2	5	2	1.0	6.0
pre-Leiterband - Max.	7.5	8.5	5.0	7.0	9	7	9	7.5	8.5
pre-Leiterband - Mode			4.0	6.0	7	7	4	7.0	7.0
pre-Leiterband - Median	7.00	7.00	4.00	6.00	5.00	6.50	4.50	6.00	7.00
pre-Leiterband - Mean	6.50	7.17	4.25	6.13	5.35	6.25	5.30	5.25	6.92
Leiterband - No.	10	8	14	14	46	14	28	20	16
Leiterband - Min.	2.5	2.0	0.0	3.0	1	1	3	2.0	2.0
Leiterband - Max.	6.0	8.0	5.0	8.0	8	8	8	7.0	8.0
Leiterband - Mode	5.5	5.0	3.0	4.0	4	5	4	5.0	5.0
Leiterband - Median	4.50	5.00	3.00	5.50	5.00	4.00	5.00	5.00	5.00
Leiterband - Mean	4.35	5.06	3.04	5.43	4.83	3.93	5.25	4.78	5.19
Significance	U: 4.000; Z: -1.875; Point P.: .014; Asymp. Sig. (2-tailed): .061 Exact Sig. (2-tailed): .073 Exact Sig. (1-tailed): .038	U: 3.500; Z: -1.755; Point P.: .012; Asymp. Sig. (2-tailed): .079 Exact Sig. (2-tailed): .085 Exact Sig. (1-tailed): .042	U: 11.500; Z: -1.809; Point P.: .020; Asymp. Sig. (2-tailed): .070 Exact Sig. (2-tailed): .082 Exact Sig. (1-tailed): .044	U: 21.000; Z: -.756; Point P.: .044; Asymp. Sig. (2-tailed): .450 Exact Sig. (2-tailed): .482 Exact Sig. (1-tailed): .253	U: 343.000; Z: -.752; Point P.: .002; Asymp. Sig. (2-tailed): .452 Exact Sig. (2-tailed): .458 Exact Sig. (1-tailed): .229	U: 9.000; Z: -2.053; Point P.: .008; Asymp. Sig. (2-tailed): .040 Exact Sig. (2-tailed): .038 Exact Sig. (1-tailed): .021	U: 137.000; Z: -.101; Point P.: .005; Asymp. Sig. (2-tailed): .919 Exact Sig. (2-tailed): .926 Exact Sig. (1-tailed): .464	U: 45.500; Z: -.890; Point P.: .007; Asymp. Sig. (2-tailed): .373 Exact Sig. (2-tailed): .394 Exact Sig. (1-tailed): .197	U: 14.000; Z: -2.554; Point P.: .001; Asymp. Sig. (2-tailed): .011 Exact Sig. (2-tailed): .009 Exact Sig. (1-tailed): .004

	PR011a/12a - Femoral shaft bowing (m)
pre-Leiterband - No.	4
pre-Leiterband - Mode	5.0
pre-Leiterband - Frequ.	(1) 0:4, 0.0%; (3) 0:4, 0.0%; (4) 0:4, 0.0%; (4.5) 0:4, 0.0%; (5) 4:4, 100.0%
Leiterband - No.	14
Leiterband - Mode	5.0
Leiterband - Frequ.	(1) 2:14, 14.3%; (3) 1:14, 7.1%; (4) 2:14, 14.3%; (4.5) 1:14, 7.1%; (5) 8:14, 57.1%
Significance	Pearson's χ^2: 3.001; df: 4; not significant; Yates's χ^2: 0.994; df: 4; not significant

Appendix XXIII.A.7. Musculoskeletal stress traits

	CS001 - *M. trapezius* (*Origo*)	CS004/5 - *M. sternocleidomastoideus* (*Insertio*) (m)	CS010/11 - *M. masseter* (*Insertio*) (m)	CS012/13 - *M. pterygoideus medialis* (*Insertio*) (m)	PS001/2 - *M. pectoralis major* (*Insertio*) (m)	PS003/4 - *M. deltoideus* (*Insertio*) (m)	PS005/6 - *M. biceps brachii* (*Insertio*) (m)	PS007/8 - *M. brachialis* (*Insertio*) (m)	PS011/12 - *M. gluteus maximus* (*Insertio*) (m)	PS015/16 - *M. soleus* (*Origo*) (m)
pre-Leiterband - No.	2	2	2	2	3	3	2	3	4	2
pre-Leiterband - Min.	7	8.0	5.0	6.0	5.5	3.5	5.0	6.0	6.0	5.0
pre-Leiterband - Max.	8	8.0	6.0	7.0	7.0	5.5	6.5	7.5	7.0	8.0
pre-Leiterband - Mode		8.0			7.0			6.0	6.0	
pre-Leiterband - Median	7.50	8.00	5.50	6.50	7.00	5.00	5.75	6.00	6.25	6.50
pre-Leiterband - Mean	7.50	8.00	5.50	6.50	6.50	4.67	5.75	6.50	6.38	6.50
Leiterband - No.	5	4	6	4	5	8	6	6	6	4
Leiterband - Min.	2	5.0	3.0	5.0	6.0	4.0	4.0	5.5	4.0	3.0
Leiterband - Max.	9	8.5	6.0	5.5	7.5	8.5	7.0	8.0	9.0	6.0
Leiterband - Mode	5		4.0	5.0	7.0	4.0	5.0	5.5	6.0	
Leiterband - Median	5.00	7.50	4.50	5.00	7.00	5.50	5.25	5.75	6.50	4.25
Leiterband - Mean	5.40	7.13	4.50	5.13	7.00	5.75	5.42	6.08	6.67	4.38
Significance	U: 2.000; Z: -1.172; Point P.: .095; Asymp. Sig. (2-tailed): .241 Exact Sig. (2-tailed): .381 Exact Sig. (1-tailed): .190	U: 3.000; Z: -.492; Point P.: .267; Asymp. Sig. (2-tailed): .623 Exact Sig. (2-tailed): .933 Exact Sig. (1-tailed): .467	U: 2.500; Z: -1.211; Point P.: .214; Asymp. Sig. (2-tailed): .226 Exact Sig. (2-tailed): .357 Exact Sig. (1-tailed): .250	U: .000; Z: -1.967; Point P.: .067; Asymp. Sig. (2-tailed): .049 Exact Sig. (2-tailed): .067 Exact Sig. (1-tailed): .067	U: 4.000; Z: -1.119; Point P.: .107; Asymp. Sig. (2-tailed): .263 Exact Sig. (2-tailed): .268 Exact Sig. (1-tailed): .179	U: 7.000; Z: -1.032; Point P.: .024; Asymp. Sig. (2-tailed): .302 Exact Sig. (2-tailed): .364 Exact Sig. (1-tailed): .182	U: 5.000; Z: -.342; Point P.: .107; Asymp. Sig. (2-tailed): .733 Exact Sig. (2-tailed): .857 Exact Sig. (1-tailed): .429	U: 5.000; Z: -1.099; Point P.: .107; Asymp. Sig. (2-tailed): .272 Exact Sig. (2-tailed): .381 Exact Sig. (1-tailed): .226	U: 10.500; Z: -.331; Point P.: .095; Asymp. Sig. (2-tailed): .741 Exact Sig. (2-tailed): .833 Exact Sig. (1-tailed): .414	U: 1.000; Z: -1.389; Point P.: .067; Asymp. Sig. (2-tailed): .165 Exact Sig. (2-tailed): .267 Exact Sig. (1-tailed): .133

	CPS - *Cranium* and postcranium (CS001, 4/5, 10/11, 12/13, PS001/2, 3/4, 5/6, 7/8, 11/12, 15/16)	CS - *Cranium* (CS001, 4/5, 10/11, 12/13)	CS - *Calvarium* (CS001, 4/5)	CS - *Mandibula* (CS010/11, 12/13)	PS - Postcranium (PS001/2, 3/4, 5/6, 7/8, 11/12, 15/16)	PS - Upper free extremities (PS001/2, 3/4, 5/6, 7/8)	PS - *Humerus* (PS001/2, 3/4)	PS - *Radius* and *Ulna* (PS005/6, 7/8)	PS - *Femur* and *Tibia* (PS011/12, 15/16)
pre-Leiterband - No.	25	8	4	4	17	11	6	5	6
pre-Leiterband - Min.	3.5	5.0	7.0	5.0	3.5	3.5	3.5	5.0	5.0
pre-Leiterband - Max.	8.0	8.0	8.0	7.0	8.0	7.5	7.0	7.5	8.0
pre-Leiterband - Mode	6.0	8.0	8.0	6.0	6.0	5.5	5.5	6.0	6.0
pre-Leiterband - Median	6.00	7.00	8.00	6.00	6.00	6.00	5.50	6.00	6.25
pre-Leiterband - Mean	6.32	6.88	7.75	6.00	6.06	5.86	5.58	6.20	6.42
Leiterband - No.	54	19	9	10	35	25	13	12	10
Leiterband - Min.	2.0	2.0	2.0	3.0	3.0	4.0	4.0	4.0	3.0
Leiterband - Max.	9.0	9.0	9.0	6.0	9.0	8.5	8.5	8.0	9.0
Leiterband - Mode	5.0	5.0	5.0	5.0	6.0	6.0	7.0	5.5	6.0
Leiterband - Median	5.50	5.00	6.00	5.00	6.00	6.00	6.50	5.50	6.00
Leiterband - Mean	5.75	5.42	6.17	4.75	5.93	6.00	6.23	5.75	5.75
Significance	U: 503.000; Z: -1.833; Point P.: .000; Asymp. Sig. (2-tailed): .067 Exact Sig. (2-tailed): .067 Exact Sig. (1-tailed): .034	U: 35.500; Z: -2.200; Point P.: .002; Asymp. Sig. (2-tailed): .028 Exact Sig. (2-tailed): .027 Exact Sig. (1-tailed): .014	U: 11.000; Z: -1.103; Point P.: .036; Asymp. Sig. (2-tailed): .270 Exact Sig. (2-tailed): .309 Exact Sig. (1-tailed): .157	U: 5.500; Z: -2.147; Point P.: .018; Asymp. Sig. (2-tailed): .032 Exact Sig. (2-tailed): .029 Exact Sig. (1-tailed): .023	U: 276.500; Z: -.414; Point P.: .004; Asymp. Sig. (2-tailed): .679 Exact Sig. (2-tailed): .685 Exact Sig. (1-tailed): .343	U: 131.500; Z: -.208; Point P.: .010; Asymp. Sig. (2-tailed): .835 Exact Sig. (2-tailed): .847 Exact Sig. (1-tailed): .424	U: 28.000; Z: -.977; Point P.: .010; Asymp. Sig. (2-tailed): .329 Exact Sig. (2-tailed): .350 Exact Sig. (1-tailed): .174	U: 20.000; Z: -1.077; Point P.: .016; Asymp. Sig. (2-tailed): .282 Exact Sig. (2-tailed): .310 Exact Sig. (1-tailed): .156	U: 22.000; Z: -.883; Point P.: .011; Asymp. Sig. (2-tailed): .377 Exact Sig. (2-tailed): .402 Exact Sig. (1-tailed): .200

Appendix XXIII.A.8. Dental stress and health traits

	DL - Tooth loss (all teeth)	DL - Tooth loss (affected individuals)	DS - Hypoplasia - presence (all teeth)	DS - Hypoplasia - presence (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)	DS - Hypoplasia - presence (UM1, 2, 3, LM1, 2, 3)	DS - Hypoplasia - frequency (all teeth)	DS - Hypoplasia - frequency (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)	DS - Hypoplasia - frequency (UM1, 2, 3, LM1, 2, 3)	DC - Caries - presence (all teeth)	DC - Caries - presence (affected individuals)
pre-Leiterband - No.	118	5	65	42	23	65	42	23	88	5
pre-Leiterband - Mode	1	1	1	1	0	0	2	0	0	0
pre-Leiterband - Median	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00
pre-Leiterband - Mean	0.94	0.60	0.54	0.57	0.48	0.92	1.02	0.74	0.02	0.20
pre-Leiterband - Frequ.	(0) 7:118, 5.9%; (1) 111:118, 94.1%	(0) 2:5, 40.0%; (1) 3:5, 60.0%	(0) 30:65, 46.2%; (1) 35:65, 53.8%	(0) 18:42, 42.9%; (1) 24:42, 57.1%	(0) 12:23, 52.2%; (1) 11:23, 47.8%	(0) 30:65, 46.2%; (1) 10:65, 15.4%; (2) 25:65, 38.5%	(0) 18:42, 42.9%; (1) 5:42, 11.9%; (2) 19:42, 45.2%	(0) 12:23, 52.2%; (1) 5:23, 21.7%; (2) 6:23, 26.1%	(0) 86:88, 97.7%; (1) 2:88, 2.3%	(0) 4:5, 80.0%; (1) 1:5, 20.0%
Leiterband - No.	353	15	190	111	79	190	111	79	331	16
Leiterband - Mode	1	1	1	1	1	2	2	2	0	0
Leiterband - Median	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	0.00	0.00
Leiterband - Mean	0.98	0.80	0.78	0.86	0.67	1.40	1.62	1.09	0.12	0.25
Leiterband - Frequ.	(0) 6:353, 1.7%; (1) 347:353, 98.3%	(0) 3:15, 20.0%; (1) 12:15, 80.0%	(0) 41:190, 21.6%; (1) 149:190, 78.4%	(0) 15:111, 13.5%; (1) 96:111, 86.5%	(0) 26:79, 32.9%; (1) 53:79, 67.1%	(0) 41:190, 21.6%; (1) 32:190, 16.8%; (2) 117:190, 61.6%	(0) 15:111, 13.5%; (1) 12:111, 10.8%; (2) 84:111, 75.7%	(0) 26:79, 32.9%; (1) 20:79, 25.3%; (2) 33:79, 41.8%	(0) 292:331, 88.2%; (1) 39:331, 11.8%	(0) 12:16, 75.0%; (1) 4:16, 25.0%
Significance	Pearson's χ^2: 12.648; df: 1; highly significant; Yates's χ^2: 10.242; df: 1; very significant	Pearson's χ^2: 1.250; df: 1; not significant; Yates's χ^2: 0.375; df: 1; not significant	Pearson's χ^2: 23.141; df: 1; highly significant; Yates's χ^2: 21.714; df: 1; highly significant	Pearson's χ^2: 30.998; df: 1; highly significant; Yates's χ^2: 28.535; df: 1; highly significant	Pearson's χ^2: 3.870; df: 1; significant; Yates's χ^2: 3.047; df: 1; not significant (different in tendency)	Pearson's χ^2: 23.869; df: 2; highly significant; Yates's χ^2: 22.320; df: 2; highly significant	Pearson's χ^2: 32.009; df: 2; highly significant; Yates's χ^2: 29.436; df: 2; highly significant	Pearson's χ^2: 4.071; df: 2; not significant; Yates's χ^2: 3.070; df: 2; not significant	Pearson's χ^2: 7.675; df: 1; very significant; Yates's χ^2: 6.787; df: 1; very significant	Pearson's χ^2: 0.067; df: 1; not significant; Yates's χ^2: 0.067; df: 1; not significant

	DA - Abrasion (all teeth)	DA - Ant. abrasion (UI1, 2, C, LI1, 2, C)	DA - Post. abrasion (UM1, 2, 3, LM1, 2, 3)	DS - Hypoplasia - intensity (all teeth)	DS - Hypoplasia - intensity (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)	DS - Hypoplasia - intensity (UM1, 2, 3, LM1, 2, 3)	DC - Caries - severity (all teeth)	DC - Caries - severity (all lesions)
pre-Leiterband - No.	52	18	18	65	42	23	88	2
pre-Leiterband - Min.	20.0	28.0	20.0	1.0	1.0	1.0	0	7
pre-Leiterband - Max.	60.0	58.0	55.0	5.0	4.5	5.0	7	7
pre-Leiterband - Mode	40.0	55.0	40.0	1.0	1.0	1.0	0	7
pre-Leiterband - Median	41.25	50.00	40.00	1.50	1.50	1.00	0.00	7.00
pre-Leiterband - Mean	44.13	46.86	40.28	2.10	2.11	2.09	0.16	7.00
Leiterband - No.	171	57	74	190	111	79	331	39
Leiterband - Min.	10.0	20.0	10.0	1.0	1.0	1.0	0	1
Leiterband - Max.	55.0	52.5	55.0	6.0	6.0	5.0	3	3
Leiterband - Mode	20.0	20.0	20.0	1.0	2.0	1.0	0	1
Leiterband - Median	30.00	29.00	28.00	2.50	2.50	2.50	0.00	1.00
Leiterband - Mean	30.85	29.87	28.76	2.48	2.62	2.30	0.17	1.41
Significance	U: 1685.000; Z: -6.818; Point P.: .000; Asymp. Sig. (2-tailed): .000 Exact Sig. (2-tailed): .000 Exact Sig. (1-tailed): .000	U: 124.00; Z: -4.857; Point P.: .000; Asymp. Sig. (2-tailed): .000 Exact Sig. (2-tailed): .000 Exact Sig. (1-tailed): .000	U: 278.000; Z: -3.861; Point P.: .000; Asymp. Sig. (2-tailed): .000 Exact Sig. (2-tailed): .000 Exact Sig. (1-tailed): .000	U: 4951.000; Z: -2.426; Point P.: .000; Asymp. Sig. (2-tailed): .015 Exact Sig. (2-tailed): .015 Exact Sig. (1-tailed): .007	U: 1744.500; Z: -2.427; Point P.: .000; Asymp. Sig. (2-tailed): .015 Exact Sig. (2-tailed): .015 Exact Sig. (1-tailed): .007	U: 787.000; Z: -1.006; Point P.: .001; Asymp. Sig. (2-tailed): .314 Exact Sig. (2-tailed): .318 Exact Sig. (1-tailed): .159	U: 13218.000; Z: -2.588; Point P.: .000; Asymp. Sig. (2-tailed): .010 Exact Sig. (2-tailed): .010 Exact Sig. (1-tailed): .003	U: .000; Z: -3.039; Point P.: .001; Asymp. Sig. (2-tailed): .002 Exact Sig. (2-tailed): .001 Exact Sig. (1-tailed): .001

	DA - pre-Leiterband - Ant.-post. abrasion comparison	DA - Leiterband - Ant.-post. abrasion comparison
Anterior dentition (UI1,2,UC&LI1,2,LC) - No.	18	57
Anterior dentition (UI1,2,UC&LI1,2,LC) - Min.	28.0	20.0
Anterior dentition (UI1,2,UC&LI1,2,LC) - Max.	58.0	52.5
Anterior dentition (UI1,2,UC&LI1,2,LC) - Mode	55.0	20.0
Anterior dentition (UI1,2,UC&LI1,2,LC) - Median	50.00	29.00
Anterior dentition (UI1,2,UC&LI1,2,LC) - Mean	46.86	29.87
Posterior dentition (UM1,2,3&LM1,2,3) - No.	18	74
Posterior dentition (UM1,2,3&LM1,2,3) - Min.	20.0	10.0
Posterior dentition (UM1,2,3&LM1,2,3) - Max.	55.0	55.0
Posterior dentition (UM1,2,3&LM1,2,3) - Mode	40.0	20.0
Posterior dentition (UM1,2,3&LM1,2,3) - Median	40.00	28.00
Posterior dentition (UM1,2,3&LM1,2,3) - Mean	40.28	28.76
Significance	U: 103.000; Z: -1.888; Point P.: .001; Asymp. Sig. (2-tailed): .059 Exact Sig. (2-tailed): .060 Exact Sig. (1-tailed): .030	U: 1978.500; Z: -.613; Point P.: .001; Asymp. Sig. (2-tailed): .540 Exact Sig. (2-tailed): .542 Exact Sig. (1-tailed): .271

Appendix XXIII.A.9. Age at death

	Age at death (with sub-adults)	Age at death (without sub-adults)
pre-Leiterband - No.	8	6
pre-Leiterband - Min.	11.5	30.0
pre-Leiterband - Max.	50.0	50.0
pre-Leiterband - Mode	40.0	40.0
pre-Leiterband - Median	36.3	38.8
pre-Leiterband - Mean	32.2	38.8
pre-Leiterband - S.D.	13.4	6.66
Leiterband - No.	21	18
Leiterband - Min.	7.0	20.0
Leiterband - Max.	45.0	45.0
Leiterband - Mode	30.0	30.0
Leiterband - Median	21.5	22.5
Leiterband - Mean	24.2	26.4
Leiterband - S.D.	8.9	7.51
Significance	U: 50.500; Z: -1.642; Point P.: .003; Asymp. Sig. (2-tailed): .101 Exact Sig. (2-tailed): .104 Exact Sig. (1-tailed): .052	U: 12.500; Z: -2.787; Point P.: .000; Asymp. Sig. (2-tailed): .005 Exact Sig. (2-tailed): .003 Exact Sig. (1-tailed): .002

	Frequ. of sub-adults (Leiterband - pre-Leiterband)	Frequ. of sub-adults - with 02/28-7 as sub-adult (Leiterband - pre-Leiterband)
pre-Leiterband - No.	8	8
pre-Leiterband - Frequ.	(adult or older) 6, 75.0% (sub-adult) 2, 25.0%	(adult or older) 6, 75.0% (sub-adult) 2, 25.0%
Leiterband - No.	21	21
Leiterband - Frequ.	(adult or older) 19, 90.5% (sub-adult) 2, 9.5%	(adult or older) 18, 85.7% (sub-adult) 3, 14.3%
Significance	Pearson's χ^2: 2.235; df: 1; not significant; Yates's χ^2: 0.797; df: 1; not significant	Pearson's χ^2: 0.748; df: 1; not significant; Yates's χ^2: 0.129; df: 1; not significant

	Frequ. of sub-adults (02/28 - 02/1)	Frequ. of sub-adults - with 02/28-7 as sub-adult (02/28 - 02/1)
02/1 - No.	6	6
02/1 - Frequ.	(adult or older) 5, 83.3% (sub-adult) 1, 16.7%	(adult or older) 5, 83.3% (sub-adult) 1, 16.7%
02/28 - No.	14	14
02/28 - Frequ.	(adult or older) 12, 85.7% (sub-adult) 2, 14.3%	(adult or older) 11, 78.6% (sub-adult) 3, 21.4%
Significance	Pearson's χ^2: 0.028; df: 1; not significant; Yates's χ^2: 0.174; df: 1; not significant	Pearson's χ^2: 0.080; df: 1; not significant; Yates's χ^2: 0.046; df: 1; not significant

Appendix XXIII.A.10. Living height, living weight and height-weight indices

	Living height	Living weight	Quetelet index	Body mass index	Rohrer index	*Index ponderalis*
pre-Leiterband - No.	4	4	4	4	4	4
pre-Leiterband - Min.	151.94	38.0	2.50	1.65	1.06	2.19
pre-Leiterband - Max.	165.88	50.8	3.18	1.99	1.24	2.32
pre-Leiterband - Mode						
pre-Leiterband - Median	159.46	46.7	2.87	1.77	1.10	2.23
pre-Leiterband - Mean	159.18	45.6	2.86	1.79	1.13	2.24
pre-Leiterband - S.D.	5.71	5.5	0.28	0.14	0.08	0.05
Leiterband - No.	15	18	15	15	15	15
Leiterband - Min.	144.32	40.0	2.51	1.57	0.99	2.14
Leiterband - Max.	173.19	64.6	3.73	2.15	1.37	2.39
Leiterband - Mode	165.66					
Leiterband - Median	159.46	46.5	2.98	1.91	1.21	2.29
Leiterband - Mean	158.48	47.7	3.01	1.90	1.20	2.29
Leiterband - S.D.	7.86	5.4	0.26	0.14	0.11	0.07
Significance	U: 28.000; Z: -.200; Point P.: .017; Asymp. Sig. (2-tailed): .841 Exact Sig. (2-tailed): .866 Exact Sig. (1-tailed): .432	U: 31.000; Z: -.426; Point P.: .030; Asymp. Sig. (2-tailed): .670 Exact Sig. (2-tailed): .712 Exact Sig. (1-tailed): .356	U: 19.000; Z: -1.101; Point P.: .012; Asymp. Sig. (2-tailed): .271 Exact Sig. (2-tailed): .295 Exact Sig. (1-tailed): .148	U: 16.000; Z: -1.401; Point P.: .011; Asymp. Sig. (2-tailed): .161 Exact Sig. (2-tailed): .179 Exact Sig. (1-tailed): .090	U: 17.000; Z: -1.304; Point P.: .011; Asymp. Sig. (2-tailed): .192 Exact Sig. (2-tailed): .208 Exact Sig. (1-tailed): .106	U: 17.000; Z: -1.303; Point P.: .008; Asymp. Sig. (2-tailed): .193 Exact Sig. (2-tailed): .210 Exact Sig. (1-tailed): .103

Appendix XXIII.B. χ^2 tests

Appendix XXIII.B.1. Postcranial epigenetic traits

PE007a/8a - *Fossa hypotrochanterica* (m) - presence
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((4 – 2.224)^2 / 2.224) + ((0 – 1.776)^2 / 1.776) = 1.418 + 1.776 = 3.194$
not significant (*Fossa hypotrochanterica* frequencies do not differ significantly – however, different in tendency), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|4 – 2.224| – 0.5)^2 / 2.224) + ((|0 – 1.776| – 0.5)^2 / 1.776) = 0.732 + 0.917 = 1.649$
not significant (*Fossa hypotrochanterica* frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(0)	4	1.000
(1)	0	0.000
All	4	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 2.224 (4 · 0.556 = 2.224)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 1.776 (4 · 0.444 = 1.776)
Leiterband frequencies:

	f	p
(0)	5	0.556
(1)	4	0.444
All	9	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 9.000 (9 · 1.000 = 9.000)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 0.000 (9 · 0.000 = 0.000)

Appendix XXIII.B.2. Postcranial robusticity traits

PR011a/12a - Femoral shaft bowing (m)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((0 – 0.572)^2 / 0.572) + ((0 – 0.284)^2 / 0.284) + ((0 – 0.572)^2 / 0.572) + ((0 – 0.284)^2 / 0.284) + ((4 – 2.284)^2 / 2.284) = 0.572 + 0.284 + 0.572 + 0.284 + 1.289 = 3.001$
not significant (femoral shaft shape frequencies do not differ significantly), remarks: all expected frequencies are under 5
- Yates's: $\chi^2 = ((|0 – 0.572| – 0.5)^2 / 0.572) + ((|0 – 0.284| – 0.5)^2 / 0.284) + ((|0 – 0.572| – 0.5)^2 / 0.572) + ((|0 – 0.284| – 0.5)^2 / 0.284) + ((|4 – 2.284| – 0.5)^2 / 2.284) = 0.009 + 0.164 + 0.009 + 0.164 + 0.647 = 0.994$
not significant (femoral shaft shape frequencies do not differ significantly), remarks: not a 2x2 table
df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01), 18.467 (p .001)
pre-Leiterband frequencies:

	f	p
(1)	0	0.000
(3)	0	0.000
(4)	0	0.000
(4.5)	0	0.000
(5)	4	1.000
All	4	1.000

expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 0.572 (4 · 0.143 = 0.572)
expected (3) frequency for pre-Leiterband based on the Leiterband frequency: 0.284 (4 · 0.071 = 0.284)
expected (4) frequency for pre-Leiterband based on the Leiterband frequency: 0.572 (4 · 0.143 = 0.572)
expected (4.5) frequency for pre-Leiterband based on the Leiterband frequency: 0.284 (4 · 0.071 = 0.284)
expected (5) frequency for pre-Leiterband based on the Leiterband frequency: 2.284 (4 · 0.571 = 2.284)
Leiterband frequencies:

	f	p
(1)	2	0.143
(3)	1	0.071
(4)	2	0.143
(4.5)	1	0.071
(5)	8	0.571
All	14	1.000

expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 0.000 (14 · 0.000 = 0.000)
expected (3) frequency for Leiterband based on the pre-Leiterband frequency: 0.000 (14 · 0.000 = 0.000)
expected (4) frequency for Leiterband based on the pre-Leiterband frequency: 0.000 (14 · 0.000 = 0.000)
expected (4.5) frequency for Leiterband based on the pre-Leiterband frequency: 0.000 (14 · 0.000 = 0.000)
expected (5) frequency for Leiterband based on the pre-Leiterband frequency: 14.000 (14 · 1.000 = 14.000)

Appendix XXIII.B.3. Tooth loss

DL - Tooth loss (all teeth)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((7 - 2.006)^2 / 2.006) + ((111 - 115.994)^2 / 115.994) = 12.433 + 0.215 = 12.648$

highly significant (tooth loss frequencies differ highly significantly), remarks: one expected frequency is under 5
- Yates's: $\chi^2 = ((|7 - 2.006| - 0.5)^2 / 2.006) + ((|111 - 115.994| - 0.5)^2 / 115.994) = 10.068 + 0.174 = 10.242$

very significant (tooth loss frequencies differ very significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	7	0.059
(1)	111	0.941
All	118	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 2.006 (118 · 0.017 = 2.006)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 115.994 (118 · 0.983 = 115.994)

Leiterband frequencies:

	f	p
(0)	6	0.017
(1)	347	0.983
All	353	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 20.827 (353 · 0.059 = 20.827)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 332.173 (353 · 0.941 = 332.173)

DL - Tooth loss (affected individuals)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((2 - 1.000)^2 / 1.000) + ((3 - 4.000)^2 / 4.000) = 1.000 + 0.250 = 1.250$

not significant (tooth loss frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|2 - 1.000| - 0.5)^2 / 1.000) + ((|3 - 4.000| - 0.5)^2 / 4.000) = 0.250 + 0.125 = 0.375$

not significant (tooth loss frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	2	0.400
(1)	3	0.600
All	5	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 1.000 (5 · 0.200 = 1.000)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 4.000 (5 · 0.800 = 4.000)

Leiterband frequencies:

	f	p
(0)	3	0.200
(1)	12	0.800
All	15	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 6.000 (15 · 0.400 = 6.000)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 9.000 (15 · 0.600 = 9.000)

Appendix XXIII.B.4. Enamel hypoplasia

DS - Hypoplasia - presence (all teeth)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((30 - 14.040)^2 / 14.040) + ((35 - 50.960)^2 / 50.960) = 18.142564 + 4.998 = 23.141$

highly significant (hypoplasia frequencies differ highly significantly)
- Yates's: $\chi^2 = ((|30 - 14.040| - 0.5)^2 / 14.040) + ((|35 - 50.960| - 0.5)^2 / 50.960) = 17.024 + 4.690 = 21.714$

highly significant (hypoplasia frequencies differ highly significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	30	0.462
(1)	35	0.538
All	65	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 14.040 (65 · 0.216 = 14.040)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 50.960 (65 · 0.784 = 50.960)

Leiterband frequencies:

	f	p
(0)	41	0.216
(1)	149	0.784
All	190	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 87.780 (190 · 0.462 = 87.780)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 102.220 (190 · 0.538 = 102.220)

DS - Hypoplasia - presence (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((18 – 5.670)^2 / 5.670) + ((24 – 36.330)^2 / 36.330) = 26.813 + 4.185 = 30.998
highly significant (hypoplasia frequencies differ highly significantly)
- Yates's: χ^2 = ((|18 – 5.670| – 0.5)^2 / 5.670) + ((|24 – 36.330| – 0.5)^2 / 36.330) = 24.682 + 3.852 = 28.535
highly significant (hypoplasia frequencies differ highly significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(0)	18	0.429
(1)	24	0.571
All	42	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 5.670 (42 · 0.135 = 5.670)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 36.330 (42 · 0.865 = 36.330)
Leiterband frequencies:

	f	p
(0)	15	0.135
(1)	96	0.865
All	111	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 47.619 (111 · 0.429 = 47.619)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 63.381 (111 · 0.571 = 63.381)

DS - Hypoplasia - presence (UM1, 2, 3, LM1, 2, 3)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((12 – 7.567)^2 / 7.567) + ((11 – 15.433)^2 / 15.433) = 2.597 + 1.273 = 3.870
significant (hypoplasia frequencies differ significantly)
- Yates's: χ^2 = ((|12 – 7.567| – 0.5)^2 / 7.567) + ((|11 – 15.433| – 0.5)^2 / 15.433) = 2.044 + 1.002 = 3.047
not significant (hypoplasia frequencies do not differ significantly – however, different in tendency)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(0)	12	0.522
(1)	11	0.478
All	23	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 7.567 (23 · 0.329 = 7.567)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 15.433 (23 · 0.671 = 15.433)
Leiterband frequencies:

	f	p
(0)	26	0.329
(1)	53	0.671
All	79	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 41.238 (79 · 0.522 = 41.238)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 37.762 (79 · 0.478 = 37.762)

DS - Hypoplasia - frequency (all teeth)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((30 – 14.040)^2 / 14.040) + ((10 – 10.920)^2 / 10.920) + ((25 – 40.040)^2 / 40.040) = 18.143 + 0.078 + 5.649 = 23.869
highly significant (hypoplasia frequencies differ highly significantly)
- Yates's: χ^2 = ((|30 – 14.040| – 0.5)^2 / 14.040) + ((|10 – 10.920| – 0.5)^2 / 10.920) + ((|25 – 40.040| – 0.5)^2 / 40.040) = 17.024 + 0.016 + 5.280 = 22.320
highly significant (hypoplasia frequencies differ highly significantly), remarks: not a 2x2 table
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01), 13.816 (p .001)
pre-Leiterband frequencies:

	f	p
(0)	30	0.462
(1)	10	0.154
(2)	25	0.385
All	65	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 14.040 (65 · 0.216 = 14.040)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 10.920 (65 · 0.168 = 10.920)
expected (2) frequency for pre-Leiterband based on the Leiterband frequency: 40.040 (65 · 0.616 = 40.040)
Leiterband frequencies:

	f	p
(0)	41	0.216
(1)	32	0.168
(2)	117	0.616
All	190	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 87.780 (190 · 0.462 = 87.780)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 29.260 (190 · 0.154 = 29.260)
expected (2) frequency for Leiterband based on the pre-Leiterband frequency: 73.150 (190 · 0.385 = 73.150)

DS - Hypoplasia - frequency (UI1, 2, C, P1, 2, LI1, 2, C, P1, 2)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((18 – 5.670)^2 / 5.670) + ((5 – 4.536)^2 / 4.536) + ((19 – 31.794)^2 / 31.794) = 26.813 + 0.047 + 5.148 = 32.009

highly significant (hypoplasia frequencies differ highly significantly), remarks: one expected frequency is under 5
- Yates's: χ^2 = ((|18 – 5.670| – 0.5)^2 / 5.670) + ((|5 – 4.536| – 0.5)^2 / 4.536) + ((|19 – 31.794| – 0.5)^2 / 31.794) = 24.682 + 0.000 + 4.754 = 29.436

highly significant (hypoplasia frequencies differ highly significantly), remarks: not a 2x2 table
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01), 13.816 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	18	0.429
(1)	5	0.119
(2)	19	0.452
All	42	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency:	5.670	(42 · 0.135 = 5.670)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency:	4.536	(42 · 0.108 = 4.536)
expected (2) frequency for pre-Leiterband based on the Leiterband frequency:	31.794	(42 · 0.757 = 31.794)

Leiterband frequencies:

	f	p
(0)	15	0.135
(1)	12	0.108
(2)	84	0.757
All	111	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency:	47.619	(111 · 0.429 = 47.619)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency:	13.209	(111 · 0.119 = 13.209)
expected (2) frequency for Leiterband based on the pre-Leiterband frequency:	50.172	(111 · 0.452 = 50.172)

DS - Hypoplasia - frequency (UM1, 2, 3, LM1, 2, 3)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((12 – 7.567)^2 / 7.567) + ((5 – 5.819)^2 / 5.819) + ((6 – 9.614)^2 / 9.614) = 2.597 + 0.115 + 1.359 = 4.071

not significant (hypoplasia frequencies do not differ significantly)
- Yates's: χ^2 = ((|12 – 7.567| – 0.5)^2 / 7.567) + ((|5 – 5.819| – 0.5)^2 / 5.819) + ((|6 – 9.614| – 0.5)^2 / 9.614) = 2.044+ 0.017 + 1.009 = 3.070

not significant (hypoplasia frequencies do not differ significantly), remarks: not a 2x2 table
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01), 13.816 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	12	0.522
(1)	5	0.217
(2)	6	0.261
All	23	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency:	7.567	(23 · 0.329 = 7.567)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency:	5.819	(23 · 0.253 = 5.819)
expected (2) frequency for pre-Leiterband based on the Leiterband frequency:	9.614	(23 · 0.418 = 9.614)

Leiterband frequencies:

	f	p
(0)	26	0.329
(1)	20	0.253
(2)	33	0.418
All	79	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency:	41.238	(79 · 0.522 = 41.238)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency:	17.143	(79 · 0.217 = 17.143)
expected (2) frequency for Leiterband based on the pre-Leiterband frequency:	20.619	(79 · 0.261 = 20.619)

Appendix XXIII.B.5. Dental caries

DC - Caries - presence (all teeth)

expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: χ^2 = ((86 – 77.616)^2 / 77.616) + ((2 – 10.384)^2 / 10.384) = 0.906 + 6.769 = 7.675

very significant (caries frequencies differ very significantly)
- Yates's: χ^2 = ((|86 – 77.616| – 0.5)^2 / 77.616) + ((|2 – 10.384| – 0.5)^2 / 10.384) = 0.801 + 5.986 = 6.787

very significant (caries frequencies differ very significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

pre-Leiterband frequencies:

	f	p
(0)	86	0.977
(1)	2	0.023
All	88	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency:	77.616	(88 · 0.882 = 77.616)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency:	10.384	(88 · 0.118 = 10.384)

Leiterband frequencies:

	f	p
(0)	292	0.882
(1)	39	0.118
All	331	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency:	323.387	(331 · 0.977 = 323.387)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency:	7.613	(331 · 0.023 = 7.613)

DC - Caries - presence (affected individuals)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((4 - 3.750)^2 / 3.750) + ((1 - 1.250)^2 / 1.250) = 0.017 + 0.050 = 0.067$
not significant (caries frequencies do not differ significantly), remarks: both expected frequencies are under 5
- Yates's: $\chi^2 = ((|4 - 3.750| - 0.5)^2 / 3.750) + ((|1 - 1.250| - 0.5)^2 / 1.250) = 0.017 + 0.050 = 0.067$
not significant (caries frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(0)	4	0.800
(1)	1	0.200
All	5	1.000

expected (0) frequency for pre-Leiterband based on the Leiterband frequency: 3.750 (5 · 0.750 = 3.750)
expected (1) frequency for pre-Leiterband based on the Leiterband frequency: 1.250 (5 · 0.250 = 1.250)
Leiterband frequencies:

	f	p
(0)	12	0.750
(1)	4	0.250
All	16	1.000

expected (0) frequency for Leiterband based on the pre-Leiterband frequency: 12.800 (16 · 0.800 = 12.800)
expected (1) frequency for Leiterband based on the pre-Leiterband frequency: 3.200 (16 · 0.200 = 3.200)

Appendix XXIII.B.6. Sub-adult frequencies

Frequency of sub-adults (Leiterband - pre-Leiterband)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((6 - 7.240)^2 / 7.240) + ((2 - 0.760)^2 / 0.760) = 0.212 + 2.023 = 2.235$
not significant (sub-adult frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: $\chi^2 = ((|6 - 7.240| - 0.5)^2 / 7.240) + ((|2 - 0.760| - 0.5)^2 / 0.760) = 0.076 + 0.721 = 0.797$
not significant (sub-adult frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(adult or older)	6	0.750
(sub-adult)	2	0.250
All	8	1.000

expected (adult or older) frequency for pre-Leiterband based on the Leiterband frequency: 7.240 (8 · 0.905 = 7.240)
expected (sub-adult) frequency for pre-Leiterband based on the Leiterband frequency: 0.760 (8 · 0.095 = 0.760)
Leiterband frequencies:

	f	p
(adult or older)	19	0.905
(sub-adult)	2	0.095
All	21	1.000

expected (adult or older) frequency for Leiterband based on the pre-Leiterband frequency: 15.750 (21 · 0.750 = 15.750)
expected (sub-adult) frequency for Leiterband based on the pre-Leiterband frequency: 5.250 (21 · 0.250 = 5.250)

Frequency of sub-adults - with 02/28-7 as a sub-adult (Leiterband - pre-Leiterband)
expected frequencies based on Leiterband frequencies (larger sample):
- Pearson's: $\chi^2 = ((6 - 6.856)^2 / 6.856) + ((2 - 1.144)^2 / 1.144) = 0.107 + 0.641 = 0.748$
not significant (sub-adult frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: $\chi^2 = ((|6 - 6.856| - 0.5)^2 / 6.856) + ((|2 - 1.144| - 0.5)^2 / 1.144) = 0.018 + 0.111 = 0.129$
not significant (sub-adult frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)
pre-Leiterband frequencies:

	f	p
(adult or older)	6	0.750
(sub-adult)	2	0.250
All	8	1.000

expected (adult or older) frequency for pre-Leiterband based on the Leiterband frequency: 6.856 (8 · 0.857 = 6.856)
expected (sub-adult) frequency for pre-Leiterband based on the Leiterband frequency: 1.144 (8 · 0.143 = 1.144)
Leiterband frequencies:

	f	p
(adult or older)	18	0.857
(sub-adult)	3	0.143
All	21	1.000

expected (adult or older) frequency for Leiterband based on the pre-Leiterband frequency: 15.750 (21 · 0.750 = 15.750)
expected (sub-adult) frequency for Leiterband based on the pre-Leiterband frequency: 5.250 (21 · 0.250 = 5.250)

Frequency of sub-adults (02/28 - 02/1)

expected frequencies based on 02/28 frequencies (larger sample):
- Pearson's: $\chi^2 = ((5 - 5.142)^2 / 5.142) + ((1 - 0.858)^2 / 0.858) = 0.004 + 0.024 = 0.028$

not significant (sub-adult frequencies do not differ significantly), remarks: one expected frequency is under 5
- Yates's: $\chi^2 = ((|5 - 5.142| - 0.5)^2 / 5.142) + ((|1 - 0.858| - 0.5)^2 / 0.858) = 0.025 + 0.149 = 0.174$

not significant (sub-adult frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

02/1 frequencies:

	f	p
(adult or older)	5	0.833
(sub-adult)	1	0.167
All	6	1.000

expected (adult or older) frequency for 02/1 based on the 02/28 frequency:	5.142	(6 · 0.857 = 5.142)
expected (sub-adult) frequency for 02/1 based on the 02/28 frequency:	0.858	(6 · 0.143 = 0.858)

02/28 frequencies:

	f	p
(adult or older)	12	0.857
(sub-adult)	2	0.143
All	14	1.000

expected (adult or older) frequency for 02/28 based on the 02/1 frequency:	11.662	(14 · 0.833 = 11.662)
expected (sub-adult) frequency for 02/28 based on the 02/1 frequency:	2.338	(14 · 0.167 = 2.338)

Frequency of sub-adults - with 02/28-7 as a sub-adult (02/28 - 02/1)

expected frequencies based on 02/28 frequencies (larger sample):
- Pearson's: $\chi^2 = ((5 - 4.716)^2 / 4.716) + ((1 - 1.284)^2 / 1.284) = 0.017 + 0.063 = 0.080$

not significant (sub-adult frequencies do not differ significantly), remarks: two expected frequencies are under 5
- Yates's: $\chi^2 = ((|5 - 4.716| - 0.5)^2 / 4.716) + ((|1 - 1.284| - 0.5)^2 / 1.284) = 0.010 + 0.036 = 0.046$

not significant (sub-adult frequencies do not differ significantly)
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01), 10.828 (p .001)

02/1 frequencies:

	f	p
(adult or older)	5	0.833
(sub-adult)	1	0.167
All	6	1.000

expected (adult or older) frequency for 02/1 based on the 02/28 frequency:	4.716	(6 · 0.786 = 4.716)
expected (sub-adult) frequency for 02/1 based on the 02/28 frequency:	1.284	(6 · 0.214 = 1.284)

02/28 frequencies:

	f	p
(adult or older)	11	0.786
(sub-adult)	3	0.214
All	14	1.000

expected (adult or older) frequency for 02/28 based on the 02/1 frequency:	11.662	(14 · 0.833 = 11.662)
expected (sub-adult) frequency for 02/28 based on the 02/1 frequency:	2.338	(14 · 0.167 = 2.338)

Appendix XXIV. Mean individuals

Appendix XXIV.A. Measurements

Appendix XXIV.A.1. Cranial measurements

	CM001 - 1. Maximum cranial length	CM002 - 3. *Glabello-Lambda* length	CM003 - 8. Maximum cranial breadth	CM004 - 9. Least frontal breadth	CM007 - 13a. Mastoid width (l)	CM008 - 13a. Mastoid width (r)	CM010 - 19a. Mastoid height (l)	CM011 - 19a. Mastoid height (r)	CM020 - 30. *Bregma-Lambda* chord	CM028 - 48(1). *Nasospinale-Prosthion* height	CM030 - *50(1). Interorbital breadth	CM035 - 54. Nasal breadth
Wadi Howar	182.9	168.0	129.3	92.4	11.8	11.6	27.8	28.3	112.3	22.4	23.5	24.6
Jebel Sahaba/Tushka	191.4	184.7	134.6	100.1	15.4	15.4	33.8	34.0	113.9	23.4	26.9	27.7
A-Group	181.3	176.3	134.4	90.8	12.4	12.8	32.4	32.2	115.6	20.8	23.9	24.8
Malian Sahara	187.7	181.4	139.9	96.3	13.3	13.8	31.8	32.9	117.0	20.1	26.4	27.7
“Sudanese Hotchpotch”	181.0	184.0	131.5	97.1	14.3	14.3	33.8	33.8	118.3	24.1	25.5	25.4
Southern Sudan	182.0	177.8	132.3	93.4	13.3	13.8	30.1	30.3	114.4	22.0	26.2	27.1
Chad	180.9	175.5	131.1	93.3	11.2	11.9	28.0	28.0	111.7	19.6	25.6	26.9
Mandinka	182.6	178.9	130.4	93.1	11.7	12.0	29.2	29.5	116.9	22.8	26.0	27.2
Somalis	185.5	180.2	135.9	94.5	12.3	12.5	31.5	31.5	115.9	20.4	24.5	24.4
Haya	180.2	175.0	130.0	95.7	12.2	12.7	30.6	30.7	111.7	20.3	25.5	26.6
W.H. - Leiterband/Handessi	176.1	168.0	127.2	92.4	11.0	10.8	27.0	27.0	110.2	20.4	23.5	23.3
W.H. - Leiterband	176.1	168.0	127.2	92.4	11.7	11.3	27.7	27.7	110.2	20.4	23.8	24.0
W.H. - pre-Leiterband	210.0		140.0		13.5	13.3	29.5	31.0	123.0	25.7		28.3
W.H. - 96/120 (Handessi)					9.0	9.0	25.0	25.0			21.5	18.0
W.H. - 96/1	173.0	168.0	130.0						113.0	19.0		24.0
W.H. - 02/28	177.2	168.0	126.5	92.4	11.7	11.3	27.7	27.7	109.5	20.8	23.0	24.2
W.H. - 02/1					13.5	13.3	29.5	31.0		22.5		28.5
W.H. - 95/4	210.0		140.0						123.0	32.0		28.0
J.S./T. - ♂	196.2	189.0	137.0	103.7	17.2	17.4	36.5	36.7	117.6	23.5	27.8	28.3
J.S./T. - ♀	186.1	180.1	131.8	96.5	13.6	13.3	31.1	31.2	110.6	23.2	26.0	27.1
M.S. - Erg Ine Sakane	181.5	176.5	136.0	94.8	11.7	12.7	30.8	32.2	110.8	20.7	24.5	24.3
M.S. - Hassi el Abiod	191.4	184.4	141.0	96.7	15.2	15.3	33.2	33.9	118.8	20.6	27.2	28.5
M.S. - Kobadi	181.0	177.6	138.3	97.3	8.7	9.8	27.8	29.8	114.8	18.4	26.4	28.3
“S.H.” - El Kadada												
“S.H.” - Saggai	179.0	184.0	136.0	97.5					118.0			25.3
“S.H.” - Jebel Shaqadud	183.0		127.0	96.0	14.3	14.3	33.8	33.8	118.5	24.1	25.5	25.5

	CM042 - *61a(1). Canine alveolar breadth (mx)	CM043 - *61a(1). Canine alveolar breadth (md)	CM045 - *61a(2). 1st premolar alveolar breadth (md)	CM047 - *61a(3). 2nd premolar alveolar breadth (md)	CM049 - *61a(4). 1st moalr alveolar breadth (md)	CM051 - *61a(5). 2nd molar alveolar breadth (md)	CM058 - *62a(3). 3rd internal dental arch length (mx)	CM059 - *62a(3). 3rd internal dental arch length (md)	CM060 - *62a(4). 4th internal dental arch length (mx)	CM061 - *62a(4). 4th internal dental arch length (md)	CM068 - 63(2). Anterior palate breadth (mx)	CM069 - *63(2). Anterior palate breadth (md)
Wadi Howar	42.1	31.8	39.9	45.7	54.1	59.9	14.0	9.8	19.0	16.4	30.7	26.1
Jebel Sahaba/Tushka	44.4	33.7	41.6	48.1	57.1	61.5	12.7	9.9	19.3	16.0	33.6	27.2
A-Group	39.6	30.6	38.0	44.0	53.3	58.7	12.3	8.0	18.0	13.6	30.0	24.1
Malian Sahara	42.3	31.6	39.1	46.3	56.9	63.0	12.4	9.8	18.2	16.4	31.7	26.9
“Sudanese Hotchpotch”	42.3	30.0	37.0	43.0	52.5	56.5	11.8	11.0	17.8	17.0	34.8	23.0
Southern Sudan	42.1	31.9	40.9	47.5	57.2	63.1	12.6	9.6	19.2	16.6	33.4	26.9
Chad	40.8	30.8	39.0	45.3	54.5	60.2	12.1	9.1	18.3	15.5	31.6	25.9
Mandinka	42.4	31.5	39.7	46.4	55.3	60.5	13.1	9.4	19.5	16.1	33.3	27.5
Somalis	39.4	31.0	38.7	45.2	54.1	59.9	13.4	9.4	19.3	15.4	30.1	25.1
Haya	41.4	32.2	40.0	47.2	57.1	62.3	13.4	9.6	19.8	16.3	31.6	26.8
W.H. - Leiterband/Handessi	42.2	31.9	40.4	46.3	54.3	59.9	13.5	9.0	19.0	16.5	31.1	26.8
W.H. - Leiterband	42.2	31.9	40.4	46.3	54.3	59.9	13.5	9.0	19.0	16.5	31.1	26.8
W.H. - pre-Leiterband	42.0	31.5	39.0	44.5	53.8	60.0	16.5	11.3		16.0	30.0	24.8
W.H. - 96/120 (Handessi)												
W.H. - 96/1					51.0	60.0	9.5		14.0		23.0	
W.H. - 02/28	42.2	31.9	40.4	46.3	55.3	59.8	14.5	9.0	20.3	16.5	33.1	26.8
W.H. - 02/1	42.0	31.5	39.0	44.5	53.8	60.0	16.5	11.3		16.0	29.0	24.8
W.H. - 95/4											32.0	
J.S./T. - ♂	46.0	34.2	41.9	48.9	58.2	62.8	12.7	9.9	19.0	16.2	35.2	27.7
J.S./T. - ♀	42.8	33.2	41.3	47.2	56.0	60.2	12.7	9.9	19.5	15.8	32.1	26.7
M.S. - Erg Ine Sakane	40.7	31.0	38.2	43.3	52.2	55.5	11.7	9.2	16.5	15.0	30.3	24.5
M.S. - Hassi el Abiod	44.9	32.2	39.8	47.7	60.2	66.6	13.5	10.2	19.6	17.1	33.6	28.0
M.S. - Kobadi	36.8	29.0	37.5	45.0	54.5	60.8	10.0	8.0	15.8	14.5	27.4	24.8
“S.H.” - El Kadada												
“S.H.” - Saggai												
“S.H.” - Jebel Shaqadud	42.3	30.0	37.0	43.0	52.5	56.5	11.8	11.0	17.8	17.0	34.8	23.0

	CM070 - *63(2)a. 1st internal dental arch breadth (mx)	CM071 - *63(2)a. 1st internal dental arch breadth (md)	CM072 - *63(2)b. 2nd internal dental arch breadth (mx)	CM073 - *63(2)b. 2nd internal dental arch breadth (md)	CM075 - *63(2)c. 3rd internal dental arch breadth (md)	CM077 - *63(2)d. 4th internal dental arch breadth (md)	CM080 - 66. Bigonial breadth	CM082 - 68. Projective length of the body of the mandible	CM083 - 69. Height of the mandibular symphysis	CM085 - *69c. Thickness of the mandibular symphysis	CM086 - 69(1). Mental foramen height (l)	CM087 - 69(1). Mental foramen height (r)
Wadi Howar	25.6	18.3	35.3	31.0	34.5	40.3	88.4	73.3	36.5	13.4	34.3	34.2
Jebel Sahaba/Tushka	27.6	19.3	38.9	32.7	37.0	41.3	102.3	75.9	41.1	15.6	36.5	37.0
A-Group	24.0	16.4	35.3	29.8	33.7	39.1	89.9	70.1	34.9	14.4	32.4	32.6
Malian Sahara	25.5	17.6	37.4	32.3	37.2	43.5	98.6	75.3	37.8	15.1	33.8	34.2
"Sudanese Hotchpotch"	24.1	17.0	38.2	28.0	31.0	36.5	91.0	84.2	34.9	13.5	33.5	33.6
Southern Sudan	27.0	19.2	39.0	33.4	38.1	44.9	96.4	74.9	36.7	14.9	33.5	33.6
Chad	25.1	17.4	37.3	31.3	35.5	41.2	91.9	71.1	35.3	14.2	31.1	31.5
Mandinka	27.3	18.0	38.3	33.6	37.4	43.3	94.9	73.3	37.6	13.4	33.5	33.8
Somalis	24.3	17.1	35.4	31.4	35.1	40.6	90.6	73.2	35.8	14.6	32.4	33.2
Haya	25.0	18.0	36.8	33.3	37.6	43.1	92.0	71.1	34.3	13.1	31.1	31.3
W.H. - Leiterband/Handessi	25.8	18.9	35.8	31.9	35.4	41.3	89.3	69.9	34.9	13.5	33.6	33.6
W.H. - Leiterband	25.8	18.9	35.8	31.9	35.4	41.3	89.3	69.9	35.5	14.0	33.6	33.6
W.H. - pre-Leiterband	25.2	17.0	32.5	29.8	32.8	38.3	86.3	80.2	39.8	13.0	36.0	35.7
W.H. - 96/120 (Handessi)									31.0	10.0		
W.H. - 96/1	18.0		28.0			41.0	91.0	66.0	36.0	13.5	32.0	32.0
W.H. - 02/28	27.8	18.9	37.8	31.9	35.4	41.3	88.9	70.7	35.0	13.4	32.8	32.8
W.H. - 02/1	24.8	17.0	32.5	29.8	32.8	38.3	86.3	72.8	37.7	13.0	33.5	33.0
W.H. - 95/4	26.0							95.0	46.0		41.0	41.0
J.S./T. - ♂	28.8	19.7	39.9	33.7	38.2	42.4	105.3	76.9	42.6	16.4	37.4	38.1
J.S./T. - ♀	26.3	18.9	37.9	31.8	35.8	40.2	99.3	75.0	39.7	14.8	35.5	36.0
M.S. - Erg Ine Sakane	24.0	16.5	35.3	29.5	33.3	37.5	82.8	67.0	33.8	14.8	30.2	31.2
M.S. - Hassi el Abiod	27.1	18.1	39.5	33.9	39.4	46.7	105.5	77.3	39.3	15.7	34.8	35.1
M.S. - Kobadi	21.2	16.8	34.4	30.8	35.3	41.7	91.3	76.2	37.0	14.0	32.8	33.2
"S.H." - El Kadada												
"S.H." - Saggai							85.0	88.8	35.1		32.8	32.8
"S.H." - Jebel Shaqadud	24.1	17.0	38.2	28.0	31.0	36.5	103.0	75.0	34.6	13.5	33.9	34.0

	CM088 - 69(2). 2nd molar mandibular body height (l)	CM089 - 69(2). 2nd molar mandibular body height (r)	CM100 - 69(3). Mental foramen body thickness (l)	CM101 - 69(3). Mental foramen body thickness (r)	CM102 - 69b. 2nd molar mandibular body thickness (l)	CM103 - 69b. 2nd molar mandibular body thickness (r)	CM122 - 71a. Minimum ramus width (l)	CM123 - 71a. Minimum ramus width (r)	CM133 - 80a. Dental arch length of the mandible	CM135 - 80(1). External dental arch width (md)	CM136 - *80(1)a. Canine dental arch breadth (mx)	CM137 - *80(1)a. Canine dental arch breadth (md)
Wadi Howar	28.3	28.0	12.9	12.8	16.0	15.9	35.1	35.1	51.9	63.9	42.9	32.0
Jebel Sahaba/Tushka	31.1	31.4	14.3	14.5	16.7	16.9	41.1	40.9	56.1	64.0	42.8	34.2
A-Group	27.4	27.6	12.2	12.3	14.7	15.0	33.3	33.1	50.8	61.1	37.6	29.5
Malian Sahara	28.8	29.4	12.5	13.0	15.8	15.9	38.2	37.9	56.6	66.5	40.5	30.6
"Sudanese Hotchpotch"	28.2	28.7	11.9	11.6	15.8	15.6	34.1	33.9		61.0	40.5	
Southern Sudan	28.6	28.7	12.3	12.6	15.6	15.6	37.0	36.8	56.7	65.4	41.6	33.9
Chad	27.1	27.1	12.3	12.6	15.8	15.9	34.6	34.8	54.0	64.8	39.5	31.1
Mandinka	27.9	28.5	12.1	12.0	15.2	15.6	34.9	35.7	55.0	62.6	41.5	32.6
Somalis	27.2	27.7	12.0	12.2	14.3	15.0	35.3	35.5	52.6	62.9	38.8	30.1
Haya	27.1	27.3	12.5	12.3	14.8	15.2	34.4	34.1	59.0	63.9	41.0	33.5
W.H. - Leiterband/Handessi	27.4	26.9	12.5	12.5	15.9	15.8	35.5	35.5	51.0	64.5	44.2	32.1
W.H. - Leiterband	27.6	27.0	12.5	12.5	16.7	16.5	35.5	35.5	51.0	64.5	44.2	32.1
W.H. - pre-Leiterband	30.5	30.7	13.7	13.5	16.2	16.2	32.5	32.5	53.8	63.0	41.7	31.8
W.H. - 96/120 (Handessi)	26.0	26.0			11.5	11.5						
W.H. - 96/1	23.0	22.0	13.0	13.0	17.0	16.0	34.0	34.0	41.0			
W.H. - 02/28	28.1	27.5	12.4	12.4	16.8	16.8	35.8	35.8	54.3	64.5	44.2	32.1
W.H. - 02/1	28.8	29.0	12.5	12.3	15.3	15.3	32.5	32.5	53.8	63.0	40.0	31.8
W.H. - 95/4	34.0	34.0	16.0	16.0	18.0	18.0					45.0	
J.S./T. - ♂	31.8	32.0	14.7	14.7	17.0	17.0	42.6	42.2	56.1	65.3	44.1	35.2
J.S./T. - ♀	30.3	30.8	14.0	14.4	16.4	16.8	39.6	39.6	56.3	62.5	41.6	32.9
M.S. - Erg Ine Sakane	25.5	26.2	11.8	13.5	15.0	15.5	31.7	31.3	53.0	59.5	40.0	29.3
M.S. - Hassi el Abiod	29.8	30.4	12.6	12.9	16.1	16.2	40.9	40.5	60.0	70.2	43.8	32.3
M.S. - Kobadi	28.3	28.3	12.7	12.5	15.5	15.5	36.7	36.2	53.5	64.7	35.5	28.8
"S.H." - El Kadada												
"S.H." - Saggai	28.3	29.8	12.5	12.0	18.1	18.1	38.8	38.5				
"S.H." - Jebel Shaqadud	28.1	28.1	11.4	11.2	14.6	14.4	32.5	32.3		61.0	40.5	

	CM141 - *80(1)c. 2nd premolar dental arch breadth (md)	CM143 - *80(1)d. 1st molar dental arch breadth (md)	CM148 - *80(4)a. Canine dental arch length (mx)	CM149 - *80(4)a. Canine dental arch length (md)	CM150 - *80(4)b. 1st premolar dental arch length (mx)	CM153 - *80(4)c. 2nd premolar dental arch length (md)
Wadi Howar	46.1	55.0	13.3	11.0	22.3	23.7
Jebel Sahaba/Tushka	48.2	57.0	15.3	11.4	22.0	23.7
A-Group	43.8	52.5	14.7	9.1	20.4	20.9
Malian Sahara	45.9	58.2	14.6	10.5	20.6	23.9
"Sudanese Hotchpotch"	43.5	52.5				
Southern Sudan	48.0	56.9	15.3	11.7	22.1	24.1
Chad	45.6	54.3	14.8	10.6	21.2	22.4
Mandinka	46.1	55.1	16.8	12.8	24.0	25.5
Somalis	45.2	53.4	15.4	11.0	22.4	23.3
Haya	46.4	55.5	17.0	12.3	27.0	26.3
W.H. - Leiterband/Handessi	46.7	56.0	14.3	11.5	22.6	24.0
W.H. - Leiterband	46.7	56.0	14.3	11.5	22.6	24.0
W.H. - pre-Leiterband	45.3	53.5	12.3	10.5	21.5	23.3
W.H. - 96/120 (Handessi)						
W.H. - 96/1						
W.H. - 02/28	46.7	56.0	14.3	11.5	22.6	24.0
W.H. - 02/1	45.3	53.5	14.5	10.5	21.5	23.3
W.H. - 95/4			8.0			
J.S./T. - ♂	49.0	58.7	14.9	11.7	22.2	23.9
J.S./T. - ♀	47.4	55.9	15.6	11.0	21.9	23.5
M.S. - Erg Ine Sakane	41.3	55.0	13.5	11.3	20.0	23.5
M.S. - Hassi el Abiod	48.2	60.9	16.0	11.0	22.6	25.2
M.S. - Kobadi	45.7	54.8	12.9	8.0	18.1	21.0
"S.H." - El Kadada						
"S.H." - Saggai						
"S.H." - Jebel Shaqadud	43.5	52.5				

Appendix XXIV.A.2. Dental measurements

	DM001 - 81. Crown length UI1 (l)	DM002 - 81. Crown length UI1 (r)	DM003 - 81. Crown length UI2 (l)	DM004 - 81. Crown length UI2 (r)	DM005 - 81. Crown length UC (l)	DM006 - 81. Crown length UC (r)	DM007 - 81. Crown length UP1 (l)	DM008 - 81. Crown length UP1 (r)	DM009 - 81. Crown length UP2 (l)	DM010 - 81. Crown length UP2 (r)	DM011 - 81. Crown length UM1 (l)	DM012 - 81. Crown length UM1 (r)
Wadi Howar	9.9	9.9	8.1	8.1	8.3	8.2	7.7	7.8	7.4	7.4	11.8	11.7
Jebel Sahaba/Tushka	9.4	9.4	7.2	7.3	8.1	8.1	7.6	7.5	7.1	7.2	11.1	11.1
A-Group	8.9	8.9	7.0	7.0	7.7	7.7	7.1	7.1	6.9	6.9	10.9	10.9
Malian Sahara	9.1	9.0	7.5	7.5	8.3	8.3	7.6	7.6	7.0	7.1	10.9	10.9
"Sudanese Hotchpotch"	9.6	9.6	7.2	7.2	7.6	7.6	7.2	7.1	7.1	7.0	10.9	11.0
Southern Sudan	9.1	9.2	7.3	7.3	7.9	7.9	7.6	7.6	7.1	7.0	11.3	11.3
Chad	9.0	8.7	6.9	6.9	7.7	7.7	7.3	7.2	6.8	6.7	11.0	11.1
Mandinka	9.5	9.1	8.2	8.0	8.0	8.0	7.3	7.4	7.0	6.9	10.9	11.0
Somalis	8.8	8.8	6.8	6.8	7.8	7.7	7.2	7.2	6.8	6.8	10.9	10.9
Haya	8.9	8.4	7.3	7.3	7.9	7.9	7.5	7.5	7.0	7.0	10.9	10.8
W.H. - Leiterband/Handessi	9.9	9.9	7.9	7.9	8.1	8.1	7.6	7.7	7.3	7.3	11.7	11.7
W.H. - Leiterband	9.9	9.9	7.9	7.9	8.1	8.1	7.6	7.7	7.3	7.3	11.7	11.7
W.H. - pre-Leiterband	9.9	10.0	8.6	8.6	8.7	8.8	7.9	7.9	7.6	7.6	12.2	11.9
W.H. - 96/120 (Handessi)												
W.H. - 96/1	9.5	9.5			7.2	7.2	7.0	7.0			11.3	11.3
W.H. - 02/28	10.0	10.0	8.1	8.1	8.3	8.2	7.6	7.8	7.3	7.3	11.7	11.8
W.H. - 02/1	9.8	9.9	8.6	8.6	8.5	8.6	7.7	7.9	7.4	7.4	11.2	11.2
W.H. - 95/4	10.3	10.3	8.7	8.7	9.1	9.2	8.2	7.9	8.3	8.3	13.1	12.5
J.S./T. - ♂	9.4	9.3	7.3	7.6	8.1	8.2	7.5	7.4	7.2	7.4	11.3	11.1
J.S./T. - ♀	9.4	9.4	7.0	7.0	8.1	8.0	7.7	7.7	7.1	7.0	11.1	11.0
M.S. - Erg Ine Sakane	9.3	9.3	7.4	7.4	7.8	7.8	6.8	6.8	6.0	6.0	10.4	10.4
M.S. - Hassi el Abiod	9.4	9.4	7.6	7.7	8.6	8.6	8.0	8.0	7.3	7.4	11.8	11.8
M.S. - Kobadi	8.7	8.6	7.6	7.2	7.9	8.1	7.1	7.1	6.6	6.7	10.3	10.2
"S.H." - El Kadada	10.0	10.0	7.2	7.2	7.0	7.1	7.3	7.0	7.1	6.8	11.2	11.5
"S.H." - Saggai	9.1	9.1			8.2	8.2	7.3	7.3	7.3	7.3	10.8	10.8
"S.H." - Jebel Shaqadud					7.5	7.5	7.0	7.0	6.8	6.8	10.6	10.8

	DM013 - 81. Crown length UM2 (l)	DM014 - 81. Crown length UM2 (r)	DM015 - 81. Crown length UM3 (l)	DM016 - 81. Crown length UM3 (r)	DM017 - 81. Crown length LI1 (l)	DM018 - 81. Crown length LI1 (r)	DM019 - 81. Crown length LI2 (l)	DM020 - 81. Crown length LI2 (r)	DM021 - 81. Crown length LC (l)	DM022 - 81. Crown length LC (r)	DM023 - 81. Crown length LP1 (l)	DM024 - 81. Crown length LP1 (r)
Wadi Howar	11.2	11.3	10.0	10.1	6.0	6.0	6.7	6.5	7.4	7.3	7.7	7.7
Jebel Sahaba/Tushka	11.0	10.8	9.4	9.3	5.9	6.0	6.2	6.3	7.3	7.3	7.4	7.4
A-Group	10.4	10.4	9.2	9.2	5.3	5.4	5.9	5.8	6.7	6.7	7.1	7.0
Malian Sahara	10.9	10.8	9.7	9.8	5.8	5.9	6.3	6.3	7.4	7.4	7.8	7.8
“Sudanese Hotchpotch”	10.0	10.0	9.6	9.7	5.8	5.9	5.9	5.9	7.1	7.1	7.4	7.3
Southern Sudan	10.5	10.8	9.4	9.6	5.6	5.6	6.2	6.2	7.2	7.1	7.5	7.5
Chad	10.4	10.2	9.1	9.1	5.4	5.5	6.0	6.0	7.1	7.0	7.2	7.2
Mandinka	10.2	10.3	9.2	9.1	5.5	5.5	6.2	6.1	6.8	6.9	7.1	7.1
Somalis	10.3	10.3	8.7	8.8	5.4	5.4	5.8	5.9	6.6	6.6	7.1	7.1
Haya	10.5	10.5	9.0	9.1	5.8	5.5	6.2	6.2	7.4	7.5	7.6	7.6
W.H. - Leiterband/Handessi	11.1	11.3	10.0	10.1	6.1	6.0	6.6	6.5	7.3	7.3	7.8	7.7
W.H. - Leiterband	11.1	11.3	10.0	10.1	6.1	6.0	6.6	6.5	7.3	7.3	7.8	7.7
W.H. - pre-Leiterband	11.2	10.9	10.1	10.1	5.6	5.7	7.0	6.7	7.6	7.5	7.7	7.8
W.H. - 96/120 (Handessi)												
W.H. - 96/1	11.0	11.0	9.8	9.8	5.7	5.7			6.4	6.4	7.6	7.1
W.H. - 02/28	11.1	11.4	10.1	10.4	6.2	6.1	6.6	6.6	7.4	7.4	7.8	7.7
W.H. - 02/1	10.8	10.8	9.5	9.5	5.6	5.7	7.0	6.7	7.4	7.2	7.5	7.6
W.H. - 95/4	12.1	11.1	11.1	11.2					8.1	8.1	8.1	8.2
J.S./T. - ♂	10.9	11.0	9.4	9.5	6.1	6.3	6.3	6.3	7.5	7.5	7.3	7.4
J.S./T. - ♀	11.1	10.5	9.4	9.2	5.6	5.6	6.2	6.2	7.1	7.0	7.4	7.4
M.S. - Erg Ine Sakane	9.8	9.9	9.6	9.6	5.5	5.7	6.1	6.0	7.1	7.4	6.8	6.8
M.S. - Hassi el Abiod	11.4	11.3	9.8	9.8	5.9	5.9	6.5	6.5	7.9	8.0	8.3	8.4
M.S. - Kobadi	10.6	10.5	9.7	9.8			6.2	6.4	6.7	6.6	7.3	7.3
“S.H.” - El Kadada	10.0	9.9	9.3	9.7	5.6	5.8	5.7	5.7	7.3	7.3	7.5	7.5
“S.H.” - Saggai	10.4	10.4	10.1	10.1	5.9	5.9	6.2	6.2	7.4	7.4	7.7	7.7
“S.H.” - Jebel Shaqadud	9.5	9.5	9.3	9.3			5.6	5.6	5.8	5.8	7.1	6.8

	DM025 - 81. Crown length LP2 (l)	DM026 - 81. Crown length LP2 (r)	DM027 - 81. Crown length LM1 (l)	DM028 - 81. Crown length LM1 (r)	DM029 - 81. Crown length LM2 (l)	DM030 - 81. Crown length LM2 (r)	DM031 - 81. Crown length LM3 (l)	DM032 - 81. Crown length LM3 (r)	DM033 - 81(1). Crown width UI1 (l)	DM034 - 81(1). Crown width UI1 (r)	DM035 - 81(1). Crown width UI2 (l)	DM036 - 81(1). Crown width UI2 (r)
Wadi Howar	7.7	7.8	11.8	11.9	11.9	11.8	11.6	11.6	7.8	7.9	7.2	7.1
Jebel Sahaba/Tushka	7.4	7.2	11.8	11.8	11.4	11.5	11.2	11.3	7.9	8.0	7.3	7.2
A-Group	7.2	7.2	11.2	11.2	10.9	10.9	10.7	10.6	7.4	7.4	6.4	6.4
Malian Sahara	7.7	7.6	12.0	12.0	11.7	11.7	11.0	11.1	7.8	7.8	7.1	7.1
“Sudanese Hotchpotch”	7.3	7.4	11.4	11.4	11.2	11.2	10.9	10.8	7.6	7.6	6.5	6.4
Southern Sudan	7.6	7.6	12.0	12.0	11.3	11.2	11.6	11.7	7.6	7.6	6.6	6.6
Chad	7.4	7.4	11.4	11.3	10.9	10.9	10.9	10.9	7.3	7.4	6.4	6.4
Mandinka	7.2	7.1	11.6	11.6	10.7	10.7	10.8	10.9	7.5	7.5	7.0	7.2
Somalis	7.4	7.3	11.4	11.4	10.7	10.9	10.6	10.4	7.3	7.3	6.2	6.2
Haya	7.7	7.7	11.8	11.7	11.3	11.3	11.2	11.3	7.6	7.6	7.0	7.1
W.H. - Leiterband/Handessi	7.8	7.8	11.8	11.9	11.9	11.8	11.5	11.6	7.7	7.8	7.0	7.0
W.H. - Leiterband	7.8	7.8	11.8	11.9	11.9	11.8	11.5	11.6	7.7	7.8	7.0	7.0
W.H. - pre-Leiterband	7.7	7.9	11.8	11.7	12.0	12.0	11.7	11.7	8.1	8.1	7.8	7.5
W.H. - 96/120 (Handessi)												
W.H. - 96/1	6.9	6.9	11.7	12.2	11.5	11.7	12.6	12.8	6.5	6.5		
W.H. - 02/28	7.8	7.8	11.9	12.0	11.9	11.8	11.4	11.4	7.8	7.8	7.0	7.0
W.H. - 02/1	7.4	7.6	11.4	11.3	11.7	11.7	11.3	11.3	8.1	8.1	7.4	7.2
W.H. - 95/4	9.1	9.1	12.8	12.8	13.0	13.0	12.8	12.6	8.1	8.1	8.7	8.1
J.S./T. - ♂	7.5	7.5	12.1	12.0	11.4	11.5	11.3	11.4	7.7	7.8	7.3	7.3
J.S./T. - ♀	7.2	7.0	11.5	11.6	11.4	11.5	11.2	11.2	8.1	8.2	7.2	7.2
M.S. - Erg Ine Sakane	7.4	6.7	11.7	11.7	10.7	10.7	10.5	10.5	7.3	7.3	6.8	6.8
M.S. - Hassi el Abiod	8.2	8.1	12.6	12.6	12.4	12.5	11.3	11.5	8.1	8.2	7.1	7.1
M.S. - Kobadi	7.1	7.2	11.0	11.1	11.1	10.8	10.9	11.1	7.5	7.5	7.5	7.3
“S.H.” - El Kadada	6.9	7.2	12.0	12.0	11.3	11.3	10.7	11.0	7.7	7.6	6.5	6.3
“S.H.” - Saggai	8.0	8.0	10.8	10.8	11.0	11.0	10.5	10.5	7.2	7.2		
“S.H.” - Jebel Shaqadud	7.4	7.2	12.1	12.1	11.3	11.4	11.4	11.2	8.4	8.4	6.5	6.5

	DM037 - 81(1). Crown width UC (l)	DM038 - 81(1). Crown width UC (r)	DM039 - 81(1). Crown width UP1 (l)	DM040 - 81(1). Crown width UP1 (r)	DM041 - 81(1). Crown width UP2 (l)	DM042 - 81(1). Crown width UP2 (r)	DM043 - 81(1). Crown width UM1 (l)	DM044 - 81(1). Crown width UM1 (r)	DM045 - 81(1). Crown width UM2 (l)	DM046 - 81(1). Crown width UM2 (r)	DM047 - 81(1). Crown width UM3 (l)	DM048 - 81(1). Crown width UM3 (r)
Wadi Howar	8.7	8.7	10.2	10.2	9.9	10.0	12.4	12.3	12.6	12.5	12.1	12.0
Jebel Sahaba/Tushka	8.9	8.8	10.1	10.0	10.1	10.1	12.5	12.5	12.7	12.7	11.7	11.8
A-Group	8.3	8.3	9.5	9.4	9.5	9.5	11.7	11.7	11.6	11.7	11.0	11.1
Malian Sahara	8.9	8.9	10.1	10.1	9.9	9.9	12.0	12.1	12.2	12.2	11.5	11.5
“Sudanese Hotchpotch”	8.0	8.0	9.3	9.3	9.7	9.7	12.0	12.0	11.4	11.5	10.7	10.8
Southern Sudan	8.5	8.5	9.8	9.8	9.7	9.8	11.4	11.4	11.6	11.8	11.3	11.4
Chad	8.4	8.5	9.5	9.5	9.3	9.3	11.4	11.4	11.4	11.4	11.2	11.4
Mandinka	8.2	8.3	9.5	9.4	9.5	9.4	11.4	11.4	11.6	11.7	11.7	11.8
Somalis	8.0	8.1	9.3	9.2	9.2	9.2	11.4	11.5	11.3	11.6	11.4	11.4
Haya	8.9	8.9	9.9	9.9	10.0	10.0	11.7	11.8	12.1	12.3	11.7	11.9
W.H. - Leiterband/Handessi	8.5	8.6	10.1	10.1	10.0	10.1	12.5	12.4	12.6	12.5	12.3	12.0
W.H. - Leiterband	8.5	8.6	10.1	10.1	10.0	10.1	12.5	12.4	12.6	12.5	12.3	12.0
W.H. - pre-Leiterband	9.0	9.0	10.3	10.5	9.7	9.6	12.1	11.9	12.4	12.5	11.8	11.8
W.H. - 96/120 (Handessi)												
W.H. - 96/1	6.7	6.7					11.5	11.5	12.1	12.1	12.7	12.4
W.H. - 02/28	8.6	8.7	10.1	10.1	10.0	10.1	12.6	12.4	12.7	12.7	12.2	11.9
W.H. - 02/1	8.9	8.8	10.4	10.6	9.7	9.6	12.1	11.9	12.4	12.5	11.6	11.5
W.H. - 95/4	9.5	9.5	10.2	10.2							12.3	12.3
J.S./T. - ♂	9.0	9.0	10.0	10.1	10.2	10.2	12.5	12.5	12.7	12.8	11.8	11.9
J.S./T. - ♀	8.9	8.7	10.1	9.9	10.0	10.0	12.5	12.5	12.6	12.5	11.6	11.6
M.S. - Erg Ine Sakane	8.8	8.8	9.4	9.4	9.0	9.0	12.2	12.2	11.5	11.5	11.3	11.3
M.S. - Hassi el Abiod	9.2	9.3	10.7	10.5	10.2	10.2	12.3	12.5	12.6	12.6	12.0	12.0
M.S. - Kobadi	8.2	8.2	9.5	9.5	9.5	9.4	11.2	11.3	11.7	11.7	10.8	10.8
“S.H.” - El Kadada	7.8	7.8	9.1	9.1	8.7	8.6	11.8	11.8	10.8	10.9	10.4	10.8
“S.H.” - Saggai	8.2	8.2	9.7	9.7	10.2	10.2	12.2	12.2	11.9	11.9	10.9	10.9
“S.H.” - Jebel Shaqadud	8.1	8.1	9.4	9.4	9.8	9.8	11.9	12.0	11.4	11.4	10.7	10.7

	DM049 - 81(1). Crown width LI1 (l)	DM050 - 81(1). Crown width LI1 (r)	DM051 - 81(1). Crown width LI2 (l)	DM052 - 81(1). Crown width LI2 (r)	DM053 - 81(1). Crown width LC (l)	DM054 - 81(1). Crown width LC (r)	DM055 - 81(1). Crown width LP1 (l)	DM056 - 81(1). Crown width LP1 (r)	DM057 - 81(1). Crown width LP2 (l)	DM058 - 81(1). Crown width LP2 (r)	DM059 - 81(1). Crown width LM1 (l)	DM060 - 81(1). Crown width LM1 (r)
Wadi Howar	6.3	6.3	6.7	6.5	7.7	7.8	8.5	8.5	8.9	8.9	11.6	11.7
Jebel Sahaba/Tushka	6.7	6.8	7.1	7.0	8.3	8.3	8.9	8.9	9.0	9.1	11.6	11.6
A-Group	6.0	6.0	6.2	6.2	7.7	7.7	8.1	8.1	8.6	8.7	11.1	11.1
Malian Sahara	6.4	6.4	6.7	6.8	8.1	8.1	8.8	9.0	8.8	8.8	11.5	11.5
“Sudanese Hotchpotch”	5.5	5.5	5.9	5.9	7.5	7.5	8.1	7.9	8.3	8.3	11.1	10.9
Southern Sudan	6.0	6.0	6.3	6.3	7.8	7.8	8.5	8.4	8.6	8.7	11.0	11.0
Chad	5.9	5.9	6.1	6.1	7.8	7.7	8.2	8.2	8.5	8.5	10.8	10.8
Mandinka	5.8	5.9	6.2	6.2	7.8	7.8	8.2	8.2	8.5	8.5	10.8	10.8
Somalis	5.8	5.7	6.2	6.2	7.4	7.4	8.1	8.1	8.4	8.3	10.7	10.7
Haya	5.9	6.0	6.5	6.5	8.2	8.2	8.6	8.6	8.7	8.8	11.2	11.2
W.H. - Leiterband/Handessi	6.3	6.3	6.6	6.5	7.6	7.6	8.5	8.5	8.8	8.7	11.7	11.8
W.H. - Leiterband	6.3	6.3	6.6	6.5	7.6	7.6	8.5	8.5	8.8	8.7	11.7	11.8
W.H. - pre-Leiterband	6.2	6.3	6.8	6.7	8.1	8.1	8.5	8.4	9.1	9.2	11.3	11.2
W.H. - 96/120 (Handessi)												
W.H. - 96/1	5.0	5.0			6.0	6.4	7.2	7.3	6.8	6.8	11.5	11.5
W.H. - 02/28	6.5	6.5	6.7	6.5	7.8	7.8	8.7	8.6	9.0	8.9	11.8	11.9
W.H. - 02/1	6.2	6.3	6.8	6.7	7.8	7.8	8.4	8.3	9.1	9.2	11.3	11.2
W.H. - 95/4					9.1	9.1	8.7	8.7				
J.S./T. - ♂	6.8	6.9	7.3	7.1	8.4	8.4	8.9	8.9	9.0	9.2	11.7	11.6
J.S./T. - ♀	6.6	6.6	6.9	6.9	8.2	8.2	8.8	8.9	9.0	9.0	11.5	11.6
M.S. - Erg Ine Sakane	6.0	6.0	6.5	6.6	7.7	7.7	8.0	8.0	7.9	7.9	11.3	11.2
M.S. - Hassi el Abiod	6.5	6.5	6.8	6.7	8.5	8.5	9.3	9.3	9.2	9.1	12.0	12.0
M.S. - Kobadi			6.6	6.7	7.2	7.2	8.0	8.5	8.5	8.5	10.5	10.5
“S.H.” - El Kadada	5.3	5.3	5.8	5.8	7.8	7.8	7.9	7.8	8.4	8.4	11.1	10.7
“S.H.” - Saggai	5.7	5.7	6.0	6.0	7.4	7.4	7.8	7.8	7.8	7.8	11.0	11.0
“S.H.” - Jebel Shaqadud			5.9	5.9	7.2	7.2	9.0	8.3	8.7	8.6	11.1	11.3

	DM061 - 81(1). Crown width LM2 (l)	DM062 - 81(1). Crown width LM2 (r)	DM063 - 81(1). Crown width LM3 (l)	DM064 - 81(1). Crown width LM3 (r)
Wadi Howar	11.4	11.3	10.8	10.9
Jebel Sahaba/Tushka	11.3	11.2	10.9	11.0
A-Group	10.7	10.5	10.2	10.1
Malian Sahara	11.5	11.4	10.5	10.5
“Sudanese Hotchpotch”	11.1	11.0	10.4	10.4
Southern Sudan	10.6	10.6	10.6	10.6
Chad	10.8	10.7	10.4	10.5
Mandinka	10.8	10.8	10.3	10.4
Somalis	10.4	10.3	10.2	10.1
Haya	10.9	10.9	10.7	10.9
W.H. - Leiterband/Handessi	11.3	11.3	10.8	10.9
W.H. - Leiterband	11.3	11.3	10.8	10.9
W.H. - pre-Leiterband	11.7	11.5	10.9	11.0
W.H. - 96/120 (Handessi)			11.0	10.9
W.H. - 96/1	11.3	11.2	11.2	11.1
W.H. - 02/28	11.4	11.4	10.8	10.9
W.H. - 02/1	11.4	11.2	10.9	11.0
W.H. - 95/4	12.7	12.7	11.0	10.9
J.S./T. - ♂	11.3	11.2	11.0	11.0
J.S./T. - ♀	11.4	11.2	10.8	11.0
M.S. - Erg Ine Sakane	11.6	11.6	10.2	10.2
M.S. - Hassi el Abiod	11.8	11.7	10.5	10.6
M.S. - Kobadi	10.5	10.3	10.6	10.4
“S.H.” - El Kadada	10.8	10.8	9.5	9.5
“S.H.” - Saggai	11.4	11.4	10.5	10.5
“S.H.” - Jebel Shaqadud	11.1	11.0	10.5	10.5

Appendix XXIV.A.3. Postcranial measurements

	PM015 - H1. *Humerus* - Maximum length (l)	PM016 - H1. *Humerus* - Maximum length (r)	PM019 - H5. Maximum diameter of the mid-shaft (l)	PM020 - H5. Maximum diameter of the mid-shaft (r)	PM021 - H6. Minimum diameter of the mid-shaft (l)	PM022 - H6. Minimum diameter of the mid-shaft (r)	PM025 - H7a. Mid-shaft circumference (l)	PM026 - H7a. Mid-shaft circumference (r)	PM065 - U1. *Ulna* - Maximum length (l)	PM066 - U1. *Ulna* - Maximum length (r)	PM067 - U3. Least circumference (l)	PM068 - U3. Least circumference (r)
Wadi Howar	312.1	312.5	19.8	19.8	15.5	15.4	57.4	57.9	259.8	259.6	34.2	34.3
Jebel Sahaba/Tushka	318.8	318.8	20.1	20.9	16.6	16.8	59.6	61.2	269.0	269.5	36.4	37.3
W.H. - Leiterband/Handessi	304.5	304.5	19.7	19.7	15.6	15.5	57.2	58.0	257.0	257.0	34.3	34.5
W.H. - Leiterband	300.0	300.0	19.7	19.8	15.8	15.7	57.3	58.1	254.4	254.4	34.8	35.1
W.H. - pre-Leiterband	331.3	332.5	20.1	20.0	15.1	15.1	57.8	57.8	269.2	268.3	34.0	33.5
W.H. - 96/120 (Handessi)	345.0	345.0	19.5	19.5	13.0	13.0	57.0	57.0	280.0	280.0	30.0	30.0
W.H. - 96/1	297.5	297.5	18.3	19.3	16.5	16.5	55.5	58.0	260.0	260.0	30.3	30.3
W.H. - 02/28	295.8	295.8	20.3	20.1	15.8	15.6	58.0	58.7	251.4	251.4	35.0	35.4
W.H. - 02/1	331.3	332.5	20.1	20.0	15.1	15.1	57.8	57.8	269.2	268.3	34.0	33.5
W.H. - 95/4												
J.S./T. - ♂	325.1	325.1	21.1	22.1	17.6	17.9	62.4	64.4	276.2	276.2	38.1	39.5
J.S./T. - ♀	311.6	311.6	19.0	19.6	15.6	15.6	56.3	57.6	259.3	260.7	34.0	34.3

	PM071 - *U3c. Crest circumference (l)	PM072 - *U3c. Crest circumference (r)	PM073 - U11. Dorso-ventral shaft diameter (l)	PM074 - U11. Dorso-ventral shaft diameter (r)	PM075 - U12. Transverse shaft diameter (l)	PM076 - U12. Transverse shaft diameter (r)	PM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)	PM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)	PM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)	PM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)	PM089 - F1. *Femur* - Maximum length (l)	PM090 - F1. *Femur* - Maximum length (r)
Wadi Howar	44.6	45.4	12.6	12.6	15.5	15.7	15.4	14.7	9.0	8.6	441.5	441.5
Jebel Sahaba/Tushka	47.2	47.9	14.7	14.9	15.3	15.3	14.9	15.9	8.1	8.1	435.1	435.1
W.H. - Leiterband/Handessi	43.8	44.8	12.6	12.6	15.1	15.3	15.5	15.0	9.6	9.3	443.1	443.1
W.H. - Leiterband	44.4	45.6	12.7	12.8	15.1	15.3	15.6	15.0	8.5	8.1	443.1	443.1
W.H. - pre-Leiterband	47.0	47.0	12.7	12.7	16.8	16.8	15.2	14.2	7.8	7.2	436.3	436.3
W.H. - 96/120 (Handessi)	39.0	39.0	11.0	11.0	15.0	15.0	15.0	15.0	15.0	15.0		
W.H. - 96/1			11.0	11.0	14.0	13.0					430.0	430.0
W.H. - 02/28	43.8	45.2	13.2	13.3	15.0	15.4	15.6	15.0	8.5	8.1	427.9	427.9
W.H. - 02/1	47.0	47.0	12.7	12.7	16.8	16.8	15.2	14.2	7.8	7.2	436.3	436.3
W.H. - 95/4												
J.S./T. - ♂	48.9	50.4	15.6	15.8	15.9	16.6	14.9	16.3	9.1	9.2	447.4	447.4
J.S./T. - ♀	44.8	44.7	13.5	13.8	14.4	13.4	14.8	15.3	6.8	6.7	421.1	421.1

	PM093 - F6. Anterior-posterior mid-shaft diameter (l)	PM094 - F6. Anterior-posterior mid-shaft diameter (r)	PM095 - F7. Medio-lateral mid-shaft diameter (l)	PM096 - F7. Medio-lateral mid-shaft diameter (r)	PM097 - F8. Mid-shaft circumference (l)	PM098 - F8. Mid-shaft circumference (r)	PM099 - F9. Subtrochanteric transverse diameter (l)	PM100 - F9. Subtrochanteric transverse diameter (r)	PM101 - F10. Subtrochanteric sagittal diameter (l)	PM102 - F10. Subtrochanteric sagittal diameter (r)	PM103 - *F10(1). Subtrochanteric circumference (l)	PM104 - *F10(1). Subtrochanteric circumference (r)
Wadi Howar	28.4	28.8	23.8	23.8	80.6	80.8	27.3	27.2	22.1	22.1	78.8	78.8
Jebel Sahaba/Tushka	30.4	30.2	26.1	26.2	85.3	85.3	30.1	30.1	24.4	24.0	85.5	85.6
W.H. - Leiterband/Handessi	28.4	28.8	23.9	23.8	80.8	80.9	27.6	27.5	22.2	22.3	79.6	79.6
W.H. - Leiterband	28.5	28.9	23.9	23.9	81.1	81.3	27.6	27.5	22.2	22.3	79.6	79.6
W.H. - pre-Leiterband	28.3	28.9	23.6	23.5	80.0	80.3	26.1	26.1	21.6	21.5	76.4	76.4
W.H. - 96/120 (Handessi)	27.0	27.0	23.0	23.0	76.0	76.0						
W.H. - 96/1	25.3	25.0	20.5	20.0	70.0	70.0	26.0	26.0	21.5	21.5	74.5	74.5
W.H. - 02/28	29.0	29.5	25.1	25.1	81.3	81.6	27.6	27.2	21.7	21.8	80.3	80.3
W.H. - 02/1	28.3	28.9	23.6	23.5	80.0	80.3	26.1	26.1	21.6	21.5	76.4	76.4
W.H. - 95/4												
J.S./T. - ♂	31.7	31.4	26.5	26.6	87.4	87.4	30.5	30.3	25.6	25.3	87.9	87.9
J.S./T. - ♀	29.0	28.9	25.6	25.7	82.9	82.9	29.6	29.9	23.1	22.5	82.9	83.0

	PM117 - *F34. *Linea aspera* breadth (l)	PM118 - *F34. *Linea aspera* breadth (r)	PM121 - *Femur* - Cortical thickness (ant.)	PM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)	PM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)	PM124 - *Femur* - Cortical thickness (med.)	PM125 - *Femur* - Cortical thickness (lat.)	PM126 - *Femur* - Cortical thickness (max.)	PM127 - *Femur* - Cortical thickness (min.)	PM130 - T1a. *Tibia* - Maximum length (l)	PM131 - T1a. *Tibia* - Maximum length (r)	PM138 - T8. Sagittal mid-shaft diameter (l)
Wadi Howar	5.8	5.8	5.8	9.7	6.0	5.9	6.4	9.3	5.1	376.8	376.8	26.9
Jebel Sahaba/Tushka	6.5	6.6	6.5	10.4	6.7	6.8	7.8	10.4	5.5	366.3	366.3	28.1
W.H. - Leiterband/Handessi	5.9	5.8	5.8	9.8	6.2	5.9	6.2	9.2	5.2	376.4	376.4	26.8
W.H. - Leiterband	5.9	5.8	5.8	9.8	6.2	6.0	6.3	9.4	5.2	376.0	376.0	26.8
W.H. - pre-Leiterband	5.5	5.7	6.0	9.6	5.8	5.9	7.1	9.6	4.9	378.3	378.3	27.1
W.H. - 96/120 (Handessi)						5.0	5.0	7.0	5.0	380.0	380.0	27.0
W.H. - 96/1			4.0	8.5		5.5	4.8	8.5	3.0	370.0	370.0	25.0
W.H. - 02/28	5.8	5.6	5.4	9.6	5.9	6.0	6.4	9.1	4.7	370.0	370.0	25.2
W.H. - 02/1	5.5	5.7	6.0	9.6	5.8	5.9	7.1	9.6	4.9	378.3	378.3	27.1
W.H. - 95/4												
J.S./T. - ♂	6.8	6.9	7.7	10.9	7.2	7.2	7.3	10.9	6.0	378.1	378.1	29.1
J.S./T. - ♀	6.2	6.1	5.6	9.9	6.3	6.5	8.2	9.9	5.2	352.9	352.9	27.0

	PM139 - T8. Sagittal mid-shaft diameter (r)	PM142 - T9. Transverse mid-shaft diameter (l)	PM143 - T9. Transverse mid-shaft diameter (r)	PM146 - T10. Mid-shaft circumference (l)	PM147 - T10. Mid-shaft circumference (r)	PM150 - T10b. Minimum shaft circumference (l)	PM151 - T10b. Minimum shaft circumference (r)
Wadi Howar	26.9	20.1	20.3	74.3	74.7	63.3	63.5
Jebel Sahaba/Tushka	28.0	20.6	20.5	77.8	77.4	71.3	70.9
W.H. - Leiterband/Handessi	26.8	20.5	20.9	74.9	75.4	62.9	63.0
W.H. - Leiterband	26.8	20.6	21.0	75.0	75.5	63.3	63.4
W.H. - pre-Leiterband	27.3	18.8	18.8	72.8	73.0	64.3	64.7
W.H. - 96/120 (Handessi)	27.0	20.0	20.0	74.0	74.0	60.0	60.0
W.H. - 96/1	25.0	23.0	23.0	75.0	76.0	61.0	61.0
W.H. - 02/28	25.2	20.0	20.5	71.3	71.9	61.8	62.0
W.H. - 02/1	27.3	18.8	18.8	72.8	73.0	64.3	64.7
W.H. - 95/4							
J.S./T. - ♂	29.0	22.0	21.9	81.7	81.1	74.6	74.3
J.S./T. - ♀	26.9	18.9	18.9	73.4	73.1	67.6	67.1

Appendix XXIV.A.4. Scaled measurements

Appendix XXIV.A.4.a. Scaled cranial measurements

	SCM001 - 1. Maximum cranial length	SCM002 - 3. *Glabello-Lambda* length	SCM003 - 8. Maximum cranial breadth	SCM004 - 9. Least frontal breadth	SCM007 - 13a. Mastoid width (l)	SCM008 - 13a. Mastoid width (r)	SCM010 - 19a. Mastoid height (l)	SCM011 - 19a. Mastoid height (r)	SCM020 - 30. *Bregma-Lambda* chord	SCM028 - 48(1). *Nasospinale-Prosthion* height	SCM030 - *50(1). Interorbital breadth	SCM035 - 54. Nasal breadth
Wadi Howar	16.0742	15.2434	11.3807	7.8593	1.0145	0.9955	2.4544	2.4952	9.8696	1.9820	2.0912	2.1755
Jebel Sahaba/Tushka	17.0116	16.4199	11.9730	8.8635	1.3673	1.3645	2.9954	3.0131	10.1470	2.0686	2.3852	2.4491
A-Group	17.3113	16.8324	12.8369	8.6743	1.1808	1.2148	3.0921	3.0741	11.0274	1.9753	2.2882	2.3619
Malian Sahara	16.4922	15.9426	12.1930	8.3635	1.1527	1.2046	2.7755	2.8795	10.2916	1.7670	2.3279	2.4451
"Sudanese Hotchpotch"	16.4916	16.1483	11.9851	8.6099	1.2891	1.2891	3.0395	3.0395	10.7748	2.1712	2.3077	2.2623
Southern Sudan	17.2185	16.8212	12.5331	8.8420	1.2609	1.3041	2.8468	2.8624	10.8221	2.0720	2.4818	2.5644
Chad	16.8406	16.3423	12.2040	8.6809	1.0426	1.1036	2.6017	2.6026	10.4070	1.7221	2.3845	2.5058
Mandinka	16.9729	16.6259	12.1185	8.6440	1.0863	1.1188	2.7056	2.7354	10.8579	2.1091	2.4105	2.5289
Somalis	17.9827	17.4762	13.1741	9.1613	1.1933	1.2098	3.0539	3.0527	11.2405	1.9723	2.3729	2.3689
Haya	16.5820	16.1063	11.9826	8.8031	1.1133	1.1568	2.7962	2.8064	10.2768	1.8701	2.3472	2.4424
W.H. - Leiterband/Handessi	15.9819	15.2434	11.4402	7.8593	0.9344	0.9173	2.3772	2.3772	9.9003	1.8760	2.0912	2.0886
W.H. - Leiterband	15.9819	15.2434	11.4402	7.8593	0.9645	0.9431	2.4064	2.4064	9.9003	1.8760	2.1392	2.1462
W.H. - pre-Leiterband	16.5354		11.0236		1.2148	1.1910	2.6474	2.7903	9.6850	2.1942		2.4364
W.H. - 96/120 (Handessi)					0.8137	0.8137	2.2604	2.2604			1.8037	1.6275
W.H. - 96/1	16.4762	16.0000	12.3810						10.7619	1.8095		2.2857
W.H. - 02/28	15.8584	15.0543	11.2520	7.8593	0.9645	0.9431	2.4064	2.4064	9.7280	1.8893	2.0532	2.1290
W.H. - 02/1					1.2148	1.1910	2.6474	2.7903		2.0314		2.5522
W.H. - 95/4	16.5354		11.0236						9.6850	2.5197		2.2047
J.S./T. - ♂	17.3673	16.7297	12.1068	9.1723	1.5259	1.5405	3.2257	3.2446	10.4535	2.0752	2.4627	2.5003
J.S./T. - ♀	16.6165	16.0756	11.8224	8.5547	1.2086	1.1885	2.7651	2.7815	9.8745	2.0620	2.3077	2.3978
M.S. - Erg Ine Sakane	15.3894	14.9677	11.5244	8.1756	1.0066	1.0923	2.6606	2.7722	9.3944	1.7800	2.1163	2.1003
M.S. - Hassi el Abiod	16.3624	15.7586	12.0552	8.3235	1.2928	1.3071	2.8314	2.8940	10.1471	1.7596	2.3158	2.4352
M.S. - Kobadi	17.6346	17.3062	13.7545	8.9635	0.8377	0.9709	2.7048	2.9318	11.1998	1.7757	2.5605	2.7362
"S.H." - El Kadada												
"S.H." - Saggai	16.4220	16.1483	12.4771	8.5839					10.8257			2.2182
"S.H." - Jebel Shaqadud	16.5611		11.4932	8.6878	1.2891	1.2891	3.0395	3.0395	10.7240	2.1712	2.3077	2.2917

	SCM042 - *61a(1). Canine alveolar breadth (mx)	SCM043 - *61a(1). Canine alveolar breadth (md)	SCM045 - *61a(2). 1st premolar alveolar breadth (md)	SCM047 - *61a(3). 2nd premolar alveolar breadth (md)	SCM049 - *61a(4). 1st molar alveolar breadth (md)	SCM051 - *61a(5). 2nd molar alveolar breadth (md)	SCM058 - *62a(3). 3rd internal dental arch length (mx)	SCM059 - *62a(3). 3rd internal dental arch length (md)	SCM060 - *62a(4). 4th internal dental arch length (mx)	SCM061 - *62a(4). 4th internal dental arch length (md)	SCM068 - 63(2). Anterior palate breadth (mx)	SCM069 - *63(2). Anterior palate breadth (md)
Wadi Howar	3.8520	2.8835	3.5469	4.0604	4.9004	5.4295	1.2722	0.8448	1.7554	1.4333	2.7676	2.3433
Jebel Sahaba/Tushka	3.9369	2.9936	3.6906	4.2621	5.0645	5.4543	1.1247	0.8806	1.7085	1.4194	2.9829	2.4166
A-Group	3.7594	2.9017	3.6074	4.1759	5.0555	5.5731	1.1660	0.7617	1.7030	1.2888	2.8488	2.2833
Malian Sahara	3.7329	2.7549	3.4595	4.0868	5.0130	5.5449	1.0904	0.8449	1.6061	1.4097	2.7881	2.3374
“Sudanese Hotchpotch”	3.8057	2.6549	3.2743	3.8053	4.6460	5.0000	1.0635	0.9735	1.6025	1.5044	3.1316	2.0354
Southern Sudan	3.9849	3.0211	3.8686	4.4940	5.4444	5.9728	1.1922	0.9100	1.8190	1.5734	3.1649	2.5506
Chad	3.7977	2.8839	3.6464	4.2306	5.1013	5.6211	1.1316	0.8560	1.7009	1.4552	2.9440	2.4225
Mandinka	3.9375	2.9272	3.6911	4.3116	5.1351	5.6215	1.2115	0.8717	1.8150	1.4887	3.0891	2.5530
Somalis	3.8174	3.0057	3.7502	4.3776	5.2478	5.8040	1.2933	0.9118	1.8711	1.4955	2.9204	2.4329
Haya	3.8074	2.9592	3.6807	4.3468	5.2612	5.7135	1.2340	0.8761	1.8151	1.4960	2.9120	2.4702
W.H. - Leiterband/Handessi	3.9053	2.8977	3.5620	4.0856	4.9292	5.4441	1.2458	0.7919	1.7554	1.4512	2.8782	2.4359
W.H. - Leiterband	3.9053	2.8977	3.5620	4.0856	4.9292	5.4441	1.2458	0.7919	1.7554	1.4512	2.8782	2.4359
W.H. - pre-Leiterband	3.7720	2.8480	3.5167	4.0101	4.8430	5.4002	1.4043	0.9505		1.3617	2.5832	2.1889
W.H. - 96/120 (Handessi)												
W.H. - 96/1					4.8571	5.7143	0.9048		1.3333		2.1905	
W.H. - 02/28	3.9053	2.8977	3.5620	4.0856	4.9532	5.3540	1.3310	0.7919	1.8610	1.4512	3.0501	2.4359
W.H. - 02/1	3.7720	2.8480	3.5167	4.0101	4.8430	5.4002	1.4043	0.9505		1.3617	2.6150	2.1889
W.H. - 95/4											2.5197	
J.S./T. - ♂	4.0687	3.0289	3.7097	4.3264	5.1533	5.5628	1.1208	0.8767	1.6797	1.4313	3.1118	2.4529
J.S./T. - ♀	3.8050	2.9543	3.6693	4.1977	4.9757	5.3457	1.1285	0.8844	1.7373	1.4075	2.8541	2.3762
M.S. - Erg Ine Sakane	3.5121	2.6800	3.2998	3.7475	4.5046	4.7927	1.0086	0.7899	1.4236	1.2921	2.6161	2.1206
M.S. - Hassi el Abiod	3.8577	2.7542	3.4541	4.1238	5.1666	5.7365	1.1611	0.8772	1.6865	1.4641	2.8922	2.3883
M.S. - Kobadi	3.5846	2.8709	3.7015	4.3591	5.2793	5.8898	0.9743	0.7263	1.5339	1.3190	2.6766	2.4584
“S.H.” - El Kadada												
“S.H.” - Saggai												
“S.H.” - Jebel Shaqadud	3.8057	2.6549	3.2743	3.8053	4.6460	5.0000	1.0635	0.9735	1.6025	1.5044	3.1316	2.0354

	SCM070 - *63(2)a. 1st internal dental arch breadth (mx)	SCM071 - *63(2)a. 1st internal dental arch breadth (md)	SCM072 - *63(2)b. 2nd internal dental arch breadth (mx)	SCM073 - *63(2)b. 2nd internal dental arch breadth (md)	SCM075 - *63(2)c. 3rd internal dental arch breadth (md)	SCM077 - *63(2)d. 4th internal dental arch breadth (md)	SCM080 - 66. Bigonial breadth	SCM082 - 68. Projective length of the body of the mandible	SCM083 - 69. Height of the mandibular symphysis	SCM085 - *69c. Thickness of the mandibular symphysis	SCM086 - 69(1). Mental foramen height (l)	SCM087 - 69(1). Mental foramen height (r)
Wadi Howar	2.3038	1.6719	3.2256	2.7338	3.0669	3.6496	7.9395	6.5639	3.2325	1.2085	3.0322	3.0278
Jebel Sahaba/Tushka	2.4451	1.7119	3.4507	2.9015	3.2819	3.6675	9.0710	6.7237	3.6460	1.3838	3.2333	3.2844
A-Group	2.2736	1.5584	3.3508	2.8220	3.1988	3.7060	8.5211	6.6469	3.3064	1.3643	3.0667	3.0934
Malian Sahara	2.2253	1.5369	3.3073	2.8464	3.2610	3.8151	8.6013	6.5750	3.3001	1.3196	2.9497	2.9866
“Sudanese Hotchpotch”	2.1735	1.5044	3.4346	2.4779	2.7434	3.2301	8.0523	7.4482	3.1002	1.2140	2.9879	2.9959
Southern Sudan	2.5541	1.8197	3.6889	3.1665	3.6081	4.2499	9.1281	7.0891	3.4707	1.4168	3.1707	3.1824
Chad	2.3414	1.6344	3.4755	2.9296	3.3245	3.8578	8.5836	6.6542	3.3031	1.3239	2.9162	2.9534
Mandinka	2.5306	1.6653	3.5558	3.1182	3.4743	4.0211	8.8165	6.8112	3.4875	1.2479	3.1065	3.1370
Somalis	2.3570	1.6519	3.4255	3.0379	3.4044	3.9387	8.7793	7.1009	3.4707	1.4165	3.1459	3.2168
Haya	2.2985	1.6576	3.3841	3.0676	3.4665	3.9553	8.4618	6.5368	3.1465	1.2050	2.8538	2.8729
W.H. - Leiterband/Handessi	2.3844	1.7389	3.3175	2.8159	3.1270	3.7518	8.0120	6.4053	3.1606	1.2303	3.0087	3.0145
W.H. - Leiterband	2.3844	1.7389	3.3175	2.8159	3.1270	3.7518	8.0120	6.4053	3.2054	1.2711	3.0087	3.0145
W.H. - pre-Leiterband	2.1694	1.5380	2.7660	2.6244	2.9468	3.4453	7.7584	6.8811	3.3942	1.1429	3.0950	3.0633
W.H. - 96/120 (Handessi)									2.8029	0.9042		
W.H. - 96/1	1.7143		2.6667			3.9048	8.6667	6.2857	3.4286	1.2857	3.0476	3.0476
W.H. - 02/28	2.5520	1.7389	3.4802	2.8159	3.1270	3.7008	7.8483	6.4292	3.1290	1.2129	2.9073	2.9151
W.H. - 02/1	2.2305	1.5380	2.7660	2.6244	2.9468	3.4453	7.7584	6.5816	3.3182	1.1429	3.0284	2.9807
W.H. - 95/4	2.0472							7.4803	3.6220		3.2283	3.2283
J.S./T. - ♂	2.5511	1.7412	3.5285	2.9795	3.3778	3.7588	9.3177	6.8107	3.7676	1.4546	3.3127	3.3699
J.S./T. - ♀	2.3391	1.6794	3.3729	2.8235	3.1860	3.5762	8.8243	6.6368	3.5244	1.3130	3.1540	3.1989
M.S. - Erg Ine Sakane	2.0712	1.4260	3.0465	2.5525	2.8832	3.2381	7.1489	5.7795	2.9145	1.2783	2.5967	2.6830
M.S. - Hassi el Abiod	2.3151	1.5456	3.3943	2.9185	3.3642	3.9897	9.0166	6.5980	3.3534	1.3394	2.9695	3.0000
M.S. - Kobadi	2.0756	1.6718	3.3559	3.0006	3.4360	4.0474	8.8210	7.3772	3.5890	1.3546	3.1767	3.2142
“S.H.” - El Kadada												
“S.H.” - Saggai							7.4674	7.8162	3.0855		2.8639	2.8658
“S.H.” - Jebel Shaqadud	2.1735	1.5044	3.4346	2.4779	2.7434	3.2301	9.2222	6.7122	3.1150	1.2140	3.0498	3.0609

	SCM088 - 69(2). 2nd molar mandibular body height (l)	SCM089 - 69(2). 2nd molar mandibular body height (r)	SCM100 - 69(3). Mental foramen body thickness (l)	SCM101 - 69(3). Mental foramen body thickness (r)	SCM102 - 69b. 2nd molar mandibular body thickness (l)	SCM103 - 69b. 2nd molar mandibular body thickness (r)	SCM122 - 71a. Minimum ramus width (l)	SCM123 - 71a. Minimum ramus width (r)	SCM133 - 80a. Dental arch length of the mandible	SCM135 - 80(1). External dental arch width (md)	SCM136 - *80(1)a. Canine dental arch breadth (mx)	SCM137 - *80(1)a. Canine dental arch breadth (md)
Wadi Howar	2.5560	2.5287	1.1629	1.1535	1.4460	1.4365	3.1686	3.1686	4.6906	5.7309	3.8334	2.9001
Jebel Sahaba/Tushka	2.7564	2.7874	1.2673	1.2860	1.4773	1.4927	3.6389	3.6219	4.9633	5.6773	3.7798	3.0391
A-Group	2.5975	2.6143	1.1565	1.1639	1.3944	1.4155	3.1575	3.1377	5.0006	5.8320	3.6218	2.9288
Malian Sahara	2.5176	2.5696	1.0947	1.1327	1.3753	1.3863	3.3348	3.3014	4.9081	5.8933	3.5913	2.7019
"Sudanese Hotchpotch"	2.5232	2.5685	1.0626	1.0301	1.4034	1.3887	3.0572	3.0409		5.3982	3.6652	
Southern Sudan	2.7012	2.7140	1.1661	1.1934	1.4764	1.4731	3.5084	3.4916	5.4064	6.1977	3.9377	3.2013
Chad	2.5411	2.5371	1.1513	1.1795	1.4737	1.4888	3.2205	3.2403	4.8838	5.9721	3.6317	2.8558
Mandinka	2.5900	2.6407	1.1255	1.1144	1.4068	1.4474	3.2463	3.3159	5.1514	5.8058	3.8785	2.9720
Somalis	2.6328	2.6801	1.1563	1.1808	1.3808	1.4523	3.4187	3.4376	5.1964	6.1061	3.7942	2.9275
Haya	2.4942	2.5089	1.1421	1.1259	1.3601	1.3912	3.1574	3.1287	5.2294	5.8790	3.7401	2.9602
W.H. - Leiterband/Handessi	2.5250	2.4799	1.1601	1.1534	1.4729	1.4593	3.2357	3.2357	4.6182	5.7727	4.0844	2.9168
W.H. - Leiterband	2.5540	2.5014	1.1601	1.1534	1.5450	1.5292	3.2357	3.2357	4.6182	5.7727	4.0844	2.9168
W.H. - pre-Leiterband	2.6283	2.6425	1.1697	1.1538	1.3833	1.3833	2.7660	2.7660	4.8354	5.6682	3.5823	2.8668
W.H. - 96/120 (Handessi)	2.3508	2.3508			1.0398	1.0398						
W.H. - 96/1	2.1905	2.0952	1.2381	1.2381	1.6190	1.5238	3.2381	3.2381	3.9048			
W.H. - 02/28	2.5954	2.5403	1.1470	1.1393	1.5458	1.5458	3.2353	3.2353	4.8560	5.7727	4.0844	2.9168
W.H. - 02/1	2.6039	2.6251	1.1246	1.1008	1.3663	1.3663	2.7660	2.7660	4.8354	5.6682	3.6018	2.8668
W.H. - 95/4	2.6772	2.6772	1.2598	1.2598	1.4173	1.4173					3.5433	
J.S./T. - ♂	2.8163	2.8341	1.2986	1.2986	1.5035	1.5035	3.7725	3.7334	4.9544	5.7843	3.8942	3.1100
J.S./T. - ♀	2.6965	2.7407	1.2360	1.2733	1.4511	1.4819	3.5054	3.5105	4.9753	5.5569	3.6654	2.9480
M.S. - Erg Ine Sakane	2.1970	2.2541	1.0220	1.1652	1.2957	1.3373	2.7311	2.7014	4.4899	5.1407	3.3333	2.4813
M.S. - Hassi el Abiod	2.5417	2.5992	1.0808	1.1042	1.3814	1.3844	3.4918	3.4610	5.2517	6.0597	3.7829	2.7386
M.S. - Kobadi	2.7368	2.7422	1.2191	1.2044	1.4850	1.4841	3.5362	3.4785	4.7137	6.2574	3.4686	2.8489
"S.H." - El Kadada												
"S.H." - Saggai	2.4722	2.6079	1.1005	1.0554	1.5616	1.5616	3.4028	3.3818				
"S.H." - Jebel Shaqadud	2.5487	2.5487	1.0247	1.0098	1.3244	1.3022	2.9420	2.9273		5.3982	3.6652	

	SCM141 - *80(1)c. 2nd premolar dental arch breadth (md)	SCM143 - *80(1)d. 1st molar dental arch breadth (md)	SCM148 - *80(4)a. Canine dental arch length (mx)	SCM149 - *80(4)a. Canine dental arch length (md)	SCM150 - *80(4)b. 1st premolar dental arch length (mx)	SCM153 - *80(4)c. 2nd premolar dental arch length (md)
Wadi Howar	4.0648	4.9351	1.2007	1.0014	2.0282	2.0914
Jebel Sahaba/Tushka	4.2726	5.0597	1.3432	1.0079	1.9430	2.1003
A-Group	4.1674	5.0045	1.3917	0.9098	1.9602	2.0485
Malian Sahara	4.1181	5.1566	1.3191	0.9120	1.8597	2.0653
“Sudanese Hotchpotch”	3.8496	4.6460				
Southern Sudan	4.5378	5.4035	1.4514	1.1139	2.0973	2.2918
Chad	4.2417	5.0790	1.3607	0.9752	1.9398	2.0552
Mandinka	4.2936	5.1296	1.5150	1.1942	2.1682	2.3832
Somalis	4.4223	5.1802	1.5024	1.0795	2.1863	2.2819
Haya	4.2210	5.1032	1.4978	1.0924	2.3847	2.3334
W.H. - Leiterband/Handessi	4.0603	5.0107	1.3215	1.0559	2.0780	2.0871
W.H. - Leiterband	4.0603	5.0107	1.3215	1.0559	2.0780	2.0871
W.H. - pre-Leiterband	4.0714	4.8217	1.0800	0.9468	1.9286	2.0978
W.H. - 96/120 (Handessi)						
W.H. - 96/1						
W.H. - 02/28	4.0603	5.0107	1.3215	1.0559	2.0780	2.0871
W.H. - 02/1	4.0714	4.8217	1.3050	0.9468	1.9286	2.0978
W.H. - 95/4			0.6299			
J.S./T. - ♂	4.3348	5.2109	1.3210	1.0335	1.9670	2.1122
J.S./T. - ♀	4.2103	4.9652	1.3654	0.9737	1.9191	2.0846
M.S. - Erg Ine Sakane	3.5014	4.7414	1.1250	0.9519	1.6667	1.9899
M.S. - Hassi el Abiod	4.2180	5.2278	1.3927	0.9756	1.9740	2.2034
M.S. - Kobadi	4.4296	5.3168	1.2573	0.7048	1.7650	1.8502
“S.H.” - El Kadada						
“S.H.” - Saggai						
“S.H.” - Jebel Shaqadud	3.8496	4.6460				

Appendix XXIV.A.4.b. Scaled dental measurements

	SDM001 - 81. Crown length UI1 (l)	SDM002 - 81. Crown length UI1 (r)	SDM003 - 81. Crown length UI2 (l)	SDM004 - 81. Crown length UI2 (r)	SDM005 - 81. Crown length UC (l)	SDM006 - 81. Crown length UC (r)	SDM007 - 81. Crown length UP1 (l)	SDM008 - 81. Crown length UP1 (r)	SDM009 - 81. Crown length UP2 (l)	SDM010 - 81. Crown length UP2 (r)	SDM011 - 81. Crown length UM1 (l)	SDM012 - 81. Crown length UM1 (r)
Wadi Howar	0.8686	0.8713	0.7036	0.7030	0.7315	0.7287	0.6816	0.6905	0.6499	0.6501	1.0368	1.0348
Jebel Sahaba/Tushka	0.8373	0.8352	0.6437	0.6523	0.7242	0.7244	0.6791	0.6737	0.6369	0.6426	0.9919	0.9842
A-Group	0.8454	0.8466	0.6665	0.6665	0.7330	0.7316	0.6777	0.6719	0.6438	0.6466	1.0244	1.0247
Malian Sahara	0.8276	0.8212	0.6657	0.6643	0.7319	0.7346	0.6798	0.6785	0.6254	0.6324	0.9787	0.9786
“Sudanese Hotchpotch”	0.8775	0.8795	0.6729	0.6748	0.6861	0.6896	0.6544	0.6430	0.6364	0.6297	0.9867	0.9992
Southern Sudan	0.8625	0.8709	0.7059	0.7005	0.7452	0.7390	0.7161	0.7125	0.6673	0.6575	1.0696	1.0704
Chad	0.8345	0.8122	0.6467	0.6547	0.7103	0.7155	0.6738	0.6657	0.6278	0.6252	1.0243	1.0318
Mandinka	0.8879	0.8505	0.7664	0.7477	0.7396	0.7377	0.6811	0.6831	0.6454	0.6407	1.0130	1.0196
Somalis	0.8588	0.8601	0.6697	0.6654	0.7599	0.7511	0.6922	0.6921	0.6584	0.6539	1.0520	1.0566
Haya	0.7841	0.7401	0.6346	0.6361	0.7239	0.7169	0.6923	0.6930	0.6451	0.6406	0.9992	0.9934
W.H. - Leiterband/Handessi	0.8744	0.8758	0.6927	0.6918	0.7298	0.7236	0.6825	0.6949	0.6522	0.6533	1.0392	1.0408
W.H. - Leiterband	0.8744	0.8758	0.6927	0.6918	0.7298	0.7236	0.6825	0.6949	0.6522	0.6533	1.0392	1.0408
W.H. - pre-Leiterband	0.8433	0.8516	0.7291	0.7291	0.7373	0.7459	0.6793	0.6785	0.6442	0.6419	1.0225	0.9989
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0.9048	0.9048			0.6857	0.6857	0.6667	0.6667			1.0762	1.0762
W.H. - 02/28	0.8756	0.8756	0.7017	0.6991	0.7386	0.7308	0.6820	0.6971	0.6485	0.6468	1.0335	1.0354
W.H. - 02/1	0.8594	0.8719	0.7511	0.7511	0.7477	0.7567	0.6713	0.6894	0.6411	0.6381	1.0136	1.0136
W.H. - 95/4	0.8110	0.8110	0.6850	0.6850	0.7165	0.7244	0.6873	0.6676	0.6535	0.6535	1.0315	0.9843
J.S./T. - ♂	0.8376	0.8362	0.6542	0.6769	0.7239	0.7283	0.6715	0.6627	0.6410	0.6598	1.0047	0.9944
J.S./T. - ♀	0.8369	0.8339	0.6333	0.6276	0.7246	0.7205	0.6912	0.6915	0.6323	0.6232	0.9805	0.9751
M.S. - Erg Ine Sakane	0.8017	0.8017	0.6425	0.6425	0.6575	0.6575	0.5862	0.5862	0.5000	0.5000	0.9011	0.8983
M.S. - Hassi el Abiod	0.8193	0.8141	0.6606	0.6706	0.7437	0.7389	0.6922	0.6913	0.6349	0.6437	1.0157	1.0201
M.S. - Kobadi	0.8410	0.8322	0.7160	0.6780	0.7639	0.7813	0.6886	0.6863	0.6343	0.6412	0.9916	0.9877
“S.H.” - El Kadada	0.9324	0.9358	0.6729	0.6748	0.6597	0.6686	0.6752	0.6524	0.6674	0.6374	1.0431	1.0638
“S.H.” - Saggai	0.7952	0.7952			0.7161	0.7161	0.6412	0.6412	0.6390	0.6390	0.9492	0.9492
“S.H.” - Jebel Shaqadud					0.6787	0.6787	0.6261	0.6261	0.6121	0.6121	0.9615	0.9796

	SDM013 - 81. Crown length UM2 (l)	SDM014 - 81. Crown length UM2 (r)	SDM015 - 81. Crown length UM3 (l)	SDM016 - 81. Crown length UM3 (r)	SDM017 - 81. Crown length LI1 (l)	SDM018 - 81. Crown length LI1 (r)	SDM019 - 81. Crown length LI2 (l)	SDM020 - 81. Crown length LI2 (r)	SDM021 - 81. Crown length LC (l)	SDM022 - 81. Crown length LC (r)	SDM023 - 81. Crown length LP1 (l)	SDM024 - 81. Crown length LP1 (r)
Wadi Howar	0.9788	0.9886	0.8916	0.9028	0.5291	0.5269	0.5859	0.5764	0.6521	0.6480	0.6925	0.6910
Jebel Sahaba/Tushka	0.9748	0.9564	0.8306	0.8248	0.5242	0.5307	0.5576	0.5627	0.6496	0.6492	0.6611	0.6623
A-Group	0.9771	0.9823	0.8727	0.8721	0.5131	0.5191	0.5660	0.5626	0.6461	0.6486	0.6765	0.6331
Malian Sahara	0.9626	0.9539	0.8699	0.8762	0.5035	0.5122	0.5478	0.5456	0.6558	0.6599	0.6965	0.6991
"Sudanese Hotchpotch"	0.9064	0.9047	0.8746	0.8841	0.5324	0.5390	0.5321	0.5321	0.6454	0.6454	0.6727	0.6660
Southern Sudan	0.9982	1.0224	0.9015	0.9085	0.5335	0.5313	0.5906	0.5891	0.6754	0.6715	0.7092	0.7072
Chad	0.9634	0.9488	0.8343	0.8340	0.4803	0.4873	0.5563	0.5577	0.6493	0.6405	0.6733	0.6739
Mandinka	0.9480	0.9592	0.8500	0.8452	0.5168	0.5136	0.5596	0.5456	0.6264	0.6356	0.6548	0.6548
Somalis	0.9979	0.9962	0.8408	0.8468	0.5358	0.5359	0.5668	0.5717	0.6389	0.6387	0.6908	0.6863
Haya	0.9667	0.9697	0.8307	0.8385	0.5183	0.4898	0.5426	0.5476	0.6552	0.6594	0.7019	0.6989
W.H. - Leiterband/Handessi	0.9863	1.0037	0.8940	0.9101	0.5371	0.5334	0.5818	0.5743	0.6496	0.6476	0.7018	0.6962
W.H. - Leiterband	0.9863	1.0037	0.8940	0.9101	0.5371	0.5334	0.5818	0.5743	0.6496	0.6476	0.7018	0.6962
W.H. - pre-Leiterband	0.9464	0.9230	0.8868	0.8881	0.4930	0.4976	0.6109	0.5891	0.6597	0.6489	0.6694	0.6779
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0.9738	0.9738	0.8702	0.8720	0.5429	0.5429			0.6095	0.6095	0.7238	0.6762
W.H. - 02/28	0.9806	1.0033	0.9033	0.9336	0.5373	0.5326	0.5832	0.5759	0.6510	0.6496	0.6943	0.6933
W.H. - 02/1	0.9432	0.9475	0.8570	0.8540	0.4930	0.4976	0.6109	0.5891	0.6669	0.6526	0.6800	0.6887
W.H. - 95/4	0.9528	0.8740	0.9314	0.9393					0.6378	0.6378	0.6378	0.6457
J.S./T. - ♂	0.9694	0.9751	0.8328	0.8379	0.5421	0.5543	0.5603	0.5653	0.6658	0.6702	0.6547	0.6578
J.S./T. - ♀	0.9813	0.9336	0.8283	0.8116	0.4945	0.4914	0.5537	0.5591	0.6335	0.6281	0.6693	0.6681
M.S. - Erg Ine Sakane	0.8280	0.8405	0.8253	0.8253	0.4741	0.4914	0.5172	0.5047	0.5983	0.6277	0.5667	0.5667
M.S. - Hassi el Abiod	0.9895	0.9807	0.8373	0.8386	0.5132	0.5192	0.5634	0.5614	0.6830	0.6864	0.7269	0.7323
M.S. - Kobadi	0.9862	0.9795	0.9327	0.9405			0.5463	0.5639	0.6487	0.6373	0.7030	0.7025
"S.H." - El Kadada	1.0000	0.9900	0.8936	0.9315	0.5600	0.5800	0.5366	0.5366	0.6798	0.6798	0.6916	0.6916
"S.H." - Saggai	0.9159	0.9159	0.8919	0.8919	0.5185	0.5185	0.5403	0.5403	0.6512	0.6512	0.6722	0.6722
"S.H." - Jebel Shaqadud	0.8454	0.8454	0.8446	0.8446			0.5068	0.5068	0.5249	0.5249	0.6352	0.6087

	SDM025 - 81. Crown length LP2 (l)	SDM026 - 81. Crown length LP2 (r)	SDM027 - 81. Crown length LM1 (l)	SDM028 - 81. Crown length LM1 (r)	SDM029 - 81. Crown length LM2 (l)	SDM030 - 81. Crown length LM2 (r)	SDM031 - 81. Crown length LM3 (l)	SDM032 - 81. Crown length LM3 (r)	SDM033 - 81(1). Crown width UI1 (l)	SDM034 - 81(1). Crown width UI1 (r)	SDM035 - 81(1). Crown width UI2 (l)	SDM036 - 81(1). Crown width UI2 (r)
Wadi Howar	0.6841	0.6896	1.0451	1.0509	1.0518	1.0474	1.0296	1.0353	0.6833	0.6872	0.6242	0.6159
Jebel Sahaba/Tushka	0.6571	0.6467	1.0498	1.0504	1.0096	1.0181	0.9910	0.9982	0.7000	0.7092	0.6457	0.6415
A-Group	0.6807	0.6862	1.0576	1.0578	1.0322	1.0326	1.0085	1.0000	0.6947	0.6909	0.6073	0.6130
Malian Sahara	0.6803	0.6681	1.0736	1.0752	1.0343	1.0307	0.9762	0.9855	0.6967	0.6968	0.6190	0.6176
"Sudanese Hotchpotch"	0.6633	0.6709	1.0274	1.0274	1.0112	1.0120	0.9844	0.9804	0.6937	0.6887	0.6045	0.5919
Southern Sudan	0.7185	0.7147	1.1343	1.1331	1.0744	1.0661	1.1034	1.1059	0.7252	0.7213	0.6317	0.6354
Chad	0.6897	0.6920	1.0700	1.0638	1.0185	1.0112	1.0136	1.0118	0.6678	0.6748	0.6014	0.5971
Mandinka	0.6660	0.6583	1.0743	1.0726	0.9930	0.9938	1.0031	1.0139	0.6730	0.6761	0.6311	0.6451
Somalis	0.7177	0.7124	1.1069	1.1026	1.0364	1.0530	1.0242	1.0069	0.7106	0.7097	0.6067	0.6111
Haya	0.6964	0.6936	1.0800	1.0732	1.0407	1.0402	1.0333	1.0394	0.6725	0.6696	0.6150	0.6184
W.H. - Leiterband/Handessi	0.6921	0.6922	1.0512	1.0608	1.0585	1.0522	1.0338	1.0418	0.6830	0.6882	0.6100	0.6097
W.H. - Leiterband	0.6921	0.6922	1.0512	1.0608	1.0585	1.0522	1.0338	1.0418	0.6830	0.6882	0.6100	0.6097
W.H. - pre-Leiterband	0.6650	0.6833	1.0253	1.0188	1.0345	1.0350	1.0173	1.0155	0.6842	0.6839	0.6574	0.6303
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0.6571	0.6571	1.1143	1.1619	1.0952	1.1143	1.1220	1.1363	0.6190	0.6190		
W.H. - 02/28	0.6899	0.6882	1.0395	1.0470	1.0459	1.0358	1.0286	1.0290	0.6854	0.6874	0.6067	0.6063
W.H. - 02/1	0.6522	0.6750	1.0311	1.0224	1.0372	1.0378	1.0204	1.0233	0.6997	0.6993	0.6436	0.6266
W.H. - 95/4	0.7165	0.7165	1.0079	1.0079	1.0236	1.0236	1.0079	0.9921	0.6378	0.6378	0.6850	0.6378
J.S./T. - ♂	0.6699	0.6650	1.0830	1.0739	1.0110	1.0202	0.9935	1.0025	0.6901	0.6944	0.6546	0.6487
J.S./T. - ♀	0.6427	0.6260	1.0240	1.0322	1.0081	1.0159	0.9890	0.9947	0.7099	0.7240	0.6387	0.6359
M.S. - Erg Ine Sakane	0.6224	0.5684	1.0274	1.0274	0.9219	0.9219	0.9034	0.9032	0.6148	0.6148	0.5874	0.5874
M.S. - Hassi el Abiod	0.7072	0.6951	1.0918	1.0919	1.0705	1.0742	0.9821	0.9923	0.6976	0.7014	0.6085	0.6115
M.S. - Kobadi	0.6874	0.6988	1.0680	1.0737	1.0707	1.0454	1.0526	1.0722	0.7283	0.7231	0.7125	0.6885
"S.H." - El Kadada	0.6407	0.6702	1.1264	1.1264	1.0470	1.0445	1.0700	1.1000	0.7208	0.7108	0.6100	0.5931
"S.H." - Saggai	0.6985	0.6985	0.9470	0.9470	0.9714	0.9714	0.9256	0.9256	0.6282	0.6282		
"S.H." - Jebel Shaqadud	0.6620	0.6443	1.0708	1.0708	1.0189	1.0278	1.0343	1.0137	0.7434	0.7434	0.5882	0.5882

	SDM037 - 81(1). Crown width UC (l)	SDM038 - 81(1). Crown width UC (r)	SDM039 - 81(1). Crown width UP1 (l)	SDM040 - 81(1). Crown width UP1 (r)	SDM041 - 81(1). Crown width UP2 (l)	SDM042 - 81(1). Crown width UP2 (r)	SDM043 - 81(1). Crown width UM1 (l)	SDM044 - 81(1). Crown width UM1 (r)	SDM045 - 81(1). Crown width UM2 (l)	SDM046 - 81(1). Crown width UM2 (r)	SDM047 - 81(1). Crown width UM3 (l)	SDM048 - 81(1). Crown width UM3 (r)
Wadi Howar	0.7703	0.7743	0.9064	0.9098	0.8877	0.8921	1.1027	1.0939	1.1055	1.1033	1.0799	1.0665
Jebel Sahaba/Tushka	0.7946	0.7850	0.9003	0.8944	0.8988	0.8996	1.1133	1.1153	1.1245	1.1263	1.0403	1.0439
A-Group	0.7863	0.7854	0.8990	0.8904	0.8912	0.8982	1.1151	1.1128	1.0889	1.1080	1.0413	1.0540
Malian Sahara	0.7864	0.7887	0.9051	0.8971	0.8815	0.8796	1.0527	1.0608	1.0695	1.0701	1.0197	1.0223
“Sudanese Hotchpotch”	0.7263	0.7263	0.8492	0.8483	0.8773	0.8740	1.0858	1.0842	1.0346	1.0360	0.9746	0.9856
Southern Sudan	0.8016	0.8023	0.9253	0.9229	0.9091	0.9183	1.0835	1.0830	1.0915	1.1110	1.0688	1.0751
Chad	0.7774	0.7877	0.8793	0.8817	0.8615	0.8653	1.0577	1.0577	1.0592	1.0597	1.0329	1.0447
Mandinka	0.7555	0.7586	0.8755	0.8699	0.8745	0.8735	1.0517	1.0538	1.0815	1.0853	1.0841	1.0938
Somalis	0.7857	0.7931	0.8939	0.8902	0.8868	0.8876	1.1027	1.1115	1.0981	1.1249	1.1031	1.1015
Haya	0.8082	0.8084	0.9139	0.9085	0.9158	0.9109	1.0727	1.0814	1.1178	1.1282	1.0793	1.0976
W.H. - Leiterband/Handessi	0.7633	0.7699	0.9061	0.9056	0.8944	0.9024	1.1035	1.0957	1.1083	1.1043	1.0999	1.0809
W.H. - Leiterband	0.7633	0.7699	0.9061	0.9056	0.8944	0.9024	1.1035	1.0957	1.1083	1.1043	1.0999	1.0809
W.H. - pre-Leiterband	0.7877	0.7854	0.9074	0.9225	0.8674	0.8614	1.0950	1.0769	1.0874	1.0967	1.0397	1.0377
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0.6381	0.6381					1.0952	1.0952	1.0744	1.0744	1.1214	1.1000
W.H. - 02/28	0.7683	0.7776	0.9017	0.9035	0.8932	0.8964	1.0986	1.0877	1.1084	1.1106	1.0969	1.0720
W.H. - 02/1	0.8009	0.7979	0.9000	0.9226	0.8674	0.8614	1.0950	1.0769	1.0874	1.0967	1.0435	1.0375
W.H. - 95/4	0.7480	0.7480	0.9222	0.9222							1.0340	1.0380
J.S./T. - ♂	0.8018	0.8033	0.8987	0.9028	0.9081	0.9114	1.1146	1.1183	1.1317	1.1387	1.0502	1.0585
J.S./T. - ♀	0.7881	0.7689	0.9018	0.8860	0.8895	0.8878	1.1122	1.1127	1.1166	1.1125	1.0294	1.0278
M.S. - Erg Ine Sakane	0.7418	0.7418	0.8103	0.8103	0.7500	0.7500	1.0537	1.0537	0.9750	0.9750	0.9774	0.9774
M.S. - Hassi el Abiod	0.7964	0.7993	0.9236	0.9084	0.8824	0.8835	1.0543	1.0638	1.0801	1.0799	1.0255	1.0219
M.S. - Kobadi	0.7854	0.7902	0.9174	0.9178	0.9080	0.9004	1.0495	1.0543	1.0921	1.0945	1.0379	1.0420
“S.H.” - El Kadada	0.7279	0.7279	0.8442	0.8420	0.8217	0.8084	1.0990	1.0922	1.0300	1.0350	0.9966	1.0349
“S.H.” - Saggai	0.7207	0.7207	0.8525	0.8525	0.9003	0.9003	1.0769	1.0769	1.0480	1.0480	0.9576	0.9576
“S.H.” - Jebel Shaqadud	0.7330	0.7330	0.8538	0.8538	0.8869	0.8869	1.0801	1.0831	1.0190	1.0190	0.9713	0.9713

	SDM049 - 81(1). Crown width LI1 (l)	SDM050 - 81(1). Crown width LI1 (r)	SDM051 - 81(1). Crown width LI2 (l)	SDM052 - 81(1). Crown width LI2 (r)	SDM053 - 81(1). Crown width LC (l)	SDM054 - 81(1). Crown width LC (r)	SDM055 - 81(1). Crown width LP1 (l)	SDM056 - 81(1). Crown width LP1 (r)	SDM057 - 81(1). Crown width LP2 (l)	SDM058 - 81(1). Crown width LP2 (r)	SDM059 - 81(1). Crown width LM1 (l)	SDM060 - 81(1). Crown width LM1 (r)
Wadi Howar	0.5598	0.5580	0.5910	0.5768	0.6833	0.6859	0.7593	0.7569	0.7947	0.7917	1.0307	1.0344
Jebel Sahaba/Tushka	0.5982	0.6023	0.6369	0.6310	0.7428	0.7421	0.7889	0.7913	0.7978	0.8080	1.0371	1.0377
A-Group	0.5938	0.5876	0.6013	0.5983	0.7439	0.7425	0.7768	0.7767	0.8192	0.8272	1.0490	1.0476
Malian Sahara	0.5464	0.5479	0.5763	0.5799	0.7059	0.7060	0.7824	0.7789	0.7774	0.7731	1.0119	1.0112
“Sudanese Hotchpotch”	0.5076	0.5076	0.5334	0.5334	0.6824	0.6824	0.7375	0.7195	0.7499	0.7486	1.0198	1.0057
Southern Sudan	0.5707	0.5684	0.5967	0.5978	0.7347	0.7319	0.7991	0.7937	0.8111	0.8167	1.0361	1.0409
Chad	0.5403	0.5372	0.5709	0.5731	0.7139	0.7063	0.7676	0.7673	0.7940	0.7941	1.0108	1.0121
Mandinka	0.5449	0.5480	0.5596	0.5556	0.7103	0.7139	0.7557	0.7566	0.7811	0.7847	1.0147	1.0101
Somalis	0.5681	0.5567	0.6005	0.5982	0.7174	0.7124	0.7863	0.7880	0.8131	0.8061	1.0408	1.0392
Haya	0.5270	0.5299	0.5730	0.5713	0.7220	0.7251	0.7857	0.7923	0.7863	0.7981	1.0245	1.0290
W.H. - Leiterband/Handessi	0.5593	0.5558	0.5858	0.5702	0.6752	0.6787	0.7683	0.7685	0.7909	0.7842	1.0333	1.0412
W.H. - Leiterband	0.5593	0.5558	0.5858	0.5702	0.6752	0.6787	0.7683	0.7685	0.7909	0.7842	1.0333	1.0412
W.H. - pre-Leiterband	0.5615	0.5647	0.6102	0.6012	0.7074	0.7076	0.7391	0.7308	0.8053	0.8121	1.0211	1.0096
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0.4762	0.4762			0.5714	0.6095	0.6857	0.6952	0.6476	0.6476	1.0952	1.0952
W.H. - 02/28	0.5675	0.5695	0.5868	0.5697	0.6864	0.6831	0.7738	0.7727	0.8033	0.7973	1.0288	1.0396
W.H. - 02/1	0.5615	0.5647	0.6102	0.6012	0.7043	0.7047	0.7571	0.7461	0.8053	0.8121	1.0211	1.0096
W.H. - 95/4					0.7165	0.7165	0.6850	0.6850				
J.S./T. - ♂	0.6019	0.6094	0.6470	0.6353	0.7511	0.7504	0.7934	0.7966	0.7972	0.8163	1.0431	1.0365
J.S./T. - ♀	0.5937	0.5937	0.6253	0.6261	0.7325	0.7317	0.7831	0.7844	0.7985	0.7996	1.0311	1.0389
M.S. - Erg Ine Sakane	0.5043	0.5043	0.5464	0.5547	0.6490	0.6490	0.6667	0.6667	0.6654	0.6654	0.9920	0.9834
M.S. - Hassi el Abiod	0.5662	0.5692	0.5832	0.5778	0.7242	0.7243	0.8065	0.8094	0.7922	0.7858	1.0245	1.0278
M.S. - Kobadi			0.5815	0.5903	0.6900	0.6900	0.7701	0.7675	0.8162	0.8125	1.0154	1.0092
“S.H.” - El Kadada	0.5300	0.5300	0.5405	0.5405	0.7265	0.7265	0.7324	0.7274	0.7771	0.7801	1.0438	1.0067
“S.H.” - Saggai	0.4964	0.4964	0.5285	0.5285	0.6486	0.6486	0.6806	0.6806	0.6851	0.6851	1.0092	1.0092
“S.H.” - Jebel Shaqadud			0.5339	0.5339	0.6516	0.6516	0.8045	0.7425	0.7737	0.7648	0.9823	1.0000

	SDM063 - 81(1). Crown width LM3 (l)	SDM064 - 81(1). Crown width LM3 (r)
Wadi Howar	0.9647	0.9751
Jebel Sahaba/Tushka	0.9656	0.9736
A-Group	0.9693	0.9584
Malian Sahara	0.9212	0.9227
“Sudanese Hotchpotch”	0.9400	0.9400
Southern Sudan	1.0025	1.0067
Chad	0.9612	0.9681
Mandinka	0.9588	0.9609
Somalis	0.9900	0.9813
Haya	0.9861	0.9985
W.H. - Leiterband/Handessi	0.9683	0.9797
W.H. - Leiterband	0.9718	0.9847
W.H. - pre-Leiterband	0.9524	0.9589
W.H. - 96/120 (Handessi)	0.9228	0.9144
W.H. - 96/1	0.9893	0.9869
W.H. - 02/28	0.9763	0.9844
W.H. - 02/1	0.9811	0.9924
W.H. - 95/4	0.8661	0.8583
J.S./T. - ♂	0.9731	0.9754
J.S./T. - ♀	0.9589	0.9720
M.S. - Erg Ine Sakane	0.8802	0.8826
M.S. - Hassi el Abiod	0.8962	0.9049
M.S. - Kobadi	1.0167	1.0011
“S.H.” - El Kadada	0.9500	0.9500
“S.H.” - Saggai	0.9273	0.9273
“S.H.” - Jebel Shaqadud	0.9535	0.9535

Appendix XXIV.A.4.c. Scaled postcranial measurements

	SPM015 - H1. *Humerus* - Maximum length (l)	SPM016 - H1. *Humerus* - Maximum length (r)	SPM019 - H5. Maximum diameter of the mid-shaft (l)	SPM020 - H5. Maximum diameter of the mid-shaft (r)	SPM021 - H6. Minimum diameter of the mid-shaft (l)	SPM022 - H6. Minimum diameter of the mid-shaft (r)	SPM025 - H7a. Mid-shaft circumference (l)	SPM026 - H7a. Mid-shaft circumference (r)	SPM065 - U1. *Ulna* - Maximum length (l)	SPM066 - U1. *Ulna* - Maximum length (r)	SPM067 - U3. Least circumference (l)	SPM068 - U3. Least circumference (r)
Wadi Howar	25.9525	25.9822	1.6761	1.6845	1.3353	1.3232	4.8836	4.9409	22.4803	22.4651	2.9495	2.9455
Jebel Sahaba/Tushka	28.2397	28.2397	1.7802	1.8482	1.4723	1.4891	5.2733	5.4155	23.8126	23.8636	3.2213	3.2988
W.H. - Leiterband/Handessi	24.9897	24.9897	1.6566	1.6694	1.3407	1.3250	4.8456	4.9175	22.1464	22.1464	2.9365	2.9441
W.H. - Leiterband	24.6303	24.6303	1.6581	1.6718	1.3586	1.3418	4.8501	4.9272	22.0121	22.0121	2.9832	2.9916
W.H. - pre-Leiterband	28.8408	28.9598	1.7492	1.7411	1.3151	1.3164	5.0262	5.0287	23.7044	23.6335	2.9927	2.9502
W.H. - 96/120 (Handessi)	28.9430	28.9430	1.6359	1.6359	1.0906	1.0906	4.7819	4.7819	23.4899	23.4899	2.5168	2.5168
W.H. - 96/1	26.6369	26.6369	1.6250	1.7202	1.4762	1.4762	4.9524	5.1905	24.7619	24.7619	2.7024	2.7024
W.H. - 02/28	23.7469	23.7469	1.6590	1.6592	1.3311	1.3049	4.7877	4.8547	21.5885	21.5885	2.9727	2.9854
W.H. - 02/1	28.8408	28.9598	1.7492	1.7411	1.3151	1.3164	5.0262	5.0287	23.7044	23.6335	2.9927	2.9502
W.H. - 95/4												
J.S./T. - ♂	28.8037	28.8037	1.8671	1.9539	1.5553	1.5826	5.5319	5.7056	24.4431	24.4431	3.3817	3.5017
J.S./T. - ♀	27.5952	27.5952	1.6809	1.7275	1.3775	1.3823	4.9776	5.0840	22.9718	23.0909	3.0075	3.0282

	SPM071 - *U3c. Crest circumference (l)	SPM072 - *U3c. Crest circumference (r)	SPM073 - U11. Dorso-ventral shaft diameter (l)	SPM074 - U11. Dorso-ventral shaft diameter (r)	SPM075 - U12. Transverse shaft diameter (l)	SPM076 - U12. Transverse shaft diameter (r)	SPM077 - *U18. Longitudinal *Tuberositas ulnae* diameter (l)	SPM078 - *U18. Longitudinal *Tuberositas ulnae* diameter (r)	SPM079 - *U19. Transverse *Tuberositas ulnae* diameter (l)	SPM080 - *U19. Transverse *Tuberositas ulnae* diameter (r)	SPM089 - F1. *Femur* - Maximum length (l)	SPM090 - F1. *Femur* - Maximum length (r)
Wadi Howar	3.8774	3.9225	1.1019	1.1113	1.3581	1.3697	1.3291	1.2710	0.7825	0.7448	37.8530	37.8628
Jebel Sahaba/Tushka	4.1776	4.2412	1.3000	1.3207	1.3512	1.3563	1.3157	1.4079	0.7163	0.7181	38.5562	38.5562
W.H. - Leiterband/Handessi	3.7884	3.8485	1.0982	1.1100	1.3237	1.3385	1.3291	1.2872	0.8290	0.8008	38.5814	38.5947
W.H. - Leiterband	3.8530	3.9206	1.1157	1.1288	1.3302	1.3465	1.3468	1.2944	0.7431	0.7093	38.5814	38.5947
W.H. - pre-Leiterband	4.1443	4.1443	1.1158	1.1158	1.4841	1.4841	1.3291	1.2440	0.6897	0.6329	35.8135	35.8135
W.H. - 96/120 (Handessi)	3.2718	3.2718	0.9228	0.9228	1.2584	1.2584	1.2584	1.2584	1.2584	1.2584		
W.H. - 96/1			1.0476	1.0476	1.3333	1.2381					40.9524	40.9524
W.H. - 02/28	3.8281	3.9054	1.1483	1.1646	1.3179	1.3501	1.3468	1.2944	0.7431	0.7093	36.7830	36.8064
W.H. - 02/1	4.1443	4.1443	1.1158	1.1158	1.4841	1.4841	1.3291	1.2440	0.6897	0.6329	35.8135	35.8135
W.H. - 95/4												
J.S./T. - ♂	4.3367	4.4653	1.3792	1.4018	1.4080	1.4684	1.3219	1.4471	0.8032	0.8128	39.6312	39.6312
J.S./T. - ♀	3.9654	3.9425	1.1944	1.2124	1.2756	1.1769	1.3074	1.3555	0.6004	0.5918	37.3278	37.3278

	SPM093 - F6. Anterior-posterior mid-shaft diameter (l)	SPM094 - F6. Anterior-posterior mid-shaft diameter (r)	SPM095 - F7. Medio-lateral mid-shaft diameter (l)	SPM096 - F7. Medio-lateral mid-shaft diameter (r)	SPM097 - F8. Mid-shaft circumference (l)	SPM098 - F8. Mid-shaft circumference (r)	SPM099 - F9. Subtrochanteric transverse diameter (l)	SPM100 - F9. Subtrochanteric transverse diameter (r)	SPM101 - F10. Subtrochanteric sagittal diameter (l)	SPM102 - F10. Subtrochanteric sagittal diameter (r)	SPM103 - *F10(1). Subtrochanteric circumference (l)	SPM104 - *F10(1). Subtrochanteric circumference (r)
Wadi Howar	2.4203	2.4571	2.0151	2.0129	6.7707	6.8008	2.3645	2.3620	1.9320	1.9220	6.7887	6.8144
Jebel Sahaba/Tushka	2.6922	2.6735	2.3080	2.3168	7.5520	7.5470	2.6600	2.6601	2.1634	2.1247	7.5694	7.5770
W.H. - Leiterband/Handessi	2.4564	2.4915	2.0300	2.0271	6.8412	6.8699	2.4392	2.4358	1.9809	1.9703	6.9832	7.0188
W.H. - Leiterband	2.4683	2.5057	2.0360	2.0328	6.8686	6.8989	2.4392	2.4358	1.9809	1.9703	6.9832	7.0188
W.H. - pre-Leiterband	2.2977	2.3399	1.9613	1.9619	6.5169	6.5521	2.1555	2.1553	1.7951	1.7866	6.2829	6.2829
W.H. - 96/120 (Handessi)	2.2651	2.2651	1.9295	1.9295	6.3758	6.3758						
W.H. - 96/1	2.2679	2.2440	1.8393	1.7917	6.2738	6.2738	2.3214	2.3214	1.9226	1.9226	6.6667	6.6667
W.H. - 02/28	2.4721	2.5205	2.0652	2.0693	6.6955	6.7471	2.4284	2.4112	1.9508	1.9267	6.9676	7.0337
W.H. - 02/1	2.2977	2.3399	1.9613	1.9619	6.5169	6.5521	2.1555	2.1553	1.7951	1.7866	6.2829	6.2829
W.H. - 95/4												
J.S./T. - ♂	2.8045	2.7771	2.3471	2.3533	7.7441	7.7399	2.6995	2.6774	2.2666	2.2450	7.7840	7.7853
J.S./T. - ♀	2.5640	2.5552	2.2633	2.2752	7.3323	7.3265	2.6150	2.6403	2.0455	1.9872	7.3242	7.3390

	SPM117 - *F34. *Linea aspera* breadth (l)	SPM118 - *F34. *Linea aspera* breadth (r)	SPM121 - *Femur* - Cortical thickness (ant.)	SPM122 - *Femur* - Cortical thickness (post.; *Linea aspera*)	SPM123 - *Femur* - Cortical thickness (post.; med./lat. to *Linea aspera*)	SPM124 - *Femur* - Cortical thickness (med.)	SPM125 - *Femur* - Cortical thickness (lat.)	SPM126 - *Femur* - Cortical thickness (max.)	SPM127 - *Femur* - Cortical thickness (min.)	SPM130 - T1a. *Tibia* - Maximum length (l)	SPM131 - T1a. *Tibia* - Maximum length (r)	SPM138 - T8. Sagittal mid-shaft diameter (l)
Wadi Howar	0.4995	0.4995	0.4919	0.8067	0.5103	0.5034	0.5432	0.7818	0.4350	31.3098	31.3098	2.2424
Jebel Sahaba/Tushka	0.5794	0.5826	0.5788	0.9185	0.5973	0.6039	0.6901	0.9185	0.4914	32.4098	32.4098	2.4898
W.H. - Leiterband/Handessi	0.5253	0.5193	0.4961	0.8249	0.5292	0.5157	0.5350	0.7888	0.4483	31.5731	31.5731	2.2513
W.H. - Leiterband	0.5253	0.5193	0.4961	0.8249	0.5292	0.5221	0.5427	0.7992	0.4480	31.5476	31.5476	2.2501
W.H. - pre-Leiterband	0.4543	0.4648	0.4795	0.7596	0.4726	0.4640	0.5695	0.7596	0.3923	30.4538	30.4538	2.2194
W.H. - 96/120 (Handessi)						0.4195	0.4195	0.6329	0.4521	31.8792	31.8792	2.2651
W.H. - 96/1			0.3333	0.7083		0.4940	0.4345	0.7083	0.2500	35.2381	35.2381	2.3810
W.H. - 02/28	0.5199	0.5093	0.4691	0.7972	0.5029	0.5138	0.5422	0.7652	0.4034	30.4864	30.4864	2.0989
W.H. - 02/1	0.4543	0.4648	0.4795	0.7596	0.4726	0.4640	0.5695	0.7596	0.3923	30.4538	30.4538	2.2194
W.H. - 95/4												
J.S./T. - ♂	0.6059	0.6168	0.6795	0.9654	0.6380	0.6356	0.6466	0.9654	0.5306	33.4675	33.4675	2.5806
J.S./T. - ♀	0.5491	0.5435	0.4948	0.8794	0.5634	0.5775	0.7263	0.8794	0.4588	31.2011	31.2011	2.3860

	SPM139 - T8. Sagittal mid-shaft diameter (r)	SPM142 - T9. Transverse mid-shaft diameter (l)	SPM143 - T9. Transverse mid-shaft diameter (r)	SPM146 - T10. Mid-shaft circumference (l)	SPM147 - T10. Mid-shaft circumference (r)	SPM150 - T10b. Minimum shaft circumference (l)	SPM151 - T10b. Minimum shaft circumference (r)
Wadi Howar	2.2450	1.6931	1.7094	6.2348	6.2611	5.4168	5.4263
Jebel Sahaba/Tushka	2.4822	1.8206	1.8124	6.8844	6.8486	6.3108	6.2800
W.H. - Leiterband/Handessi	2.2516	1.7407	1.7633	6.3215	6.3513	5.4832	5.4875
W.H. - Leiterband	2.2505	1.7459	1.7704	6.3309	6.3633	5.5394	5.5443
W.H. - pre-Leiterband	2.2279	1.5693	1.5693	6.0093	6.0264	5.2672	5.2884
W.H. - 96/120 (Handessi)	2.2651	1.6779	1.6779	6.2081	6.2081	5.0336	5.0336
W.H. - 96/1	2.3810	2.1905	2.1905	7.1429	7.2381	5.8095	5.8095
W.H. - 02/28	2.0993	1.6724	1.7050	5.9631	5.9956	5.3410	5.3474
W.H. - 02/1	2.2279	1.5693	1.5693	6.0093	6.0264	5.2672	5.2884
W.H. - 95/4							
J.S./T. - ♂	2.5687	1.9476	1.9367	7.2340	7.1831	6.6049	6.5777
J.S./T. - ♀	2.3833	1.6754	1.6703	6.4850	6.4663	5.9747	5.9398

Appendix XXIV.B. Cranial morphological traits

	CN001 - Cranial length (*Norma verticalis*)	CN002 - Cranial shape (*Norma verticalis*)	CN002a - Cranial shape (*Norma verticalis*) - main	CN004 - Cranial height (*Norma occipitalis*)	CN005 - Cranial shape (*Norma occipitalis*)	CN005a - Cranial shape (*Norma occipitalis*) - main	CN006 - Occipital bunning	CN006a - Occipital bunning - degree	CN006b - Occipital bunning - shape	CN007 - Sagittal keeling	CN007a - Sagittal keeling - degree	CN007b - Sagittal keeling - shape
Wadi Howar	8	75	7	7	87	8	50	5	0	50	5	0
Jebel Sahaba/Tushka	8	70	7	7	87	8	50	5	0	65	6	5
A-Group	6	70	7	6	80	8	30	3	0	45	4	5
Malian Sahara	6	70	7	7	87	8	30	3	0	40	4	0
"Sudanese Hotchpotch"	7	75	7	8	80	8	25	2	5	55	5	5
Southern Sudan	7	75	7	7	80	8	30	3	0	50	5	0
Chad	7	70	7	6	80	8	20	2	0	55	5	5
Mandinka	7	75	7	7	87	8	20	2	0	55	5	5
Somalis	7	75	7	7	80	8	40	4	0	50	5	0
Haya	7	57	5	7	74	7	40	4	0	50	5	0
W.H. - Leiterband/Handessi	7	75	7	7	80	8	50	5	0	50	5	0
W.H. - Leiterband	7	75	7	7	80	8	50	5	0	50	5	0
W.H. - pre-Leiterband	9	70	7	8	87	8	55	5	5	95	9	5
W.H. - 96/120 (Handessi)												
W.H. - 96/1	6	75	7	7	74	7	10	1	0	30	3	0
W.H. - 02/28	8	75	7	7	80	8	50	5	0	50	5	0
W.H. - 02/1							75	7	5			
W.H. - 95/4	9	70	7	8	87	8	30	3	0	95	9	5
J.S./T. - ♂	8	75	7	7	87	8	50	5	0	55	5	5
J.S./T. - ♀	8	70	7	7	87	8	45	4	5	65	6	5
M.S. - Erg Ine Sakane	6	70	7	6	78	7	45	4	5	30	3	0
M.S. - Hassi el Abiod	7	75	7	7	87	8	30	3	0	55	5	5
M.S. - Kobadi	5	53	5	5	70	7	20	2	0	40	4	0
"S.H." - El Kadada	7	75	7	8	80	8	25	2	5	55	5	5
"S.H." - Saggai	6									55	5	5
"S.H." - Jebel Shaqadud	8	50	5	9	80	8	10	1	0			

	CN016 - Interorbital breadth	CN017 - Shape of the *Sella nasi*	CN017a - Shape of the *Sella nasi* - main	CN017b - Shape of the *Sella nasi* - additional tendency/superstructure	CN019 - Orientation of the *Processus frontales maxillae*	CN023 - *Margo infranasalis*	CN023a - *Margo infranasalis* - main	CN024 - Alveolar prognathism	CN028 - Symphyseal height	CN031 - Ramus inversion	CN032 - Ramus angle
Wadi Howar	9	10	1	0	3	30	3	8	8	6	6
Jebel Sahaba/Tushka	9	10	1	0	3	23	2	8	8	3	4
A-Group	8	72	7	2	5	56	5	6	6	3	6
Malian Sahara	8	14	1	4	4	34	3	7	6	4	5
"Sudanese Hotchpotch"	8	20	2	0	4	36	3	7	7	4	5
Southern Sudan	9	27	2	7	4	34	3	8	7	3	4
Chad	9	17	1	7	5	34	3	8	6	4	5
Mandinka	9	28	2	8	4	36	3	8	7	4	5
Somalis	8	92	9	2	6	56	5	6	7	4	5
Haya	9	26	2	6	5	30	3	8	6	4	6
W.H. - Leiterband/Handessi	9	10	1	0	3	30	3	8	7	6	6
W.H. - Leiterband	9	10	1	0	3	30	3	8	8	6	6
W.H. - pre-Leiterband		10	1	0	3	30	3	8	8	5	5
W.H. - 96/120 (Handessi)	9	10	1	0		10	1	8	6		6
W.H. - 96/1	9	28	2	8	4	33	3	8	8	6	9
W.H. - 02/28	8	10	1	0	3	30	3	8	7	6	6
W.H. - 02/1		10	1	0	3	30	3	7	8	1	5
W.H. - 95/4						30	3	8	9	8	4
J.S./T. - ♂	9	20	2	0	3	15	1	8	8	3	4
J.S./T. - ♀	9	17	1	7	3	23	2	7	7	3	5
M.S. - Erg Ine Sakane	8	34	3	4	6	30	3	7	6	4	6
M.S. - Hassi el Abiod	9	16	1	6	4	34	3	8	6	4	5
M.S. - Kobadi	8	10	1	0	3	36	3	7	6	6	7
"S.H." - El Kadada	8		2		4	36	3	6	7	3	4
"S.H." - Saggai	9	16	1	6	2	40	4	6	7		5
"S.H." - Jebel Shaqadud	9	20	2	0	5	36	3	8	8	5	6

Appendix XXIV.C. Epigenetic traits

Appendix XXIV.C.1. Cranial epigenetic traits

	CE001 - *Ossa suturae coronalis*	CE003 - *Ossa suturae lambdoideae*	CE014 - *Os incae*	CE015 - *Os incisivum/Sutura incisiva*	CE021 - *Sutura metopica*	CE040b - *Foramen zygomaticofaciale* (l) - number	CE041b - *Foramen zygomaticofaciale* (r) - number	CE054a - **Foramina paranasalia* (l)	CE054b - **Foramina paranasalia* (r)	CE057b - *Foramen mentale accessorium* (l) - number	CE058b - *Foramen mentale accessorium* (r) - number
Wadi Howar	1	2	1	2	1	2	2	4	4	1	1
Jebel Sahaba/Tushka	1	1	1	1	1	1	1	4	4	1	1
A-Group	1	2	1	2	1	1	1	1	1	1	1
Malian Sahara	1	1	1	2	1	2	2	1	1	1	1
“Sudanese Hotchpotch”	1	1	1	2	1	2	2	4	4	1	1
Southern Sudan	1	2	1	2	1	2	2	1	1	1	1
Chad	1	1	1	2	1	1	1	4	4	1	1
Mandinka	1	2	1	2	1	1	1	4	4	1	1
Somalis	1	2	1	2	1	1	1	4	4	1	1
Haya	1	1	1	2	1	2	2	1	1	1	1
W.H. - Leiterband/Handessi	1	2	1	2	1	2	2	4	4	1	1
W.H. - Leiterband	1	2	1	2	1	2	2	4	4	1	1
W.H. - pre-Leiterband	1	1	1	2	1	1	1	4	4	1	1
W.H. - 96/120 (Handessi)					1						
W.H. - 96/1	1	2	1	1	1			4	4	1	1
W.H. - 02/28	1	1	1	2	1	2	2	4	4	1	1
W.H. - 02/1	1		1	1	1	1	1	4	4	1	1
W.H. - 95/4	1	1	1	3	1					1	1
J.S./T. - ♂	1	2	1	1	1	1	1	4	4	1	1
J.S./T. - ♀	1	1	1	1	1	1	1	4	4	1	1
M.S. - Erg Ine Sakane	1	2	1	2	1	1	1	1	4	1	1
M.S. - Hassi el Abiod	1	1	1	1	1	2	2	1	1	1	1
M.S. - Kobadi	1	1	1	1	1	1	1	1	1	1	1
“S.H.” - El Kadada	1	1	1	2	1	2	1	4	4	1	1
“S.H.” - Saggai	1	1	1		1					1	1
“S.H.” - Jebel Shaqadud	1	2	2	1	1	1	2			1	1

Appendix XXIV.C.2. Dental epigenetic traits

	DE001 - Winging UI1 (l)	DE002 - Winging UI1 (r)	DE005 - Shovel UI1 (l)	DE006 - Shovel UI1 (r)	DE007 - Double shovel UI1 (l)	DE008 - Double shovel UI1 (r)	DE009 - Interruption groove UI2 (l)	DE010 - Interruption groove UI2 (r)	DE011 - *Tuberculum dentale* UI2 (l)	DE012 - *Tuberculum dentale* UI2 (r)	DE013 - Canine mesial ridge (“Bushman canine”) UC (l)	DE014 - Canine mesial ridge (“Bushman canine”) UC (r)
Wadi Howar	3	3	2	2	1	1	2	4	3	3	2	2
Jebel Sahaba/Tushka	3	3	2	2	1	1	0	1	1	1	1	1
A-Group	3	3	1	1	1	1	0	0	1	1	1	1
Malian Sahara	3	3	2	2	1	1	1	1	4	4	1	1
“Sudanese Hotchpotch”			2	2								
Southern Sudan	3	3	2	2	1	1	0	0	1	1	2	2
Chad	3	3	1	2	1	1	1	1	0	0	1	1
Mandinka	3	3			1	1	1	1	5	5	2	2
Somalis	3	3	1	1	1	1	0	0	3	3	0	0
Haya	3	3	1	1	0	0	3	3	4	4	2	2
W.H. - Leiterband/Handessi	3	3	2	2	1	1	3	3	3	3	2	2
W.H. - Leiterband	3	3	2	2	1	1	3	3	3	3	2	2
W.H. - pre-Leiterband	3	3	2	2	1	1	2	4	2	3	2	2
W.H. - 96/120 (Handessi)												
W.H. - 96/1	3	3	1	1	1	1					0	0
W.H. - 02/28	3	3	2	2	1	1	3	3	3	3	3	3
W.H. - 02/1	3	3	1	1	1	1	2	2	1	1	1	1
W.H. - 95/4	3	3	2	2	1	1	4	4	2	4	3	2
J.S./T. - ♂	3	3	2	2	1	1	0	2	1	1	2	2
J.S./T. - ♀	3	1	2	2	1	1	0	1	1	1	0	0
M.S. - Erg Ine Sakane	3	3	2	2	2	2	4	4	5	5	3	3
M.S. - Hassi el Abiod	3	3	2	2	1	1	1	1	4	4	1	1
M.S. - Kobadi	3	3	2	2	1	1	2	2	3	3	1	1
“S.H.” - El Kadada												
“S.H.” - Saggai			2	2								
“S.H.” - Jebel Shaqadud												

	DE015 - Distal accessory ridge UC (l)	DE016 - Distal accessory ridge UC (r)	DE017 - Premol. mesial & distal access. cusps UP1 (l)	DE018 - Premol. mesial & distal access. cusps UP1 (r)	DE019 - Premol. mesial & distal access. cusps UP2 (l)	DE020 - Premol. mesial & distal access. cusps UP2 (r)	DE027 - Hypocone UM2 (l)	DE028 - Hypocone UM2 (r)	DE029 - Cusp 5 (metaconule) UM1 (l)	DE030 - Cusp 5 (metaconule) UM1 (r)	DE031 - Carabelli's trait UM1 (l)	DE032 - Carabelli's trait UM1 (r)
Wadi Howar	4	4	1	1	1	1	3.5	4	4	4	3	3
Jebel Sahaba/Tushka	5	5	1	1	1	1	3.5	3.5	5	5	1	1
A-Group	1	1	1	1	1	1	3	3.5	4	4	0	0
Malian Sahara	4	4	1	1	1	1	3.5	3.5	4	4	1	1
"Sudanese Hotchpotch"							3.5	3.5			4	4
Southern Sudan	4	4	0	0	0	0	3.5	3.5	3	3	1	1
Chad	3	3	0	0	0	0	3.5	3.5	3	3	1	1
Mandinka	4	4	0	0	0	0	3.5	3.5	4	4	2	2
Somalis	3	3	1	1	1	1	3	3	4	4	5	5
Haya	3	3	1	1	1	1	3.5	3.5	4	4	3	3
W.H. - Leiterband/Handessi	5	5	1	1	1	1	4	4	4	4	3	4
W.H. - Leiterband	5	5	1	1	1	1	4	4	4	4	3	4
W.H. - pre-Leiterband	4	4	1	1	1	1	3.5	3.5	4	5	0	0
W.H. - 96/120 (Handessi)												
W.H. - 96/1	5	5	1	1			3.5	3.5	3	3		
W.H. - 02/28	5	5	1	1	1	1	4	4	4	5	4	4
W.H. - 02/1	4	4	1	1	1	1	3.5	3.5	4	5	0	0
W.H. - 95/4	4	4	0	0								
J.S./T. - ♂			0	0	0	0	3.5	3.5			1	1
J.S./T. - ♀	5	5	1	1	1	1	3.5	4	5	5	3	3
M.S. - Erg Ine Sakane	5	5	1	1			4	4	4	3	2	2
M.S. - Hassi el Abiod	4	4	1	1	0	0	3.5	3.5	5	5	1	1
M.S. - Kobadi					1	1	3.5	3.5	3	3	0	0
"S.H." - El Kadada											5	5
"S.H." - Saggai											0	0
"S.H." - Jebel Shaqadud							3.5	3.5			6	6

	DE033 - Parastyle UM2 (l)	DE034 - Parastyle UM2 (r)	DE035 - Parastyle UM3 (l)	DE036 - Parastyle UM3 (r)	DE039 - Premolar root number UP1 (l)	DE040 - Premolar root number UP1 (r)	DE041 - Upper molar root number UM2 (l)	DE042 - Upper molar root number UM2 (r)	DE043 - Peg-shaped incisor UI2 (l)	DE044 - Peg-shaped incisor UI2 (r)	DE045 - Peg-shaped molar UM3 (l)	DE046 - Peg-shaped molar UM3 (r)
Wadi Howar	0	0	0	0	1	1	3	3	0	0	0	0
Jebel Sahaba/Tushka	0	0	0	0	2	2	3	3	0	0	0	0
A-Group	0	0	0	0	2	2	3	3	0	0	0	0
Malian Sahara	0	0	0	0	1	1	3	3	0	0	0	0
“Sudanese Hotchpotch”	0	0	0	0	2	2	3	3	0	0	0	0
Southern Sudan	0	0	0	0	2	2	3	3	0	0	0	0
Chad	0	0	1	1	1	1	2	2	0	0	0	0
Mandinka	0	0	0	0	1	1	3	3	0	0	0	0
Somalis	0	0	0	0	2	2	3	3	0	0	0	0
Haya	0	0	0	0	2	2	3	3	0	0	0	0
W.H. - Leiterband/Handessi	0	0	0	0	2	2	3	3	0	0	0	0
W.H. - Leiterband	0	0	0	0	2	2	3	3	0	0	0	0
W.H. - pre-Leiterband	0	0	0	0	1	1	3	3	0	0	0	0
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0	0	0	0							0	0
W.H. - 02/28	1	0	0	0	2	2	3	3	0	0	0	0
W.H. - 02/1	0	0	0	0	1	1	3	3	0	0	0	0
W.H. - 95/4	0	0	1	1	1	1	3	3	0	0	0	0
J.S./T. - ♂	0	0	0	0	2	2	3	3	0	0	0	0
J.S./T. - ♀	0	0	0	0	2	2	3	3	0	0	0	0
M.S. - Erg Ine Sakane	0	0	0	0	1	1	2	2	0	0	0	0
M.S. - Hassi el Abiod	0	0	0	0	1	1	3	3	0	0	0	0
M.S. - Kobadi	0	0	0	0	2	2	3	3	0	0	0	0
“S.H.” - El Kadada					1	1	3	3	0	0	0	0
“S.H.” - Saggai									0	0	0	0
“S.H.” - Jebel Shaqadud	0	0	0	0	2	2	2	2	0	0	0	0

	DE047 - Congenital absence UM3 (l)	DE048 - Congenital absence UM3 (r)	DE049 - Premol. lingual cusps LP2 (l)	DE050 - Premol. lingual cusps LP2 (r)	DE053 - Groove pattern LM2 (l)	DE054 - Groove pattern LM2 (r)	DE055 - Cusp number LM1 (l)	DE056 - Cusp number LM1 (r)	DE057 - Cusp number LM2 (l)	DE058 - Cusp number LM2 (r)	DE059 - Deflecting wrinkle LM1 (l)	DE060 - Deflecting wrinkle LM1 (r)
Wadi Howar	0	0	3	2	1	1	5.5	5.5	5.5	5.5	3	3
Jebel Sahaba/Tushka	0	0	0	0	1	1	5.5	5.5	5.5	5.5	3	3
A-Group	0	0	2	2	3	3	5.5	5.5	5	5		
Malian Sahara	0	0	2	3	1	1	5.5	5.5	5	5	3	3
“Sudanese Hotchpotch”	0	0	2	2			5.5	5.5	5.5	5.5		
Southern Sudan	0	0	1	1	1	1	5.5	5.5	5	5	3	3
Chad	0	0	1	1	1	1	5.5	5.5	5	5	3	3
Mandinka	0	0	0	0	1	1	5.5	5.5	5	5	3	3
Somalis	0	0	3	3	3	1	5.5	5.5	5.5	5.5	2	2
Haya	0	0	2	2	1	1	5.5	5.5	5.5	5.5	3	3
W.H. - Leiterband/Handessi	0	0	3	2	1	1	5.5	5.5	5.5	5.5	3	3
W.H. - Leiterband	0	0	3	2	1	1	5.5	5.5	5.5	5.5	3	3
W.H. - pre-Leiterband	0	0	3	3	1	1	5.5	5.5	5.5	5.5		
W.H. - 96/120 (Handessi)												
W.H. - 96/1	0	0	0	0	1	1	6	5.5	5.5	6	3	3
W.H. - 02/28	0	0	3	2	1	1	5.5	5.5	5.5	5.5	3	2
W.H. - 02/1	0	0	3	3	1	1	5.5	5.5	5.5	5.5		
W.H. - 95/4	0	0			3	3	5.5	5.5	5.5	5.5		
J.S./T. - ♂	0	0	0	0	1	1	5.5	5.5	5.5	5.5	3	3
J.S./T. - ♀	0	0	0	0	1	1	5.5	5.5	5.5	5.5		
M.S. - Erg Ine Sakane	0	0	2	3	1	1	5.5	5.5	5	5	3	3
M.S. - Hassi el Abiod	0	0	0	0	1	1	5.5	5.5	5.5	5.5	3	3
M.S. - Kobadi	0	0	6	6	1	1	5.5	5.5	5	5		
“S.H.” - El Kadada	0	0			3	3	5.5	5.5				
“S.H.” - Saggai	0	0	4	4								
“S.H.” - Jebel Shaqadud	0	0	2	2	1	1	5.5	5.5	5.5	5.5		

	DE063 - Protostylid LM1 (l)	DE064 - Protostylid LM1 (r)	DE065 - Cusp 7 LM1 (l)	DE066 - Cusp 7 LM1 (r)	DE069 - Canine root number LC (l)	DE070 - Canine root number LC (r)	DE071 - Lower molar root number LM1 (l)	DE072 - Lower molar root number LM1 (r)	DE073 - Lower molar root number LM2 (l)	DE074 - Lower molar root number LM2 (r)	DE077 - Midline diastema	DE078 - Palatine torus
Wadi Howar	1	1	2	2	1	1	2	2	2	2	0	1
Jebel Sahaba/Tushka	0	0	2	2	1	1	2	2	2	2	0	0
A-Group	0	0	1	1	1	1	2	2	2	2	0	0
Malian Sahara	0	0	2	2	1	1	2	2	2	2	0	0
“Sudanese Hotchpotch”	0	0			1	1	2	2	2	2		0
Southern Sudan	0	0	2	2	1	1	2	2	2	2	0	0
Chad	0	0	2	2	1	1	2	2	2	2	0	0
Mandinka	0	0	3	3	1	1	2	2	2	2	0	1
Somalis	0	0	2	2	1	1	2	2	2	2	0	0
Haya	0	0	2	2	1	1	2	2	2	2	1	0
W.H. - Leiterband/Handessi	1	1	2	2	1	1	2	2	2	2	0	1
W.H. - Leiterband	1	1	2	2	1	1	2	2	2	2	0	1
W.H. - pre-Leiterband	0	0	1	1	1	1	2	2	2	2	0	0
W.H. - 96/120 (Handessi)					1	1	2	2	2	2		
W.H. - 96/1	0	0	3	3	1	1	2	2	2	2	0	
W.H. - 02/28	1	1	2	2	1	1	2	2	2	2	0	1
W.H. - 02/1	0	0	1	1	1	1	2	2	2	2	0	0
W.H. - 95/4			1	1	1	1	2	2	2	2	0	1
J.S./T. - ♂	0	0	3	2	1	1	2	2	2	2	0	0
J.S./T. - ♀	0	0	0	0	1	1	2	2	2	2	0	0
M.S. - Erg Ine Sakane	0	0	2	2	1	1	2	2	2	2	0	1
M.S. - Hassi el Abiod	0	0	2	2	1	1	2	2	2	2	0	0
M.S. - Kobadi	0	0	1	1	1	1	2	2	2	2	0	0
“S.H.” - El Kadada	0	0			1	1	2	2	2	2		1
“S.H.” - Saggai	0	0										0
“S.H.” - Jebel Shaqadud	0	0			1	1	2	2	1	1		0

	DE079 - Mandibular torus (l)	DE080 - Mandibular torus (r)	DE081 - Rocker jaw
Wadi Howar	0	0	0
Jebel Sahaba/Tushka	0	0	0
A-Group	0	0	0
Malian Sahara	0	0	0
“Sudanese Hotchpotch”	0	0	0
Southern Sudan	0	0	0
Chad	0	0	0
Mandinka	0	0	0
Somalis	0	0	0
Haya	0	0	0
W.H. - Leiterband/Handessi	0	0	0
W.H. - Leiterband	0	0	0
W.H. - pre-Leiterband	0	0	0
W.H. - 96/120 (Handessi)			0
W.H. - 96/1	0	0	0
W.H. - 02/28	0	0	0
W.H. - 02/1	0	0	0
W.H. - 95/4	0	0	0
J.S./T. - ♂	0	0	0
J.S./T. - ♀	0	0	0
M.S. - Erg Ine Sakane	0	0	0
M.S. - Hassi el Abiod	0	0	0
M.S. - Kobadi	0	0	1
“S.H.” - El Kadada	0	1	0
“S.H.” - Saggai			1
“S.H.” - Jebel Shaqadud	0	0	0

Appendix XXIV.D. Robusticity traits

Appendix XXIV.D.1. Cranial robusticity traits

	CR001 - Relief of the *Planum nuchale*	CR003 - *Processus mastoideus*	CR006 - *Arcus superciliaris*	CR010 - *Trigonum mandibulae/Mentum osseum*	CR011 - Corpus thickness	CR012 - *Angulus mandibulae* (gonial eversion)
Wadi Howar	5	4	5	5	5	5
Jebel Sahaba/Tushka	7	6	8	6	5	7
W.H. - Leiterband/Handessi	5	4	5	5	5	5
W.H. - Leiterband	5	5	5	5	6	5
W.H. - pre-Leiterband	6	4	2	5	5	5
W.H. - 96/120 (Handessi)		1	6	5	1	
W.H. - 96/1	5		5	6	4	7
W.H. - 02/28	4	4	4	5	6	5
W.H. - 02/1	5	2	2	4	4	5
W.H. - 95/4	7	9		8	9	7
J.S./T. - ♂	7	7	8	7	6	7
J.S./T. - ♀	6	4	8	5	5	7

Appendix XXIV.D.2. Postcranial robusticity traits

	PR007 - Ulnar shaft bowing (l)	PR008 - Ulnar shaft bowing (r)	PR009 - Ulnar *Margo interosseus* size (l)	PR010 - Ulnar *Margo interosseus* size (r)	PR011a - Femoral shaft bowing (l) - shape	PR012a - Femoral shaft bowing (r) - shape	PR011b - Femoral shaft bowing (l) - degree	PR012b - Femoral shaft bowing (r) - degree	PR013 - Pilasterism (l)	PR014 - Pilasterism (r)
Wadi Howar	5	5	5	5	5	5	3	3	6	6
Jebel Sahaba/Tushka	5	5	6	6	5	5	4	4	5	5
W.H. - Leiterband/Handessi	5	4	5	5	5	5	3	3	5	6
W.H. - Leiterband	4	4	5	5	5	5	3	3	5	6
W.H. - pre-Leiterband	7	6	7	7	5	5	4	4	6	6
W.H. - 96/120 (Handessi)	5	5	3	3	5	5	3	3	6	6
W.H. - 96/1	5	5	2	2	5	4	3	4	6	6
W.H. - 02/28	4	4	5	6	5	5	4	4	5	6
W.H. - 02/1	7	6	7	7	5	5	4	4	6	6
W.H. - 95/4										
J.S./T. - ♂	4	5	5	6	5	5	4	4	5	5
J.S./T. - ♀	5	6	6	6	5	5	4	4	5	5

Appendix XXIV.E. Musculoskeletal stress traits

Appendix XXIV.E.1. Cranial musculoskeletal stress traits

	CS004 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (l)	CS005 - *Calvarium*; *Musculus sternocleidomastoideus* (*Insertio*) (r)
Wadi Howar	8	7
Jebel Sahaba/Tushka	6	6
W.H. - Leiterband/Handessi	7	7
W.H. - Leiterband	7	7
W.H. - pre-Leiterband	8	8
W.H. - 96/120 (Handessi)		
W.H. - 96/1		
W.H. - 02/28	7	7
W.H. - 02/1	8	8
W.H. - 95/4		
J.S./T. - ♂	6	6
J.S./T. - ♀	5	5

Appendix XXIV.E.2. Postcranial musculoskeletal stress traits

	PS001 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (l)	PS002 - *Humerus*; *Musculus pectoralis major* (*Insertio*) (r)	PS003 - *Humerus*; *Musculus deltoideus* (*Insertio*) (l)	PS004 - *Humerus*; *Musculus deltoideus* (*Insertio*) (r)	PS007 - *Ulna; Musculus brachialis* (*Insertio*) (l)	PS008 - *Ulna; Musculus brachialis* (*Insertio*) (r)	PS011 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (l)	PS012 - *Femur*; *Musculus gluteus maximus* (*Insertio*) (r)	PS015 - *Tibia*; *Musculus soleus* (*Origo*) (l)	PS016 - *Tibia*; *Musculus soleus* (*Origo*) (r)
Wadi Howar	7	6	6	5	6	6	7	7	5	5
Jebel Sahaba/Tushka	7	7	6	6	6	7	7	7	7	7
W.H. - Leiterband/Handessi	7	6	6	6	6	6	7	7	4	5
W.H. - Leiterband	7	7	6	6	6	7	7	7	4	5
W.H. - pre-Leiterband	7	6	5	4	7	6	7	6	7	7
W.H. - 96/120 (Handessi)	4	4	6	6	6	6				
W.H. - 96/1			5	5						
W.H. - 02/28	8	7	7	6	6	7	6	6	4	5
W.H. - 02/1	7	6	5	4	7	6	7	6	7	7
W.H. - 95/4										
J.S./T. - ♂	7	6	6	6	5	6	6	7	7	7
J.S./T. - ♀	7	7	6	6	7	8	7	7	7	7

Appendix XXIV.F. Enamel hypoplasia

	DS001a - Hypoplasia UI1 (l) - intensity	DS002a - Hypoplasia UI1 (r) - intensity	DS003a - Hypoplasia UI2 (l) - intensity	DS004a - Hypoplasia UI2 (r) - intensity	DS005a - Hypoplasia UC (l) - intensity	DS006a - Hypoplasia UC (r) - intensity	DS007a - Hypoplasia UP1 (l) - intensity	DS008a - Hypoplasia UP1 (r) - intensity	DS009a - Hypoplasia UP2 (l) - intensity	DS010a - Hypoplasia UP2 (r) - intensity	DS011a - Hypoplasia UM1 (l) - intensity	DS012a - Hypoplasia UM1 (r) - intensity
Wadi Howar	3	2	3	2	3	3	2	2	2	2	2	2
Jebel Sahaba/Tushka	1	1	1	1	1	1	1	1	1	1	1	1
W.H. - Leiterband/Handessi	3	2	3	2	4	3	2	3	2	3	2	2
W.H. - Leiterband	3	2	3	2	4	3	2	3	2	3	2	2
W.H. - pre-Leiterband	2	2	2	2	2	3	2	2	2	2	1	3
W.H. - 96/120 (Handessi)												
W.H. - 96/1	3	3			5	5					1	1
W.H. - 02/28	3	3	3	2	3	3	2	2	2	2	2	2
W.H. - 02/1	1	1	1	2	2	2	2	2	2	3	1	1
W.H. - 95/4	4	4	4	3	3	4	1	1	1	1	1	5
J.S./T. - ♂	1	1	1	1	1	1	1	1	1	1	1	1
J.S./T. - ♀	1	1	1	1	1	1	1	1	1	1	1	1

	DS013a - Hypoplasia UM2 (l) - intensity	DS014a - Hypoplasia UM2 (r) - intensity	DS015a - Hypoplasia UM3 (l) - intensity	DS016a - Hypoplasia UM3 (r) - intensity	DS017a - Hypoplasia LI1 (l) - intensity	DS018a - Hypoplasia LI1 (r) - intensity	DS019a - Hypoplasia LI2 (l) - intensity	DS020a - Hypoplasia LI2 (r) - intensity	DS021a - Hypoplasia LC (l) - intensity	DS022a - Hypoplasia LC (r) - intensity	DS023a - Hypoplasia LP1 (l) - intensity	DS024a - Hypoplasia LP1 (r) - intensity
Wadi Howar	3	2	2	2	2	2	2	2	3	3	3	3
Jebel Sahaba/Tushka	1	1	1	1	1	1	1	1	1	1	1	1
W.H. - Leiterband/Handessi	2	2	3	2	2	2	2	2	3	3	3	3
W.H. - Leiterband	2	2	3	2	2	2	2	2	3	3	3	3
W.H. - pre-Leiterband	3	3	2	2	1	1	1	1	2	3	3	3
W.H. - 96/120 (Handessi)												
W.H. - 96/1	3	3	1	1					3	4	4	4
W.H. - 02/28	2	2	3	2	2	2	2	2	4	3	3	3
W.H. - 02/1	3	3	2	2	1	1	1	1	2	3	3	3
W.H. - 95/4	3	3	2	3					4	4	3	3
J.S./T. - ♂	1	1	1	1	1	1	1	1	1	1	1	1
J.S./T. - ♀	1	1	1	1	1	1	1	1	1	1	1	1

	DS025a - Hypoplasia LP2 (l) - intensity	DS026a - Hypoplasia LP2 (r) - intensity	DS027a - Hypoplasia LM1 (l) - intensity	DS028a - Hypoplasia LM1 (r) - intensity	DS029a - Hypoplasia LM2 (l) - intensity	DS030a - Hypoplasia LM2 (r) - intensity	DS031a - Hypoplasia LM3 (l) - intensity	DS032a - Hypoplasia LM3 (r) - intensity
Wadi Howar	3	3	2	2	2	2	2	2
Jebel Sahaba/Tushka	1	1	1	1	1	1	1	1
W.H. - Leiterband/Handessi	3	3	2	3	2	2	3	3
W.H. - Leiterband	3	3	2	3	2	2	3	3
W.H. - pre-Leiterband	2	3	1	1	3	3	2	2
W.H. - 96/120 (Handessi)	1	1					2	2
W.H. - 96/1			2	2	3	3	2	2
W.H. - 02/28	3	3	2	3	3	2	3	3
W.H. - 02/1	2	3	1	1	3	3	1	1
W.H. - 95/4			1	1	2	2	3	3
J.S./T. - ♂	1	1	1	1	1	1	1	1
J.S./T. - ♀	1	1	1	1	1	1	1	1

Appendix XXV. Metric and non-metric affinities

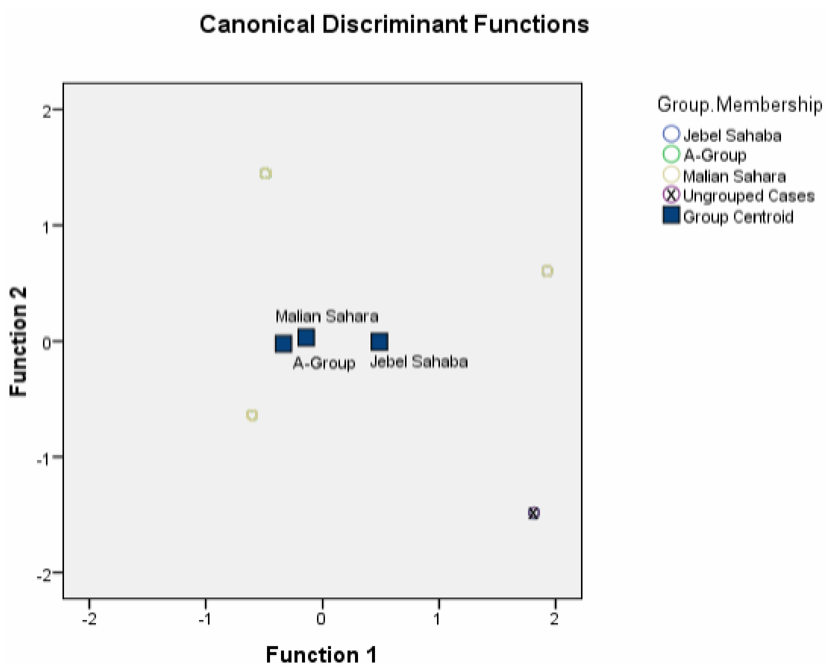
Appendix XXV.A. Discriminant function analyses

Appendix XXV.A.1. Reports

Appendix XXV.A.1.a. Wadi Howar individuals

1. Abu Tabari 95/2-3

1.C.I. Summary	
1.C.I.1. Individual:	*Abu Tabari 95/2-3*
1.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.C.I.3. Data:	*Non-metric cranial and dental traits*
1.C.I.4. Classification:	*Jebel Sahaba/Tushka*
1.C.II. Analysis overview	
1.C.II.1. Method:	*Simultaneous entry*
1.C.II.2.a. Variables in matrix:	*2*
1.C.II.2.b. Variables entered:	*2*
1.C.II.3. Best predictors:	*Occipital bunning (degree) (.998), Occipital bunning (shape) (.944 - Function 2)*
1.C.II.4.a. Wilks' Lambda:	*1 through 2: .888 (Sig. .121), 2: .999 (Sig. .853)*
1.C.II.4.b. Eigenvalues:	*1: .125 (r: .334), 2: .001 (r: .024)*
1.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
1.C.II.6. Remarks:	*Box's M (Sig. .153; Log determinants: A-Group - -3.871, Jebel Sahaba/Tushka - -2.717, Malian Sahara - -3.683), no outliers detected, no variables failed tolerance test*
1.C.III. Results	
1.C.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 41.5%, Jebel Sahaba/Tushka (D^2: 3.935), Malian Sahara (D^2: 6.095)*
1.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*21.5%*
1.C.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 43.1%, Jebel Sahaba/Tushka (D^2: 2.471), A-Group (D^2: 10.133)*
1.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (7 A-Group, 5 Malian Sahara), Malian Sahara (14 A-Group, 4 Jebel Sahaba/Tushka)*
1.C.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (12 A-Group), Malian Sahara (19 A-Group, 4 Jebel Sahaba/Tushka)*
1.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



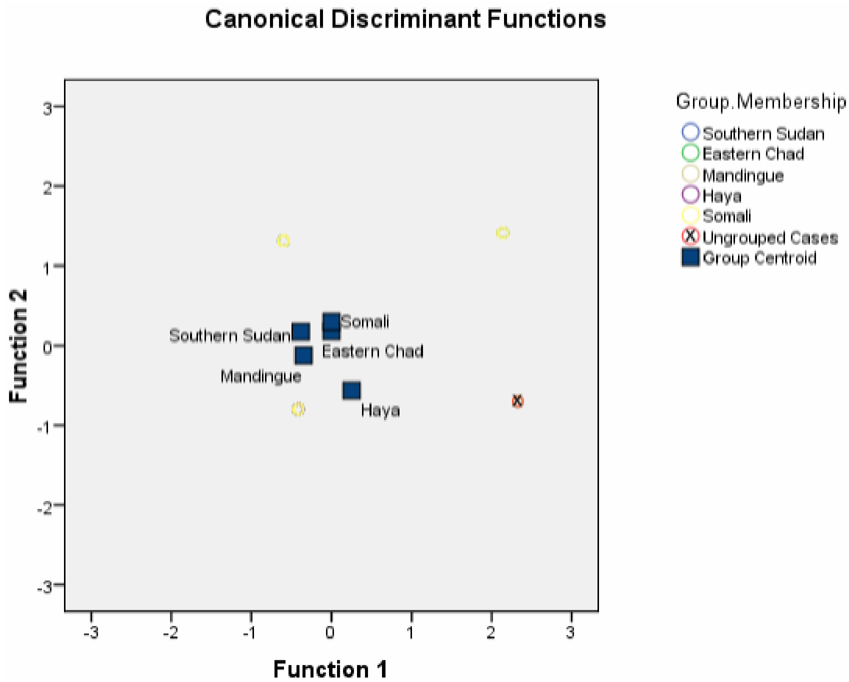
1.C.IV. Additional results	
1.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 41.5%, 21.5%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 43.1%)*

1.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 43.1%, 43.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 43.1%), variables entered (1)*
1.C.IV.2. Alternative comparative prehistoric samples:	*Simultaneous entry (within-groups covariance matrix - Jebel Sahaba/Tushka, 36.1%, 20.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 36.1%), variables entered (2)*
1.C.IV.3. Raw matrix:	*Simultaneous entry (within-groups covariance matrix - Jebel Sahaba/Tushka, 44.6%, 41.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 47.0%), variables entered (3)*

1.F.I. Summary	
1.F.I.1. Individual:	*Abu Tabari 95/2-3*
1.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.F.I.3. Data:	*Non-metric cranial and dental traits*
1.F.I.4. Classification:	*Haya*

1.F.II. Analysis overview	
1.F.II.1. Method:	*Simultaneous entry*
1.F.II.2.a. Variables in matrix:	*2*
1.F.II.2.b. Variables entered:	*2*
1.F.II.3. Best predictors:	*Occipital bunning (degree) (.996), Occipital bunning (shape) (.999 - Function 2)*
1.F.II.4.a. Wilks' Lambda:	*1 through 2: .800 (Sig. .003), 2: .913 (Sig. .024)*
1.F.II.4.b. Eigenvalues:	*1: .140 (r: .351), 2: .096 (r: .295)*
1.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
1.F.II.6. Remarks:	*Box's M (Sig. 001; Log determinants: Southern Sudan - -4.582, Chad - -3.209, Mandinka - -4.595, Somalis - -2.711, Haya - -4.017), no outliers detected, no variables failed tolerance test*

1.F.III. Results	
1.F.III.1.a. Within-groups covariance matrix:	*Haya, 29.6%, Haya (D^2: 4.318), Chad (D^2: 6.181)*
1.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*25.9%*
1.F.III.1.c. Separate-groups covariance matrix:	*Haya, 29.6%, Haya (D^2: 3.288), Somalis (D^2: 3.616)*
1.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (13 Mandinka, 1 Somali), Chad (8 Southern Sudan, 4 Somalis), Mandinka (7 Southern Sudan, 1 Somali), Somalis (6 Southern Sudan, 6 Mandinka, 4 Haya), Haya (1 Southern Sudan, 5 Somalis)*
1.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (13 Mandinka, 1 Somali), Chad (8 Southern Sudan, 10 Mandinka, 2 Somalis, 2 Haya), Mandinka (7 Southern Sudan, 1 Haya), Somalis (6 Southern Sudan, 6 Mandinka, 4 Somalis, 4 Haya), Haya (1 Southern Sudan, 1 Somali, 4 Haya)*
1.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.F.IV. Additional results

1.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 29.6%, 25.9%), separate-groups covariance matrix (Haya, 29.6%)*
1.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 28.7%, 28.7%), separate-groups covariance matrix (Somalis, 28.7%), variables entered (1)*
1.F.IV.2. Raw matrix:	*Simultaneous entry (within-groups covariance matrix - Haya, 30.6%, 25.0%; separate-groups covariance matrix - Haya, 34.3%), variables entered (3)*

2. Abu Tabari 02/1-2

2.A.I. Summary

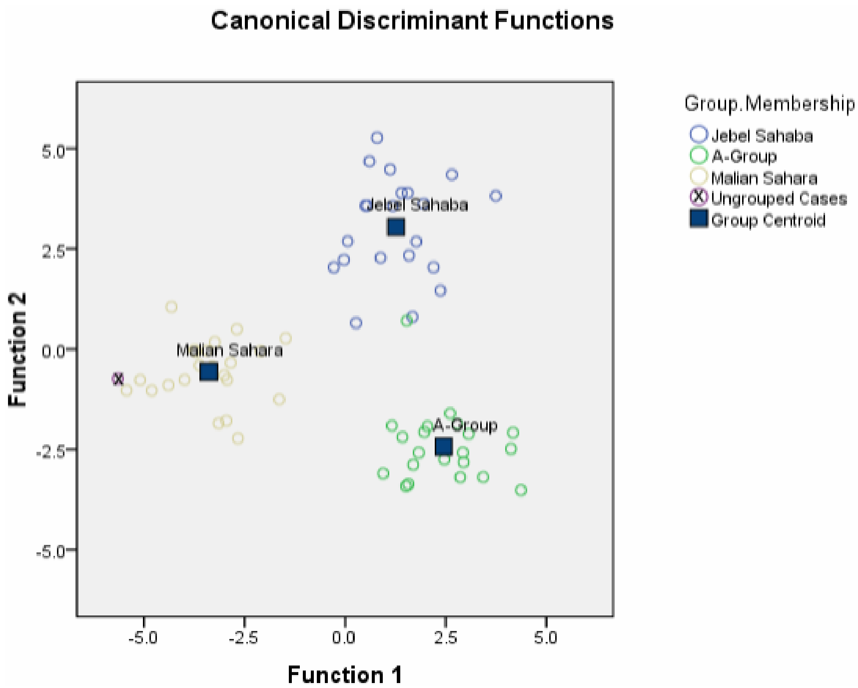
2.A.I.1. Individual:	*Abu Tabari 02/1-2*
2.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.A.I.3. Data:	*Cranial and dental measurements*
2.A.I.4. Classification:	*Malian Sahara*

2.A.II. Analysis overview

2.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.A.II.2.a. Variables in matrix:	*59*
2.A.II.2.b. Variables entered:	*15*
2.A.II.3. Best predictors:	*80a. Dental arch length of the mandible (-.313), 80(1)d. 1st molar dental arch breadth (md) (-.288), 81. Crown length UI2 (.276), 81. Crown length LI1 (.406 - Function 2)*
2.A.II.4.a. Wilks' Lambda:	*1 through 2: .020 (Sig. .000), 2: .160 (Sig. .000)*
2.A.II.4.b. Eigenvalues:	*1: 6.840 (r: .934), 2: 5.250 (r: .917)*
2.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
2.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -29.264, Jebel Sahaba/Tushka - -22.685, Malian Sahara - -21.531), no outliers detected, no variables failed tolerance test*

2.A.III. Results

2.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 5.125), Jebel Sahaba/Tushka (D^2: 62.105)*
2.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
2.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 5.143), Jebel Sahaba/Tushka (D^2: 53.313)*
2.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group)*
2.A.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka)*
2.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.A.IV. Additional results

2.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 44.6%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%)*
2.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (13)*
2.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 96.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (18)*
2.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 96.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (24)*

2.B.I. Summary

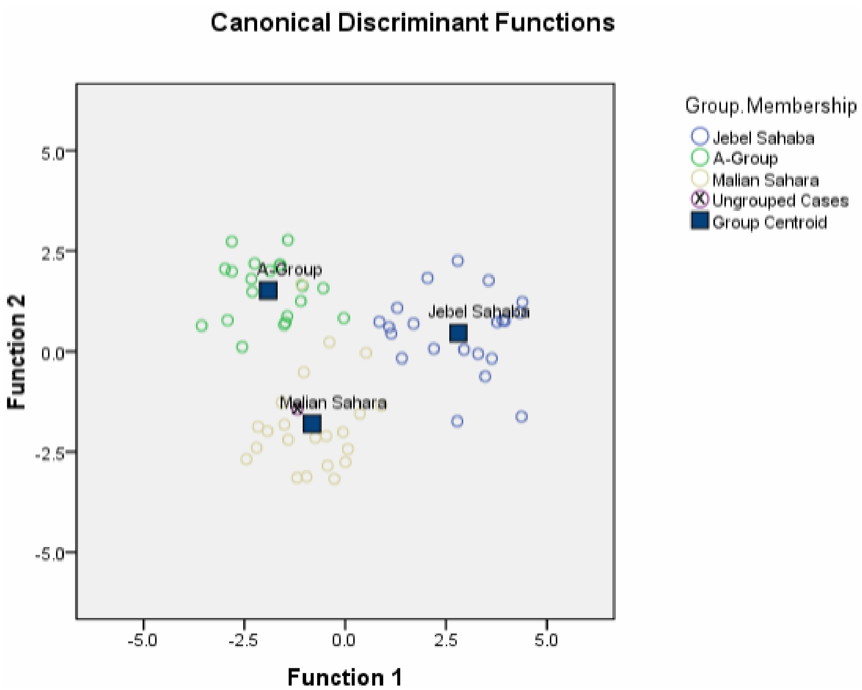
2.B.I.1. Individual:	*Abu Tabari 02/1-2*
2.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.B.I.3. Data:	*Scaled cranial and dental measurements*
2.B.I.4. Classification:	*Malian Sahara*

2.B.II. Analysis overview

2.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.B.II.2.a. Variables in matrix:	*47*
2.B.II.2.b. Variables entered:	*11*
2.B.II.3. Best predictors:	*71a. Minimum ramus width (.344), 81(1). Crown width LI2 (.320), 69. Height of the mandibular symphysis (.243), 81(1). Crown width LI1 (.548 - Function 2)*
2.B.II.4.a. Wilks' Lambda:	*1 through 2: .064 (Sig. .000), 2: .328 (Sig. .000)*
2.B.II.4.b. Eigenvalues:	*1: 4.141 (r: .897), 2: 2.053 (r: .820)*
2.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
2.B.II.6. Remarks:	*Box's M (Sig. .001; Log determinants: A-Group - -59.644, Jebel Sahaba/Tushka - -61.562, Malian Sahara - -60.099), no outliers detected, no variables failed tolerance test*

2.B.III. Results

2.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: .259), A-Group (D^2: 9.302)*
2.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*92.3%*
2.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: .290), A-Group (D^2: 16.641)*
2.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
2.B.III.2.b. Misclassifications (separate-groups):	*Malian Sahara (1 A-Group)*
2.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.B.IV. Additional results

2.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 76.9%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
2.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 96.9%, 93.8%), separate-groups covariance matrix (A-Group, 98.5%), variables entered (10)*
2.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 98.8%, 90.4%; separate-groups covariance matrix - A-Group, 98.8%), variables entered (17)*
2.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 98.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (24)*

2.C.I. Summary

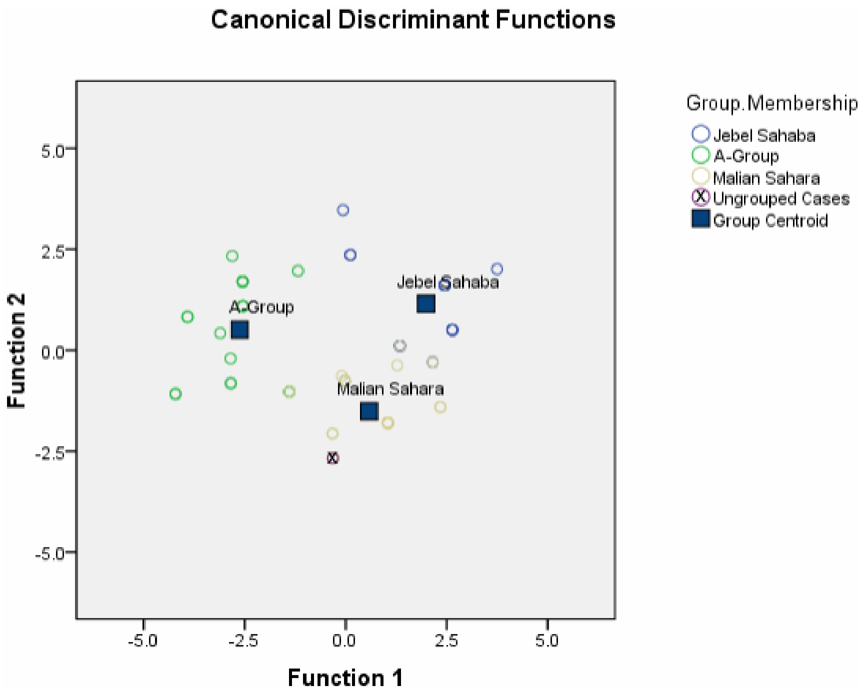
2.C.I.1. Individual:	*Abu Tabari 02/1-2*
2.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.C.I.3. Data:	*Non-metric cranial and dental traits*
2.C.I.4. Classification:	*Malian Sahara*

2.C.II. Analysis overview

2.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.C.II.2.a. Variables in matrix:	*25*
2.C.II.2.b. Variables entered:	*6*
2.C.II.3. Best predictors:	*Interruption groove UI2 (.608), Margo infranasalis (main) (-.370), Premolar lingual cusps LP2 (-.356), Premolar root number UP1 (.577 - Function 2)*
2.C.II.4.a. Wilks' Lambda:	*1 through 2: .087 (Sig. .000), 2: .419 (Sig. .000)*
2.C.II.4.b. Eigenvalues:	*1: 3.797 (r: .890), 2: 1.385 (r: .762)*
2.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
2.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

2.C.III. Results

2.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 2.161), A-Group (D^2: 15.445)*
2.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*87.7%*
2.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 2.252), A-Group (D^2: 12.432)*
2.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (1 A-Group, 3 Jebel Sahaba/Tushka)*
2.C.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara), Malian Sahara (1 A-Group, 2 Jebel Sahaba/Tushka)*
2.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.C.IV. Additional results

2.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 98.5%, 70.8%), separate-groups covariance matrix (Malian Sahara, 96.9%)*

2.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 93.8%, 87.7%), separate-groups covariance matrix (Malian Sahara, 93.8%), variables entered (6)*

2.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 92.8%, 85.5%; separate-groups covariance matrix - Malian Sahara, 92.8%), variables entered (10)*

2.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 92.8%, 88.0%; separate-groups covariance matrix - Malian Sahara, 95.2%), variables entered (11)*

2.D.I. Summary

2.D.I.1. Individual: *Abu Tabari 02/1-2*

2.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

2.D.I.3. Data: *Cranial and dental measurements*

2.D.I.4. Classification: *Chad*

2.D.II. Analysis overview

2.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.D.II.2.a. Variables in matrix: *45*

2.D.II.2.b. Variables entered: *17*

2.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.534), 80(4)b. 1st premolar dental arch length (mx) (.534), 80a. Dental arch length of the mandible (.373), 81. Crown length LC (.405 - Function 2), 81. Crown length UI2 (.503 - Function 3), 81. Crown length LM1 (.341 - Function 4)*

2.D.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .015 (Sig. .000), 3 through 4: .088 (Sig. .000), 4: .451 (Sig. .000)*

2.D.II.4.b. Eigenvalues: *1: 11.257 (r: .958), 2: 4.819 (r: .910), 3: 4.117 (r: .897), 4: 1.219 (r: .741)*

2.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

2.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -24.185, Chad - -29.059, Mandinka - 'singular', Somalis - -29.892, Haya - -62.555), no outliers detected (except ungrouped case - D^2: 28.600; critical value: 27.587 - p 0.95, df 17), no variables failed tolerance test*

2.D.III. Results

2.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 98.1%, Southern Sudan (D^2: 29.470), Chad (D^2: 35.623)*

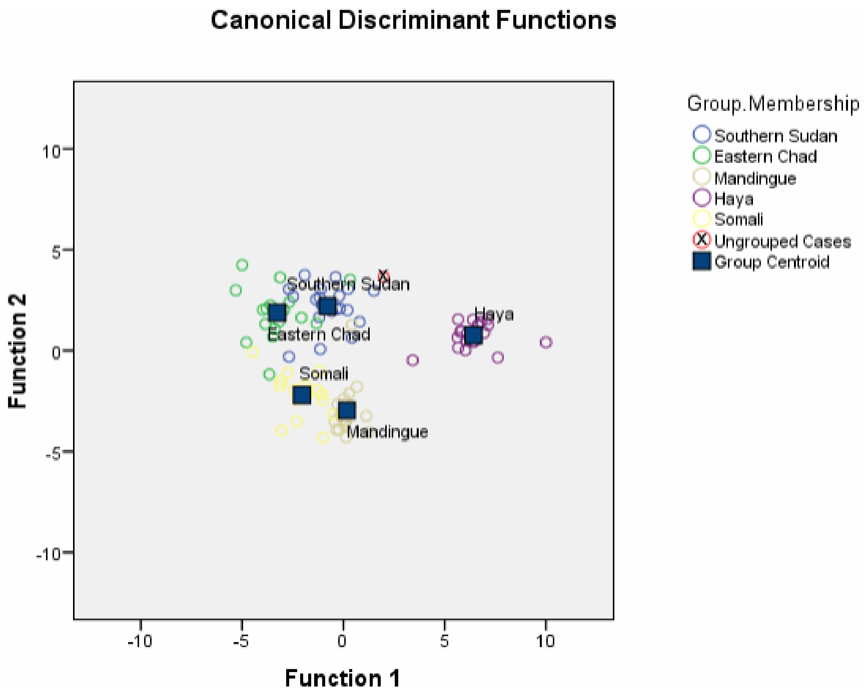
2.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*

2.D.III.1.c. Separate-groups covariance matrix: *Chad, 98.1%, Chad (D^2: 28.600), Southern Sudan (D^2: 41.336)*

2.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad), Haya (1 Somali)*

2.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Mandinka (1 Southern Sudan)*

2.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.D.IV. Additional results

2.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 100.0%, 88.9%), separate-groups covariance matrix (Chad, 100.0%)*
2.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 98.1%, 90.7%), separate-groups covariance matrix (Chad, 99.1%), variables entered (17)*
2.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 99.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (35)*

2.E.I. Summary

2.E.I.1. Individual:	*Abu Tabari 02/1-2*
2.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.E.I.3. Data:	*Scaled cranial and dental measurements*
2.E.I.4. Classification:	*Chad*

2.E.II. Analysis overview

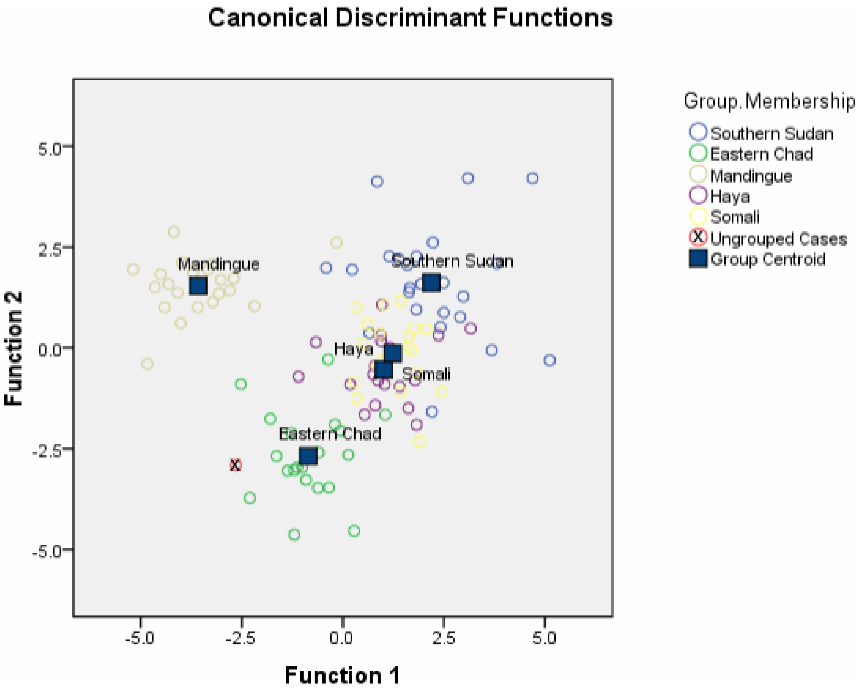
2.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.E.II.2.a. Variables in matrix:	*37*
2.E.II.2.b. Variables entered:	*17*
2.E.II.3. Best predictors:	*81. Crown length UI2 (.296), 81(1). Crown width UC (.228), 61a(5). 2nd molar alveolar breadth (md) (.202), 80a. Dental arch length of the mandible (.686 - Function 2), 69c. Thickness of the mandibular symphysis (-.370 - Function 3), 19a. Mastoid height (-.423 - Function 4)*
2.E.II.4.a. Wilks' Lambda:	*1 through 4: .011 (Sig. .000), 2 through 4: .061 (Sig. .000), 3 through 4: .226 (Sig. .000), 4: .590 (Sig. .000)*
2.E.II.4.b. Eigenvalues:	*1: 4.500 (r: .905), 2: 2.717 (r: .855), 3: 1.616 (r: .786), 4: .694 (r: .640)*
2.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
2.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -82.294, Chad - -96.267, Mandinka - -128.958, Somalis - -85.791, Haya - -90.140), no outliers detected, variables failing tolerance test - removed: 61a(4). 1st molar alveolar breadth of the mandible, 61a(3). 2nd premolar alveolar breadth of the mandible*

2.E.III. Results

2.E.III.1.a. Within-groups covariance matrix:	*Chad, 95.4%, Chad (D^2: 4.888), Mandinka (D^2: 26.246)*
2.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*80.6%*
2.E.III.1.c. Separate-groups covariance matrix:	*Chad, 97.2%, Chad (D^2: 6.633), Southern Sudan (D^2: 27.795)*
2.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 3 Somalis, 2 Haya), Chad (1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (4 Southern Sudan, 2 Haya), Haya (1 Southern Sudan, 1 Chad, 3 Somalis)*

2.E.III.2.b. Misclassifications (separate-groups): *Mandinka (1 Southern Sudan), Somalis (1 Haya), Haya (1 Southern Sudan)*

2.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.E.IV. Additional results

2.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 97.2%, 79.6%), separate-groups covariance matrix (Chad, 98.1%)*

2.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 94.4%, 84.3%), separate-groups covariance matrix (Chad, 95.4%), variables entered (17)*

2.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 98.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (38)*

2.F.I. Summary

2.F.I.1. Individual: *Abu Tabari 02/1-2*

2.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

2.F.I.3. Data: *Non-metric cranial and dental traits*

2.F.I.4. Classification: *Chad*

2.F.II. Analysis overview

2.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.F.II.2.a. Variables in matrix: *28*

2.F.II.2.b. Variables entered: *10*

2.F.II.3. Best predictors: *Midline diastema (.939), Premolar lingual cusps LP2 (.144), Interruption groove UI2 (.079), Interruption groove UI2 (-.597 - Function 2), Parastyle UM3 (-.823 - Function 3), Alveolar prognathism (-.449 - Function 4)*

2.F.II.4.a. Wilks' Lambda: *1 through 4: .004 (Sig. .000), 2 through 4: .070 (Sig. .000), 3 through 4: .326 (Sig. .000), 4: .654 (Sig. .000)*

2.F.II.4.b. Eigenvalues: *1: 17.274 (r: .972), 2: 3.633 (r: .886), 3: 1.007 (r: .708), 4: .529 (r: .588)*

2.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

2.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

2.F.III. Results

2.F.III.1.a. Within-groups covariance matrix: *Chad, 85.2%, Chad (D^2: 4.649), Mandinka (D^2: 8.755)*

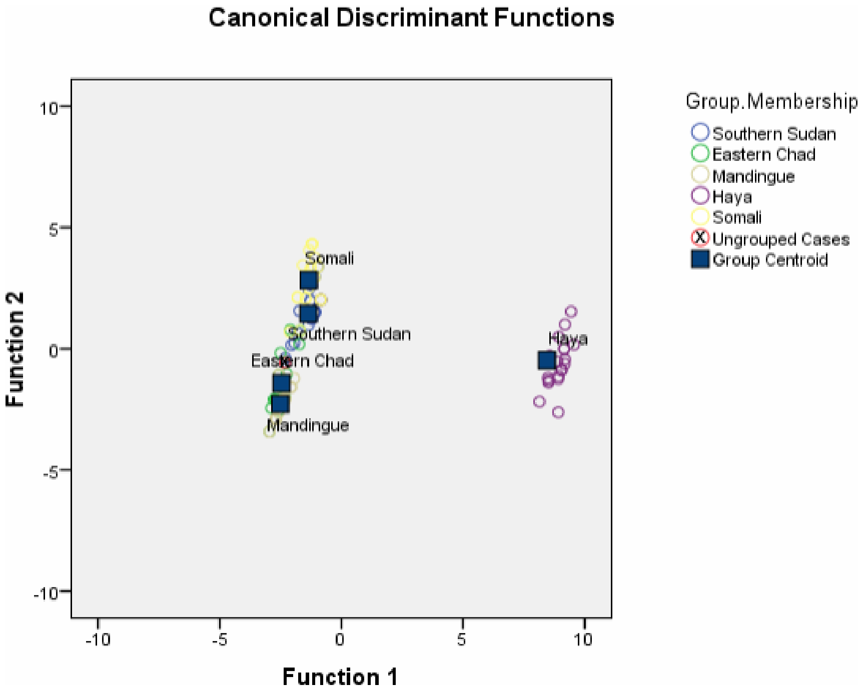
2.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *82.4%*

2.F.III.1.c. Separate-groups covariance matrix: *Chad, 86.1%, Chad (D^2: 5.122), Mandinka (D^2: 12.631)*

2.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Mandinka, 3 Somalis), Chad (2 Southern Sudan, 3 Mandinka, 1 Somali), Mandinka (2 Chad), Somalis (3 Southern Sudan, 1 Chad), Haya (1 Southern Sudan)*

2.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 2 Somalis), Chad (2 Southern Sudan, 2 Mandinka, 1 Somali), Mandinka (2 Chad), Somalis (2 Southern Sudan, 1 Chad), Haya (1 Southern Sudan)*

2.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.F.IV. Additional results

2.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 91.7%, 79.6%), separate-groups covariance matrix (Chad, 96.3%)*

2.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 85.2%, 82.4%), separate-groups covariance matrix (Chad, 85.2%), variables entered (9)*

2.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 86.1%, 76.9%; separate-groups covariance matrix - Chad, 88.9%), variables entered (11)*

3. Abu Tabari 02/1-3

3.A.I. Summary

3.A.I.1. Individual: *Abu Tabari 02/1-3*

3.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

3.A.I.3. Data: *Cranial and dental measurements*

3.A.I.4. Classification: *Malian Sahara*

3.A.II. Analysis overview

3.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

3.A.II.2.a. Variables in matrix: *45*

3.A.II.2.b. Variables entered: *14*

3.A.II.3. Best predictors: *81(1). Crown width LI2 (.610), 80(1)a. Canine dental arch breadth (mx) (.342), 61(a)3. 2nd premolar alveolar breadth (md) (.341), 81. Crown length LP1 (-.218 - Function 2)*

3.A.II.4.a. Wilks' Lambda: *1 through 2: 0.034 (Sig. .000), 2: .193 (Sig. .000)*

3.A.II.4.b. Eigenvalues: *1: 4.693 (r: .908), 2: 4.192 (r: .899)*

3.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

3.A.II.6. Remarks: *Box's M (Sig. .033; Log determinants: A-Group - -24.207, Jebel Sahaba/Tushka - -25.886, Malian Sahara - -19.136), no outliers detected, no variables failed tolerance test*

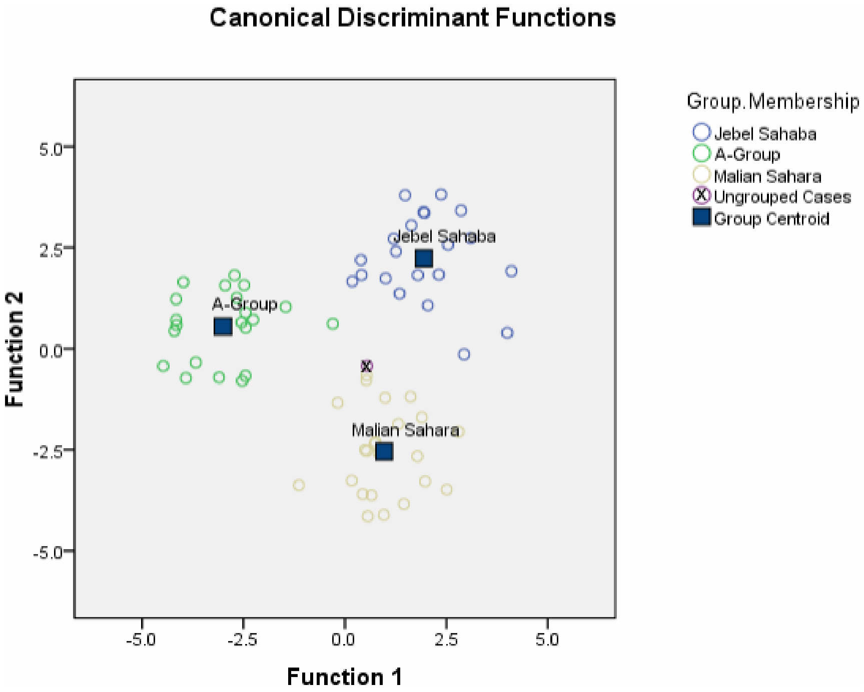
3.A.III. Results

3.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 4.651), Jebel Sahaba/Tushka (D^2: 9.045)*

3.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

3.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 4.250), Jebel Sahaba/Tushka (D^2: 9.087)*

3.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
3.A.III.2.b. Misclassifications (separate-groups):	*No missclassifications*
3.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.A.IV. Additional results	
3.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 81.5%), separate-groups covariance matrix (A-Group, 100.0%)*
3.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 93.8%, 89.2%), separate-groups covariance matrix (A-Group, 96.9%), variables entered (9)*
3.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 96.4%, 92.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (15)*
3.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (20)*

3.B.I. Summary	
3.B.I.1. Individual:	*Abu Tabari 02/1-3*
3.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
3.B.I.3. Data:	*Scaled cranial and dental measurements*
3.B.I.4. Classification:	*Jebel Sahaba/Tushka*

3.B.II. Analysis overview	
3.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.B.II.2.a. Variables in matrix:	*38*
3.B.II.2.b. Variables entered:	*13*
3.B.II.3. Best predictors:	*81(1). Crown width LI1 (.439), 81(1). Crown width LI2 (.331), 48(1). Nasospinale-Prosthion height (.329), 81(1). Crown width LI2 (.281 - Function 2)*
3.B.II.4.a. Wilks' Lambda:	*1 through 2: .055 (Sig. .000), 2: .274 (Sig. .000)*
3.B.II.4.b. Eigenvalues:	*(1: 4.008 (r: .895), 2: 2.654 (r: .852)*
3.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
3.B.II.6. Remarks:	*Box's M (Sig. .001; Log determinants: A-Group - -74.292, Jebel Sahaba/Tushka - -75.981, Malian Sahara - -72.151), no outliers detected, variables failing tolerance - removed: 61a(5). 2nd molar alveolar breadth (md)*

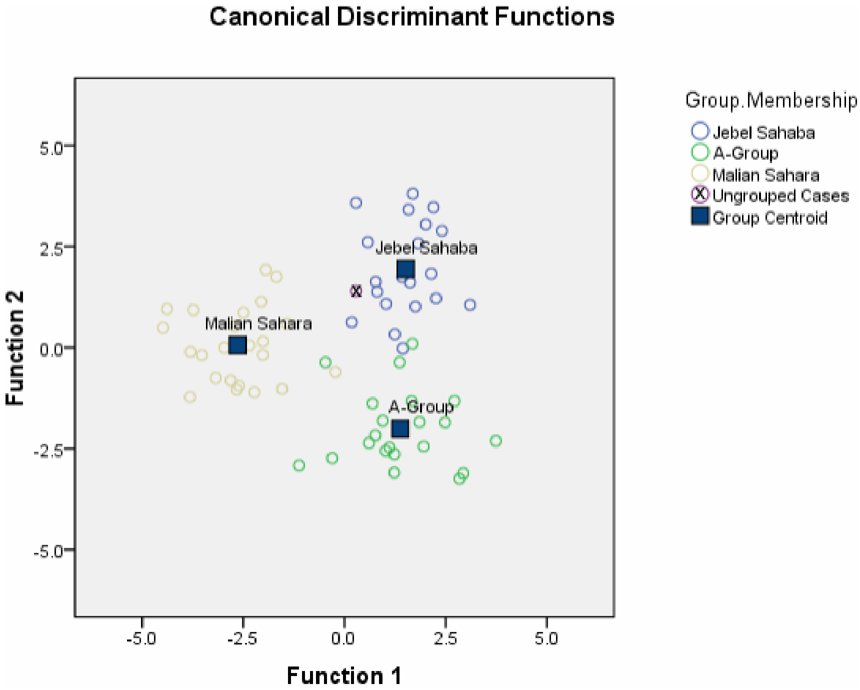
3.B.III. Results	
3.B.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 1.815), Malian Sahara (D^2: 10.345)*
3.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*89.2%*

3.B.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 2.926), Malian Sahara (D^2: 10.265)*

3.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 1 Malian Sahara), Malian Sahara (2 A-Group)*

3.B.III.2.b. Misclassifications (separate-groups): *A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 A-Group)*

3.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.B.IV. Additional results

3.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 76.9%), separate-groups covariance matrix (A-Group, 100.0%)*

3.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 92.3%, 87.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 92.3%), variables entered (10)*

3.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 96.4%, 88.0%; separate-groups covariance matrix - A-Group, 97.6%), variables entered (13)*

3.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 96.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (18)*

3.C.I. Summary

3.C.I.1. Individual: *Abu Tabari 02/1-3*

3.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

3.C.I.3. Data: *Non-metric cranial and dental traits*

3.C.I.4. Classification: *Malian Sahara*

3.C.II. Analysis overview

3.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

3.C.II.2.a. Variables in matrix: *26*

3.C.II.2.b. Variables entered: *10*

3.C.II.3. Best predictors: *Margo infranasalis (main) (.418), Orientation of the Processus frontales maxillae (.364), Groove pattern LM2 (-.299), Premolar root number UP1 (.646 - Function 2)*

3.C.II.4.a. Wilks' Lambda: *1 through 2: .125 (Sig. .000), 2: .487 (Sig. .000)*

3.C.II.4.b. Eigenvalues: *1: 2.911 (r: .863), 2: 1.053 (r: .716)*

3.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

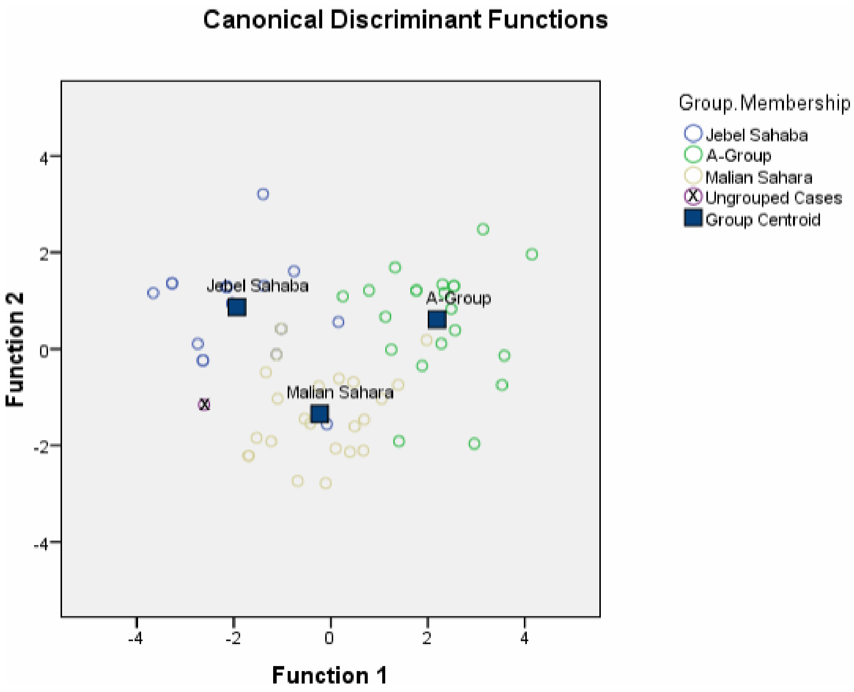
3.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

3.C.III. Results

3.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 89.2%, Jebel Sahaba/Tushka (D^2: 4.540), Malian Sahara (D^2: 5.700)*

3.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *80.0%*

3.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 89.2%, Malian Sahara (D^2: 5.911), Jebel Sahaba/Tushka (D^2: 5.951)*
3.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (3 A-Group, 3 Jebel Sahaba/Tushka)*
3.C.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara), Jebel Sahaba/Tushka (2 Malian Sahara), Malian Sahara (1 A-Group, 3 Jebel Sahaba/Tushka)*
3.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.C.IV. Additional results	
3.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 89.2%, 70.8%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 92.3%)*
3.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 81.5%, 73.8%), separate-groups covariance matrix (Malian Sahara, 81.5%), variables entered (5)*
3.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 90.4%, 79.5%; separate-groups covariance matrix - Malian Sahara, 88.0%), variables entered (13)*
3.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%, 86.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (18)*

3.D.I. Summary	
3.D.I.1. Individual:	*Abu Tabari 02/1-3*
3.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.D.I.3. Data:	*Cranial and dental measurements*
3.D.I.4. Classification:	*Chad*

3.D.II. Analysis overview	
3.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.D.II.2.a. Variables in matrix:	*38*
3.D.II.2.b. Variables entered:	*13*
3.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.799), 80(4)b. 1st premolar dental arch length (mx) (.720), 81. Crown length LC (.269), 63(2)a. 1st internal dental arch breadth (mx) (.360 - Function 2), 81. Crown length LC (.804 - Function 3), 81. Crown length LM1 (.393 - Function 4)*
3.D.II.4.a. Wilks' Lambda:	*1 through 4: .007 (Sig. .000), 2 through 4: .052 (Sig. .000), 3 through 4: .169 (Sig. .000), 4: .494 (Sig. .000)*
3.D.II.4.b. Eigenvalues:	*1: 6.142 (r: .927), 2: 2.255 (r: .832), 3: 1.921 (r: .811), 4: 1.026 (r: .712)*
3.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*

3.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -4.532, Chad - -4.124, Mandinka - 'singular', Somalis - -5.685, Haya - -2.133), no outliers detected, no variables failed tolerance test*

3.D.III. Results

3.D.III.1.a. Within-groups covariance matrix: *Chad, 94.4%, Chad (D^2: 6.030), Somalis (D^2: 9.851)*

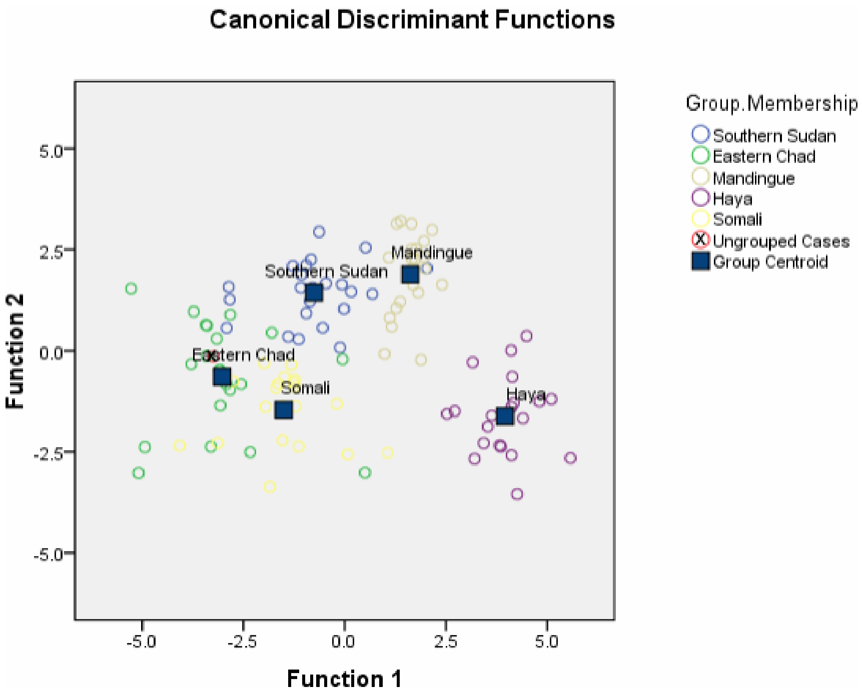
3.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *89.8%*

3.D.III.1.c. Separate-groups covariance matrix: *Chad, 96.3%, Chad (D^2: 6.946), Somalis (D^2: 7.771)*

3.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 2 Mandinka), Chad (1 Southern Sudan, 2 Somalis, 2 Haya), Mandinka (1 Southern Sudan, 1 Haya), Somalis (1 Chad)*

3.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka), Chad (1 Southern Sudan, 1 Somali), Mandinka (1 Haya)*

3.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.D.IV. Additional results

3.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 90.7%), separate-groups covariance matrix (Chad, 100.0%)*

3.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 97.2%, 93.5%), separate-groups covariance matrix (Somalis, 98.1%), variables entered (16)*

3.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 94.4%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (28)*

3.E.I. Summary

3.E.I.1. Individual: *Abu Tabari 02/1-3*

3.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.E.I.3. Data: *Scaled cranial and dental measurements*

3.E.I.4. Classification: *Chad*

3.E.II. Analysis overview

3.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

3.E.II.2.a. Variables in matrix: *30*

3.E.II.2.b. Variables entered: *14*

3.E.II.3. Best predictors: *80a. Dental arch length of the mandible (.537), 80(1)c. 2nd premolar dental arch breadth (md) (.281), 61a(5). 2nd molar alveolar breadth (md) (.265), 80(4)a. Canine dental arch length (md) (-.628 - Function 2), 69c. Thickness of the mandibular symphysis (-.389 - Function 3), 19a. Mastoid height (.473 - Function 4)*

3.E.II.4.a. Wilks' Lambda: *1 through 4: .021 (Sig. .000), 2 through 4: .099 (Sig. .000), 3 through 4: .358 (Sig. .000), 4: .669 (Sig. .000)*

3.E.II.4.b. Eigenvalues: *1: 3.661 (r: .886), 2: 2.611 (r: .850), 3: .867 (r: .682), 4: .495 (r: .575)*

3.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

3.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -64.260, Chad - -71.980, Mandinka - -78.748, Somalis - -69.072, Haya - -71.015), no outliers detected, variables failing tolerance test - removed: 61a(4). 1st moalr alveolar breadth (md), 80(1)d. 1st molar dental arch breadth (md)*

3.E.III. Results

3.E.III.1.a. Within-groups covariance matrix: *Chad, 89.8%, Chad (D^2: 3.419), Haya (D^2: 7.210)*

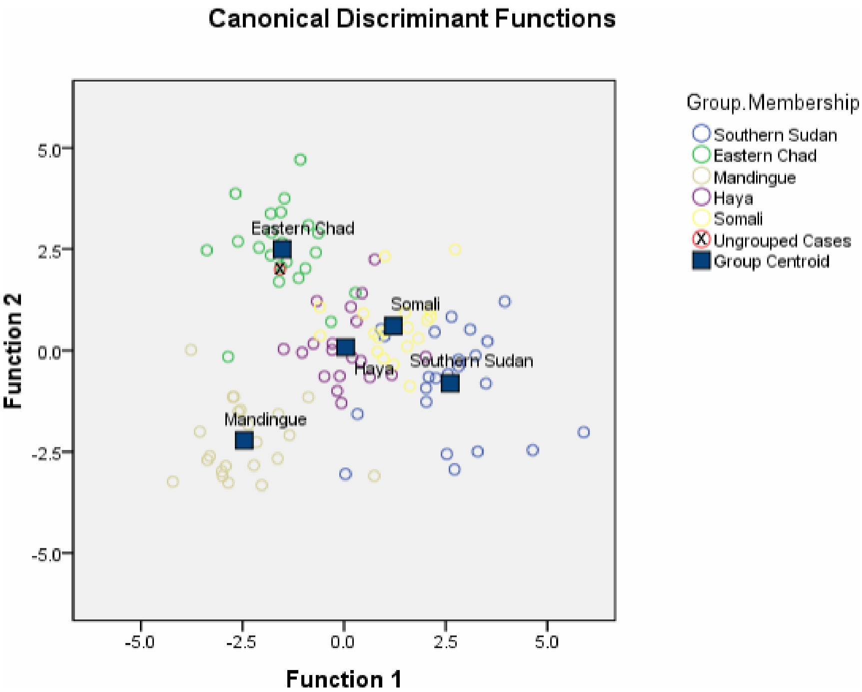
3.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *83.3%*

3.E.III.1.c. Separate-groups covariance matrix: *Chad, 90.7%, Chad (D^2: 5.101), Haya (D^2: 11.264)*

3.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Mandinka, 3 Somalis, 1 Haya), Chad (1 Mandinka, 2 Haya), Mandinka (1 Southern Sudan, Somalis), Somalis (2 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Southern Sudan, 2 Somalis)*

3.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka, 1 Haya), Chad (1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 2 Haya), Haya (2 Somalis)*

3.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.E.IV. Additional results

3.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 95.4%, 81.5%), separate-groups covariance matrix (Haya, 97.2%)*

3.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 89.8%, 80.6%), separate-groups covariance matrix (Chad, 88.0%), variables entered (14)*

3.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 98.1%, 89.8%; separate-groups covariance matrix - Chad, 100.0%), variables entered (25)*

3.F.I. Summary

3.F.I.1. Individual: *Abu Tabari 02/1-3*

3.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.F.I.3. Data: *Non-metric cranial and dental traits*

3.F.I.4. Classification: *Chad*

3.F.II. Analysis overview

3.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

3.F.II.2.a. Variables in matrix: *30*

3.F.II.2.b. Variables entered: *15*

3.F.II.3. Best predictors: *Cusp number LM2 (.525), Parastyle UM3 (-.368), Premolar root number UP1 (.360), Parastyle UM3 (-.560 - Function 2), Cusp number LM2 (-.490 - Function 3), Sella nasi (additional tendency/superstructure) (.398 - Function 4)*

3.F.II.4.a. Wilks' Lambda: *1 through 4: .062 (Sig. .000), 2 through 4: .205 (Sig. .000), 3 through 4: .498 (Sig. .000), 4: .759 (Sig. .008)*

3.F.II.4.b. Eigenvalues: 1: 2.331 (r: .837), 2: 1.422 (r: .766), 3: .524 (r: .587), 4: .318 (r: .491)

3.F.II.5. Prior classification probability: 20.1% (prior prob. + 25%: 25.1%)

3.F.II.6. Remarks: Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test, removed: Midline diastema

3.F.III. Results

3.F.III.1.a. Within-groups covariance matrix: *Chad, 77.8%, Chad (D^2: 7.884), Mandinka (D^2: 8.484)*

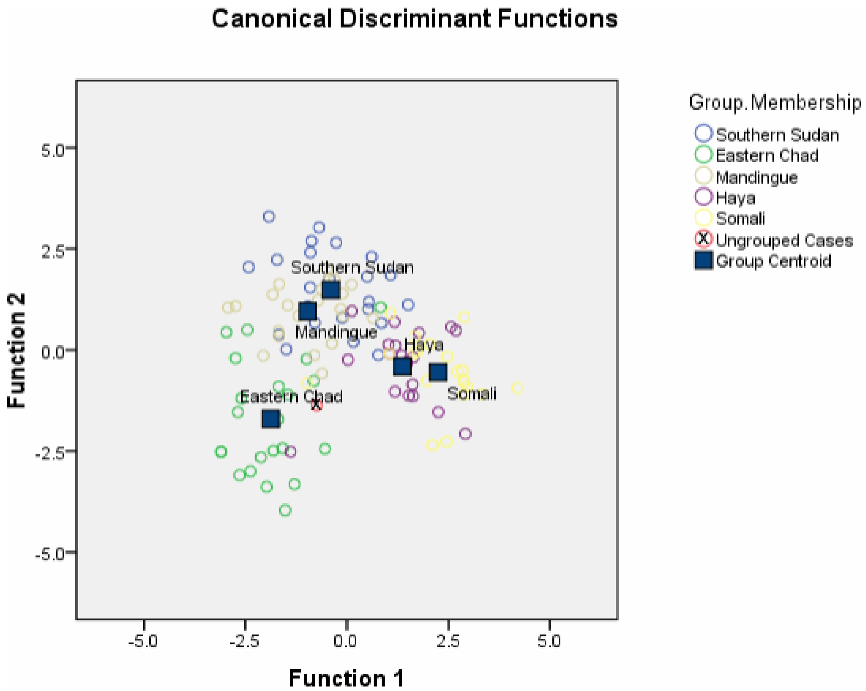
3.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *66.7%*

3.F.III.1.c. Separate-groups covariance matrix: *Chad, 84.3%, Chad (D^2: 8.894), Haya (D^2: 15.498)*

3.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 2 Mandinka, 1 Somali, 4 Haya), Chad (1 Southern Sudan, 5 Mandinka, 1 Haya), Mandinka (6 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad, 5 Haya), Haya (1 Chad, 1 Mandinka, 5 Somalis)*

3.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Mandinka, 1 Somali, 1 Haya), Chad (1 Southern Sudan, 2 Mandinka, 1 Haya), Mandinka (1 Southern Sudan, 1 Haya), Somalis (1 Southern Sudan, 1 Chad), Haya (1 Chad, 1 Mandinka, 2 Somalis)*

3.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.F.IV. Additional results

3.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 87.0%, 64.8%), separate-groups covariance matrix (Chad, 90.7%)*

3.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 74.1%, 62.0%), separate-groups covariance matrix (Mandinka, 74.1%), variables entered (10)*

3.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 77.8%, 72.2%; separate-groups covariance matrix - Haya, 74.1%), variables entered (7)*

4. Abu Tabari 02/1-5

4.A.I. Summary

4.A.I.1. Individual: *Abu Tabari 02/1-5*

4.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Saharai*

4.A.I.3. Data: *Dental measurements*

4.A.I.4. Classification: *Jebel Sahaba/Tushka*

4.A.II. Analysis overview

4.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

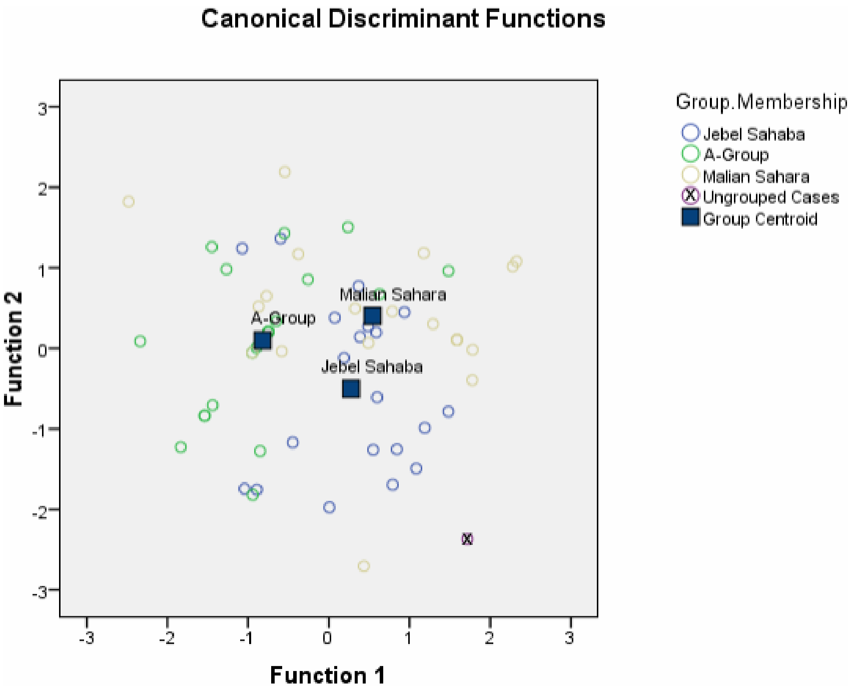
4.A.II.2.a. Variables in matrix: *4*

4.A.II.2.b. Variables entered: *2*

4.A.II.3. Best predictors: *81. Crown length LM2 (.934), 81(1). Crown width UI1 (-.797), 81(1). Crown width UI1 (.604 - Function 2)*

4.A.II.4.a. Wilks' Lambda: *1 through 2: 0.637 (Sig. .000), 2: .871 (Sig. .005)*
4.A.II.4.b. Eigenvalues: *1: .366 (r: .518), 2: .148 (r: .360)*
4.A.II.5. Prior classification probability: *33.3% (prior prob. + 25%: 41.6%)*
4.A.II.6. Remarks: *Box's M (Sig. .057; Log determinants: A-Group - -11.693, Jebel Sahaba/Tushka - -11.554, Malian Sahara - -10.617), removed outliers: Jebel Sahaba/Tushka 117-16 (D^2: 13.111; critical value: 7.815 - p 0.95, df 3), Malian Sahara HeA-EIS-AZ56/H8 (D^2: 6.692; critical value: 5.991 - p 0.95, df 2), Malian Sahara HeA-MN10/H3 (D^2: 10.118; critical value: 5.991 - p 0.95, df 2), Malian Sahara HeA-MN27/H9 (D^2: 7.891; critical value: 5.991 - p 0.95, df 2), A-Group 95/34 (D^2: 6.242; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

4.A.III. Results
4.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 65.0%, Jebel Sahaba/Tushka (D^2: 5.561), Malian Sahara (D^2: 9.058)*
4.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.0%*
4.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 71.7%, Jebel Sahaba/Tushka (D^2: 6.084), Malian Sahara (D^2: 7.919)*
4.A.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 6 Malian Sahara), Malian Sahara (7 A-Group, 2 Jebel Sahaba/Tushka)*
4.A.III.2.b. Misclassifications (separate-groups): *A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 3 Malian Sahara), Malian Sahara (5 A-Group, 3 Jebel Sahaba/Tushka)*
4.A.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



4.A.IV. Additional results
4.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 52.3%, 58.5%), separate-groups covariance matrix (Malian Sahara, 56.9%)*
4.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 66.2%, 60.0%), separate-groups covariance matrix (Malian Sahara, 69.2%), variables entered (3)*
4.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 68.7%, 65.1%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 71.1%), variables entered (4)*
4.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 59.0%, 56.6%; separate-groups covariance matrix - Malian Sahara, 55.4%), variables entered (3)*

4.B.I. Summary
4.B.I.1. Individual: *Abu Tabari 02/1-5*
4.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

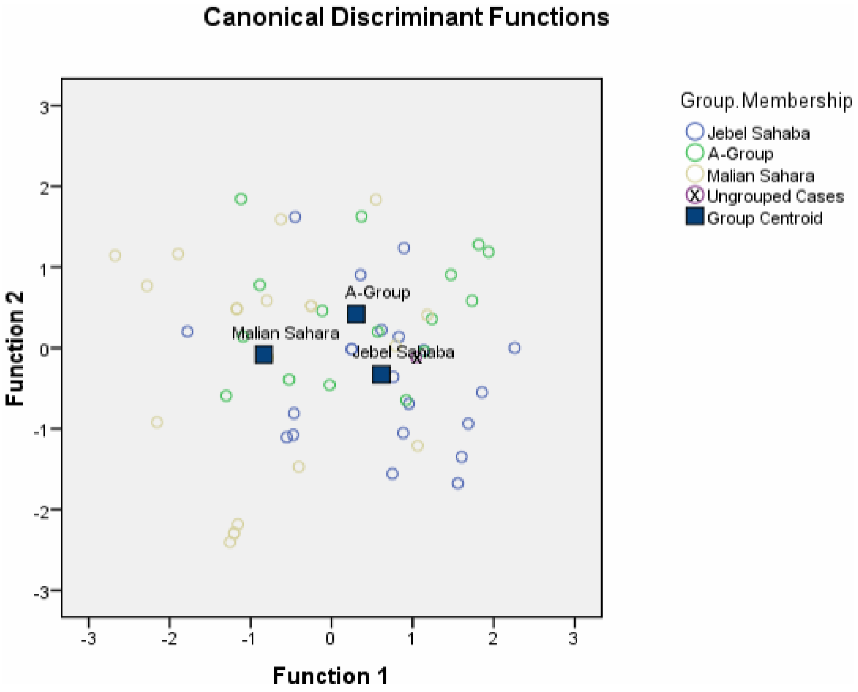
4.B.I.3. Data:	*Scaled dental measurements*
4.B.I.4. Classification:	*Jebel Sahaba/Tushka*

4.B.II. Analysis overview

4.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.B.II.2.a. Variables in matrix:	*2*
4.B.II.2.b. Variables entered:	*2*
4.B.II.3. Best predictors:	*81(1). Crown width LP2 (.560), 81. Crown length LP2 (-.260), 81. Crown length LP2 (.966 - Function 2)*
4.B.II.4.a. Wilks' Lambda:	*1 through 2: .642 (Sig. .000), 2: .910 (Sig. .016)*
4.B.II.4.b. Eigenvalues:	*1: .418 (r: .543), 2: .099 (r: .300)*
4.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
4.B.II.6. Remarks:	*Box's M (Sig. .108; Log determinants: A-Group - -14.269, Jebel Sahaba/Tushka - -13.840, Malian Sahara - -12.485), no outliers detected, no variables failed tolerance test*

4.B.III. Results

4.B.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 58.5%, Jebel Sahaba/Tushka (D^2: .232), A-Group (D^2: .835)*
4.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*56.9%*
4.B.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 60.0%, Jebel Sahaba/Tushka (D^2: .326), A-Group (D^2: 1.495)*
4.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (5 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (6 A-Group, 4 Malian Sahara), Malian Sahara (5 A-Group, 2 Jebel Sahaba/Tushka)*
4.B.III.2.b. Misclassifications (separate-groups):	*A-Group (3 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (6 A-Group, 5 Malian Sahara), Malian Sahara (4 A-Group, 2 Jebel Sahaba/Tushka)*
4.B.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



4.B.IV. Additional results

4.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 58.5%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%)*
4.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 58.5%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%), variables entered (2)*
4.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 47.0%, 41.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 59.0%), variables entered (2)*
4.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 47.0%, 44.6%; separate-groups covariance matrix - A-Group, 50.6%), variables entered (2)*

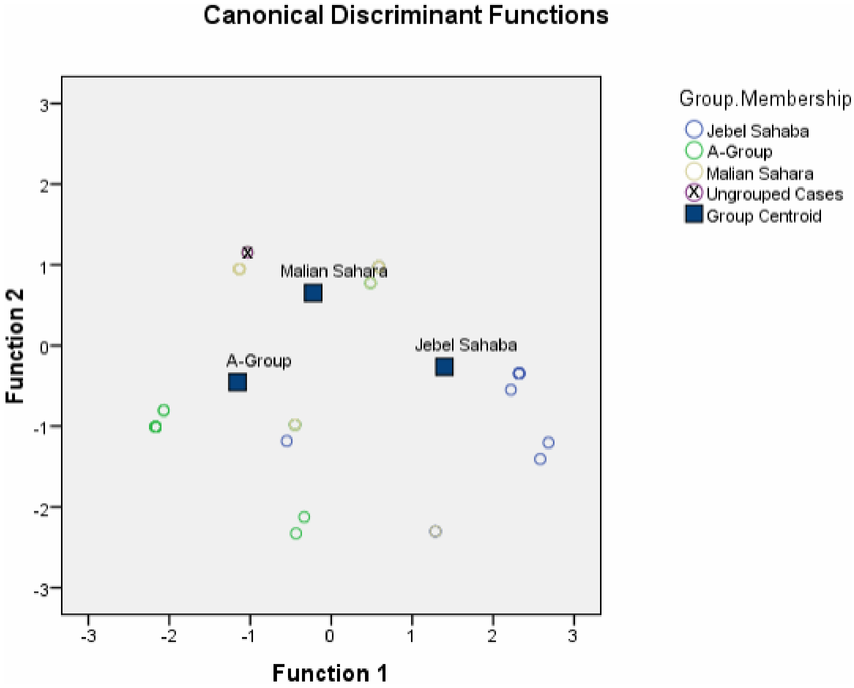
4.C.I. Summary

4.C.I.1. Individual:	*Abu Tabari 02/1-5*

4.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
4.C.I.3. Data: *Non-metric dental traits*
4.C.I.4. Classification: *Malian Sahara*

4.C.II. Analysis overview
4.C.II.1. Method: *Simultaneous entry*
4.C.II.2.a. Variables in matrix: *5*
4.C.II.2.b. Variables entered: *5*
4.C.II.3. Best predictors: *Premolar lingual cusps LP2 (.694), Cusp 7 LM1 (.453), Cusp number LM2 (.402), Groove pattern LM2 (.849 - Function 2)*
4.C.II.4.a. Wilks' Lambda: *1 through 2: .374 (Sig. .000), 2: .800 (Sig. .009)*
4.C.II.4.b. Eigenvalues: *1: 1.137 (r: .729), 2: .251 (r: .448)*
4.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
4.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

4.C.III. Results
4.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 70.8%, Malian Sahara (D^2: .912), A-Group (D^2: 2.598)*
4.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *70.8%*
4.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 70.8%, Malian Sahara (D^2: .993), A-Group (D^2: 2.664)*
4.C.III.2.a. Misclassifications (leave-one-out): *A-Group (7 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 7 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
4.C.III.2.b. Misclassifications (separate-groups): *A-Group (7 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 7 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
4.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.C.IV. Additional results
4.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 70.8%, 70.8%), separate-groups covariance matrix (Malian Sahara, 70.8%)*
4.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 67.7%, 67.7%), separate-groups covariance matrix (Malian Sahara, 67.7%), variables entered (3)*
4.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 68.7%, 67.5%; separate-groups covariance matrix - "Sudanese Hotchpotch", 69.9%), variables entered (4)*
4.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 50.6%, 44.6%; separate-groups covariance matrix - "Sudanese Hotchpotch", 72.3%), variables entered (5)*

4.D.I. Summary

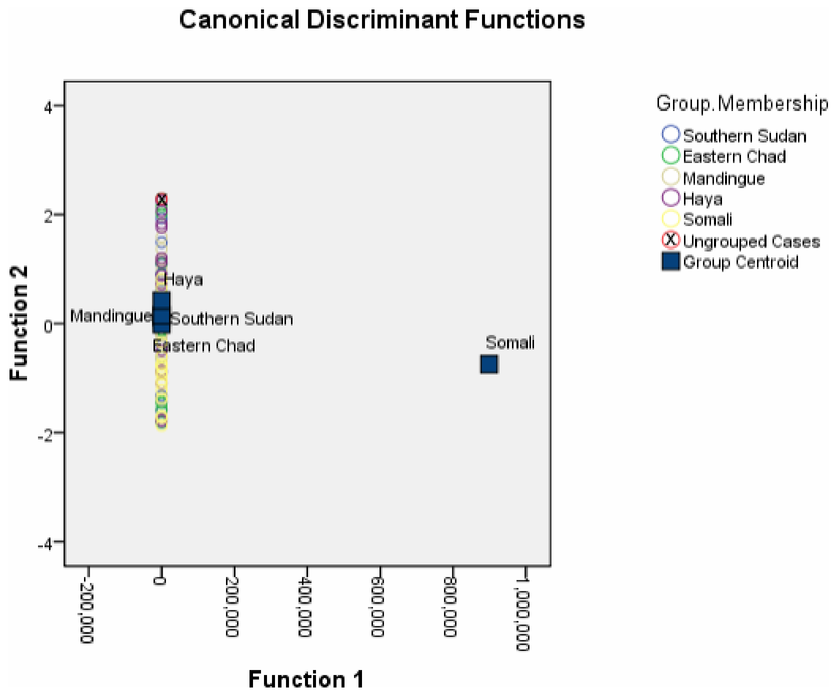
4.D.I.1. Individual:	*Abu Tabari 02/1-5*
4.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
4.D.I.3. Data:	*Dental measurements*
4.D.I.4. Classification:	*Haya*

4.D.II. Analysis overview

4.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.D.II.2.a. Variables in matrix:	*2*
4.D.II.2.b. Variables entered:	*2*
4.D.II.3. Best predictors:	*81. Crown length LM2 (.455), 81(1). Crown width LM2 (-.293), 81(1). Crown width LM2 (.956 - Function 2)*
4.D.II.4.a. Wilks' Lambda:	*1 through 2: .652 (Sig. .000), 2: .868 (Sig. .004)*
4.D.II.4.b. Eigenvalues:	*1: .333 (r: .500), 2: .152 (r: .363)*
4.D.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.2%)*
4.D.II.6. Remarks:	*Box's M (Sig. .002; Log determinants: Southern Sudan - -3.611, Chad - -4.716, Mandinka - -3.732, Somalis - -4.224, Haya - -3.302), removed outliers: Southern Sudan E.1028-10 (D^2: 6.582; critical value: 5.991 - p 0.95, df 2), Chad 17.585 (D^2: 7.864; critical value: 5.991 - p 0.95, df 2), Chad 17.592 (D^2: 6.023; critical value: 5.991 - p 0.95, df 2), Mandinka MN-0.141-2 (D^2: 7.991; critical value: 5.991 - p 0.95, df 2), Mandinka MN-0.141-3 (D^2: 6.310; critical value: 5.991 - p 0.95, df 2), Mandinka MN-0.141-13 (D^2: 9.431; critical value: 5.991 - p 0.95, df 2), Mandinka MN-0.141-18 (D^2: 9.551; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.1 (D^2: 6.090; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.41 (D^2: 7.021; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

4.D.III. Results

4.D.III.1.a. Within-groups covariance matrix:	*Haya, 53.0%, Haya (D^2: 4.497), Mandinka (D^2: 4.953)*
4.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*56.0%*
4.D.III.1.c. Separate-groups covariance matrix:	*Haya, 48.5%, Haya (D^2: 2.474), Southern Sudan (D^2: 7.588)*
4.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Mandinka, 2 Somalis, 2 Haya), Chad (2 Southern Sudan, 4 Somalis, 2 Haya), Mandinka (3 Southern Sudan, 2 Chad, 2 Somalis, 2 Haya), Somalis (3 Southern Sudan, 1 Chad, 2 Mandinka, 2 Haya), Haya (5 Southern Sudan, 4 Mandinka, 3 Somalis)*
4.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 3 Mandinka, 3 Haya), Chad (1 Southern Sudan, 3 Haya), Mandinka (4 Southern Sudan, 2 Chad, 4 Haya), Somalis (6 Southern Sudan, 8 Chad, 1 Mandinka, 3 Haya), Haya (5 Southern Sudan, 5 Chad, 2 Mandinka)*
4.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

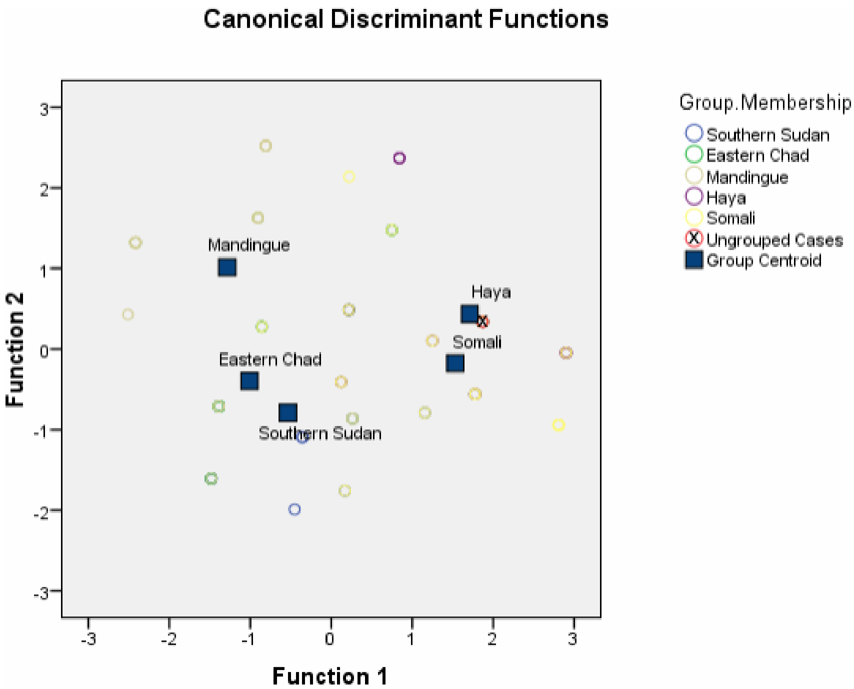


4.D.IV. Additional results	
4.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 50.0%, 50.9%), separate-groups covariance matrix (Haya, 44.4%)*
4.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 50.0%, 50.9%), separate-groups covariance matrix (Haya, 44.4%), variables entered (2)*
4.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 56.5%, 50.9%; separate-groups covariance matrix - Southern Sudan, 60.2%), variables entered (4)*

4.F.I. Summary	
4.F.I.1. Individual:	*Abu Tabari 02/1-5*
4.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
4.F.I.3. Data:	*Non-metric dental traits*
4.F.I.4. Classification:	*Haya*

4.F.II. Analysis overview	
4.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.F.II.2.a. Variables in matrix:	*5*
4.F.II.2.b. Variables entered:	*5*
4.F.II.3. Best predictors:	*Cusp number LM2 (.620), Premolar lingual cusps LP2 (.612), Cusp number LM1 (.351), Cusp 7 LM1 (.807 - Function 2), Groove pattern LM2 (-.743 - Function 3), Premolar lingual cusps LP2 (.670 - Function 4)*
4.F.II.4.a. Wilks' Lambda:	*1 through 4: .220 (Sig. .000), 2 through 4: .585 (Sig. .000), 3 through 4: .845 (Sig. .009), 4: 1.000 (Sig. .985)*
4.F.II.4.b. Eigenvalues:	*1: 1.657 (r: .790), 2: .445 (r: .555), 3: .183 (r: .393), 4: .000 (r: .017)*
4.F.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.2%)*
4.F.II.6. Remarks:	*Box's M (Sig. .272; Log determinants: Southern Sudan - -9.688, Chad - 'singular', Mandinka - 'singular', Somalis - -8.869, Haya - 'singular'), removed outliers: Somalis Af.15.0.51 (D^2: 11.358; critical value: 11.070 - p 0.95, df 5), no variables failed tolerance test*

4.F.III. Results	
4.F.III.1.a. Within-groups covariance matrix:	*Haya, 58.3%, Haya (D^2: .838), Somalis (D^2: 4.793)*
4.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*56.5%*
4.F.III.1.c. Separate-groups covariance matrix:	*Haya, 62.6%, Haya (D^2: 1.261), Somalis (D^2: 3.290)*
4.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (7 Chad, 7 Mandinka, 1 Somali, 3 Haya), Chad (4 Southern Sudan, 3 Mandinka, 1 Somali, 2 Haya), Mandinka (4 Southern Sudan, 2 Chad), Somalis (2 Southern Sudan, 1 Chad, 2 Mandinka, 3 Haya), Haya (1 Southern Sudan, 1 Chad, 7 Somalis)*
4.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (8 Chad, 3 Somalis, 3 Haya), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali, 2 Haya), Mandinka (2 Southern Sudan, 4 Chad), Somalis (2 Southern Sudan, 1 Chad, 5 Haya), Haya (1 Southern Sudan, 3 Somalis)*
4.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

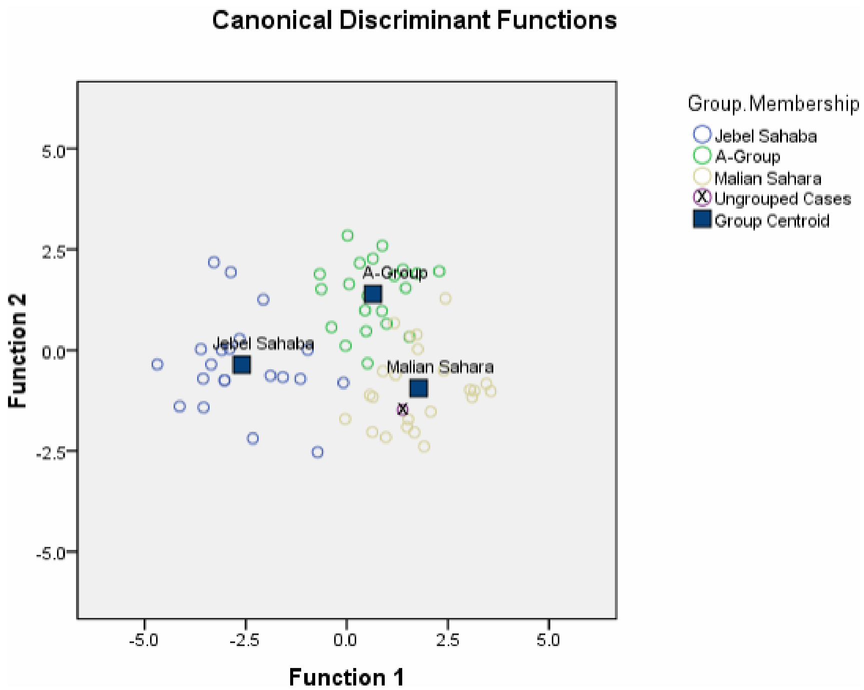


4.F.IV. Additional results	
4.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 58.3%, 56.5%), separate-groups covariance matrix (Haya, 63.0%)*
4.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 58.3%, 56.5%), separate-groups covariance matrix (Haya, 63.0%), variables entered (5)*
4.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 60.2%, 58.3%; separate-groups covariance matrix - Haya, 62.0%), variables entered (4)*

4.G.I. Summary	
4.G.I.1. Individual:	*Abu Tabari 02/1-5*
4.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
4.G.I.3. Data:	*Dental measurements and non-metric traits*
4.G.I.4. Classification:	*Malian Sahara*

4.G.II. Analysis overview	
4.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.G.II.2.a. Variables in matrix:	*11*
4.G.II.2.b. Variables entered:	*8*
4.G.II.3. Best predictors:	*Premolar lingual cusps LP2 (.308), Cusp 7 LM1 (-.285), Cusp number LM2 (-.251), 81(1). Crown width LI1 (.598 - Function 2)*
4.G.II.4.a. Wilks' Lambda:	*1 through 2: 0.107 (Sig. .000), 2: .492 (Sig. .000)*
4.G.II.4.b. Eigenvalues:	*1: 3.600 (r: .885), 2: 1.033 (r: .713)*
4.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
4.G.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

4.G.III. Results	
4.G.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 92.3%, Malian Sahara (D^2: .448), Jebel Sahaba/Tushka (D^2: 8.823)*
4.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*86.2%*
4.G.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 92.3%, Malian Sahara (D^2: .398), Jebel Sahaba/Tushka (D^2: 11.471)*
4.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (2 Malian Sahara), Malian Sahara (4 A-Group)*
4.G.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 A-Group)*
4.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



4.G.IV. Additional results

4.G.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 93.8%, 84.6%), separate-groups covariance matrix (Malian Sahara, 96.9%)*

4.G.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 90.8%, 84.6%), separate-groups covariance matrix (Malian Sahara, 95.4%), variables entered (8)*

4.G.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 84.3%, 80.7%; separate-groups covariance matrix - "Sudanese Hotchpotch", 88.0%), variables entered (9)*

4.G.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 78.3%, 68.7%; separate-groups covariance matrix - "Sudanese Hotchpotch", 79.5%), variables entered (8)*

4.H.I. Summary

4.H.I.1. Individual: *Abu Tabari 02/1-5*

4.H.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

4.H.I.3. Data: *Dental measurements and non-metric traits*

4.H.I.4. Classification: *Haya*

4.H.II. Analysis overview

4.H.II.1. Method: *Mahalanobis distance, simultaneous entry*

4.H.II.2.a. Variables in matrix: *7*

4.H.II.2.b. Variables entered: *7*

4.H.II.3. Best predictors: *Premolar lingual cusps LP2 (.528), Cusp number LM2 (.509), Cusp number LM1 (.346), Cusp 7 LM1 (.631 - Function 2), 81(1). Crown width LM2 (.535 - Function 3), 81. Crown length LM2 (.705 - Function 4)*

4.H.II.4.a. Wilks' Lambda: *1 through 4: .137 (Sig. .000), 2 through 4: .434 (Sig. .000), 3 through 4: .690 (Sig. .000), 4: .947 (Sig. .244)*

4.H.II.4.b. Eigenvalues: *1: 2.155 (r: .826), 2: .591 (r: .610), 3: .373 (r: .521), 4: .055 (r: .229)*

4.H.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

4.H.II.6. Remarks: *Box's M (test result not accepted; Sig. .092; Log determinants: Southern Sudan - -13.844, Chad - 'singular', Mandinka - 'singular', Somalis - -12.925, Haya - 'singular'), no outliers detected, no variables failed tolerance test*

4.H.III. Results

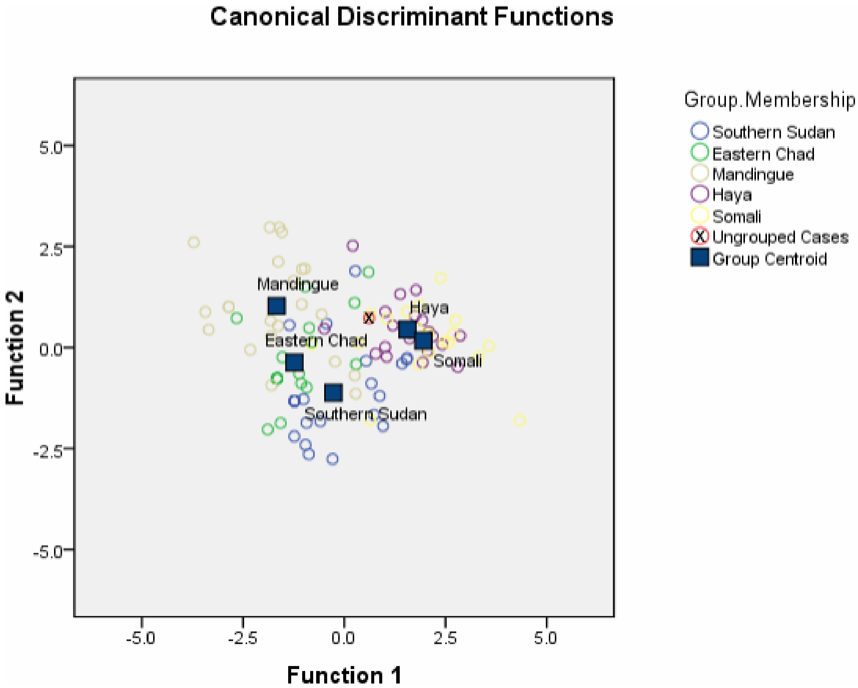
4.H.III.1.a. Within-groups covariance matrix: *Haya, 66.7%, Haya (D^2: 4.931), Chad (D^2: 11.789)*

4.H.III.1.b. Within-groups covariance matrix (Leave-one-out): *58.3%*

4.H.III.1.c. Separate-groups covariance matrix: *Haya, 78.7%, Haya (D^2: 5.592), Southern Sudan (D^2: 10.085)*

4.H.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (8 Chad, 2 Mandinka, 2 Somalis, 3 Haya), Chad (4 Southern Sudan, 3 Mandinka, 2 Haya),* 4.H.III.2.b. Misclassifications (separate-groups): *Mandinka (2 Southern Sudan, 4 Chad), Somalis (3 Southern Sudan, 1 Mandinka, 4 Haya), Haya (1 Southern Sudan, 1 Chad, 1 Mandinka, 4 Somalis) Southern Sudan (2 Chad, 1 Somali, 3 Haya), Chad (2 Southern Sudan, 3 Mandinka), Mandinka (2 Southern Sudan, 2 Chad), Somalis (2 Southern Sudan, 1 Chad, 3 Haya), Haya (1 Chad, 1 Somali)*

4.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.H.IV. Additional results

4.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 66.7%, 58.3%), separate-groups covariance matrix (Haya, 78.7%)*

4.H.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 66.7%, 58.3%), separate-groups covariance matrix (Haya, 78.7%), variables entered (7)*

4.H.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 82.4%, 74.1%; separate-groups covariance matrix - Southern Sudan, 84.3%), variables entered (7)*

5. Abu Tabari 02/1-6

no data

6. Abu Tabari 02/1-7

6.A.I. Summary

6.A.I.1. Individual: *Abu Tabari 02/1-7*

6.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.A.I.3. Data: *Cranial and dental measurements*

6.A.I.4. Classification: *Jebel Sahaba/Tushka*

6.A.II. Analysis overview

6.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.A.II.2.a. Variables in matrix: *5*

6.A.II.2.b. Variables entered: *2*

6.A.II.3. Best predictors: *69. Height of the mandibular symphysis (.831), 62(a)3. 3rd internal dental arch length (md) (.573), 62(a)3. 3rd internal dental arch length (md) (.819 - Function 2)*

6.A.II.4.a. Wilks' Lambda: *1 through 2: .543 (Sig. .000), 2: .966 (Sig. .144)*

6.A.II.4.b. Eigenvalues: *1: .779 (r: .662), 2: .035 (r: .185)*

6.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

6.A.II.6. Remarks: *Box's M (Sig. .999; Log determinants: A-Group - 3.279, Jebel Sahaba/Tushka - -3.433, Malian Sahara - -3.475), no outliers detected, no variables failed tolerance test*

6.A.III. Results

6.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 61.5%, Jebel Sahaba/Tushka (D^2: 1.431), Malian Sahara (D^2: 1.663)*

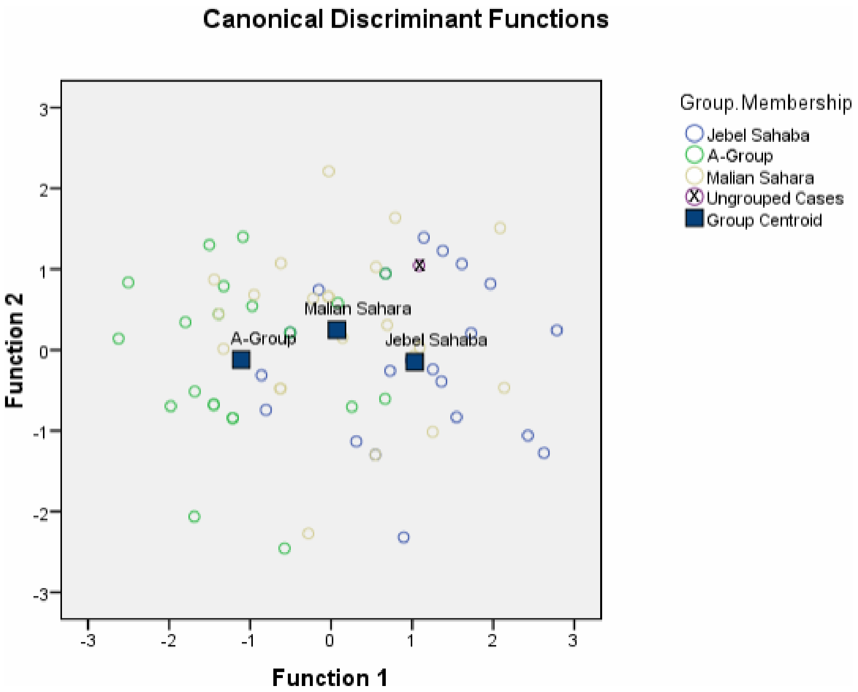
6.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.0%*

6.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 61.5%, Jebel Sahaba/Tushka (D^2: 1.494), Malian Sahara (D^2: 1.611)*

6.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 4 Malian Sahara), Malian Sahara (8 A-Group, 6 Jebel Sahaba/Tushka)*

6.A.III.2.b. Misclassifications (separate-groups): *A-Group (1 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 4 Malian Sahara), Malian Sahara (8 A-Group, 6 Jebel Sahaba/Tushka)*

6.A.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



6.A.IV. Additional results

6.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 66.2%)*

6.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 61.7%, 60.0%), separate-groups covariance matrix (Malian Sahara, 61.5%), variables entered (2)*

6.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 57.8%, 63.9%; separate-groups covariance matrix - Malian Sahara, 51.8%), variables entered (3)*

6.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 71.1%, 67.5%; separate-groups covariance matrix - Malian Sahara, 74.7%), variables entered (5)*

6.B.I. Summary

6.B.I.1. Individual: *Abu Tabari 02/1-7*

6.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.B.I.3. Data: *Scaled cranial measurements*

6.B.I.4. Classification: *Malian Sahara*

6.B.II. Analysis overview

6.B.II.1. Method: *Simultaneous entry*

6.B.II.2.a. Variables in matrix: *4*

6.B.II.2.b. Variables entered: *4*

6.B.II.3. Best predictors: *69. Height of the mandibular symphysis (.712), 62(a)3. 3rd internal dental arch length (md) (.481), 69(1). 69c. Thickness of the mandibular symphysis (-.104), 69c. Thickness of the mandibular symphysis (.705 - Function 2)*

6.B.II.4.a. Wilks' Lambda: *1 through 2: .655 (Sig. .001), 2: .957 (Sig. .443)*

6.B.II.4.b. Eigenvalues: *1: .461 (r: .562), 2: .045 (r: .208)*

6.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

6.B.II.6. Remarks: *Box's M (Sig. .278; Log determinants: A-Group - -18.427, Jebel Sahaba/Tushka - -17.332, Malian Sahara -*

-17.590), no outliers detected, no variables failed tolerance test

6.B.III. Results

6.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 47.7%, Malian Sahara (D^2: 1.699), A-Group (D^2: 3.895)*

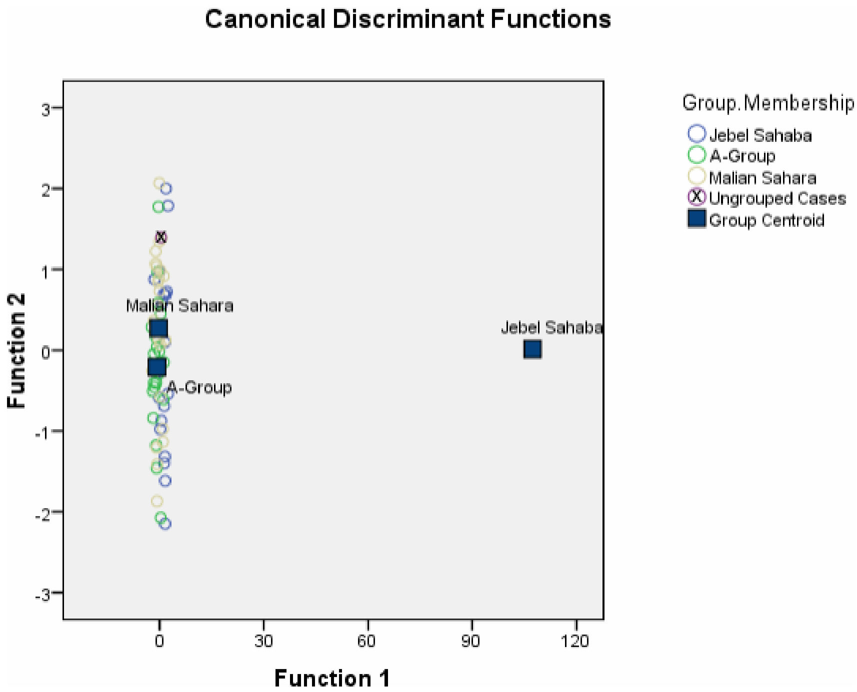
6.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *56.9%*

6.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 46.2%, Malian Sahara (D^2: 1.662), A-Group (D^2: 5.190)*

6.B.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 3 Malian Sahara), Malian Sahara (5 A-Group, 6 Jebel Sahaba/Tushka)*

6.B.III.2.b. Misclassifications (separate-groups): *A-Group (8 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 17 Malian Sahara), Malian Sahara (6 A-Group)*

6.B.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



6.B.IV. Additional results

6.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 47.7%, 56.9%), separate-groups covariance matrix (Malian Sahara, 46.2%)*

6.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 40.0%, 50.8%), separate-groups covariance matrix (Malian Sahara, 46.2%), variables entered (2)*

6.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 65.1%, 60.0%; separate-groups covariance matrix - Malian Sahara, 69.9%), variables entered (3)*

6.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 66.3%, 61.4%; separate-groups covariance matrix - Malian Sahara, 77.1%), variables entered (5)*

6.C.I. Summary

6.C.I.1. Individual: *Abu Tabari 02/1-7*

6.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.C.I.3. Data: *Non-metric cranial and dental traits*

6.C.I.4. Classification: *Malian Sahara*

6.C.II. Analysis overview

6.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.C.II.2.a. Variables in matrix: *4*

6.C.II.2.b. Variables entered: *3*

6.C.II.3. Best predictors: *Premolar root number UP1 (.831), Symphyseal height (.568), Alveolar prognathism (.100), Alveolar prognathism (.987 - Function 2)*

6.C.II.4.a. Wilks' Lambda: *1 through 2: .443 (Sig. .000), 2: .730 (Sig. .000)*

6.C.II.4.b. Eigenvalues: *1: .648 (r: .627), 2: .369 (r: .519)*

6.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

6.C.II.6. Remarks: *Box's M (Sig. .003; Log determinants: A-Group - -6.135, Jebel Sahaba/Tushka - -6.050, Malian Sahara - -4.642), no outliers detected, no variables failed tolerance test*

6.C.III. Results

6.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 64.6%, Malian Sahara (D^2: 1.607), Jebel Sahaba/Tushka (D^2: 1.790)*

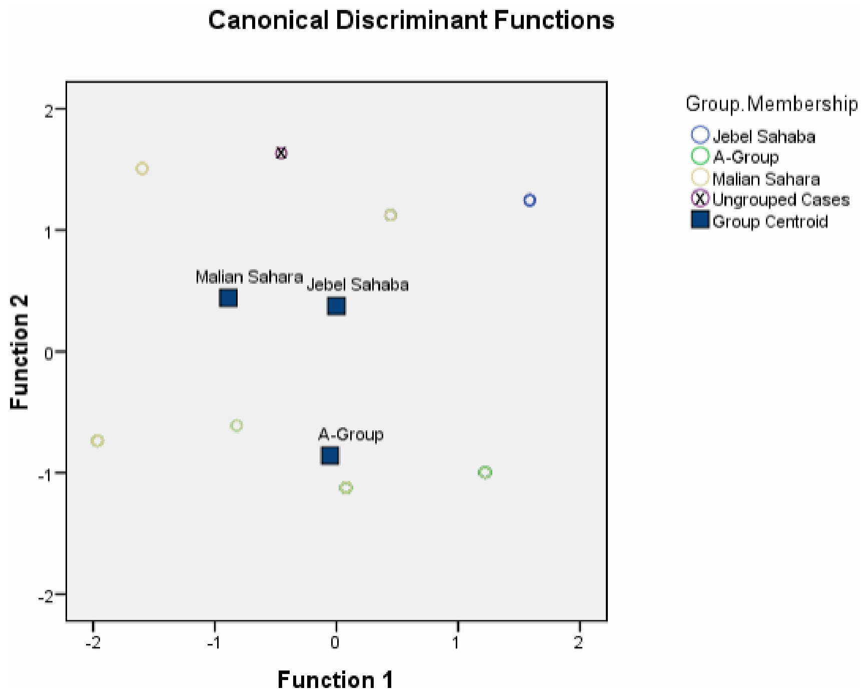
6.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *52.3%*

6.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 64.6%, Malian Sahara (D^2: 1.275), Jebel Sahaba/Tushka (D^2: 2.239)*

6.C.III.2.a. Misclassifications (leave-one-out): *A-Group (8 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (8 A-Group, 1 Malian Sahara), Malian Sahara (5 A-Group, 3 Jebel Sahaba/Tushka)*

6.C.III.2.b. Misclassifications (separate-groups): *A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (8 A-Group, 1 Malian Sahara), Malian Sahara (10 A-Group, 3 Jebel Sahaba/Tushka)*

6.C.III.3. All groups scatter plot: *Mahalanobis distance, separate-groups covariance matrix*



6.C.IV. Additional results

6.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 66.2%, 61.5%), separate-groups covariance matrix (Malian Sahara, 64.6%)*

6.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 64.6%, 52.3%), separate-groups covariance matrix (Malian Sahara, 64.6%), variables entered (3)*

6.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 53.0%, 45.8%; separate-groups covariance matrix - Malian Sahara, 55.4%), variables entered (4)*

6.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 65.1%, 56.6%; separate-groups covariance matrix - Malian Sahara, 62.7%), variables entered (5)*

6.D.I. Summary

6.D.I.1. Individual: *Abu Tabari 02/1-7*

6.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

6.D.I.3. Data: *Cranial and dental measurements*

6.D.I.4. Classification: *Southern Sudan*

6.D.II. Analysis overview

6.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.D.II.2.a. Variables in matrix: *6*

6.D.II.2.b. Variables entered: *5*

6.D.II.3. Best predictors: *63(2)b. 2nd internal dental arch breadth (md) (.698), 81(1). Crown width UP1 (.671), 63(2). Anterior palate breadth (md) (.476), 69. Height of the mandibular* *symphysis (.636 - Function 2), 69c. Thickness of the mandibular symphysis (.867 - Function 3), 63(2). Anterior palate breadth (md) (.557 - Function 4)*

6.D.II.4.a. Wilks' Lambda: *1 through 4: .386 (Sig. .000), 2 through 4: .613 (Sig. .000), 3 through 4: .788 (Sig. .001), 4: .956 (Sig. .107)*

6.D.II.4.b. Eigenvalues: *1: .588 (r: .608), 2: .286 (r: .471), 3: .213 (r: .419), 4: .046 (r: .209)*

6.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.2%)*

6.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - .388, Chad - -.125, Mandinka - 1.910, Somalis - 1.134, Haya - 2.546), removed outliers: Mandinka 0.141-8 (D^2: 11.664; critical value: 11.070 - p 0.95, df 5), Somalis Af.15.0.48 (D^2: 26.797; critical value: 11.070 - p 0.95, df 5), no variables failed tolerance test*

6.D.III. Results

6.D.III.1.a. Within-groups covariance matrix: *Haya, 61.1%, Haya (D^2: 10.413), Southern Sudan (D^2: 12.204)*

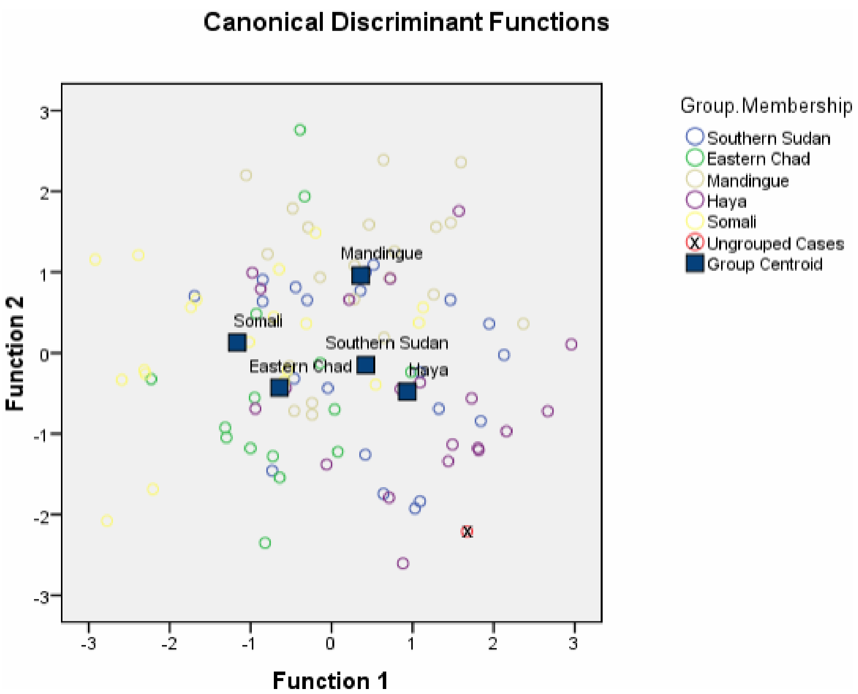
6.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *55.6%*

6.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 66.0%, Southern Sudan (D^2: 9.164), Haya (D^2: 19.784)*

6.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 2 Mandinka, 6 Somalis, 3 Haya), Chad (1 Southern Sudan, 2 Mandinka, 4 Somalis, 1 Haya), Mandinka (4 Southern Sudan, 3 Chad, 1 Somali, 2 Haya), Somalis (3 Southern Sudan, 1 Chad, 5 Mandinka), Haya (5 Southern Sudan, 4 Mandinka)*

6.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 2 Mandinka, 3 Somalis), Chad (2 Mandinka, 2 Somalis, 1 Haya), Mandinka (3 Southern Sudan, 3 Chad, 1 Haya), Somalis (3 Southern Sudan, 3 Chad, 3 Mandinka), Haya (3 Southern Sudan, 2 Chad, 2 Mandinka, 2 Somalis)*

6.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.D.IV. Additional results

6.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 63.0%, 49.1%), separate-groups covariance matrix (Southern Sudan, 68.5%)*

6.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 61.1%, 50.0%), separate-groups covariance matrix (Haya, 68.5%), variables entered (4)*

6.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 60.2%, 56.5%; separate-groups covariance matrix - Southern Sudan, 63.9%), variables entered (6)*

6.E.I. Summary

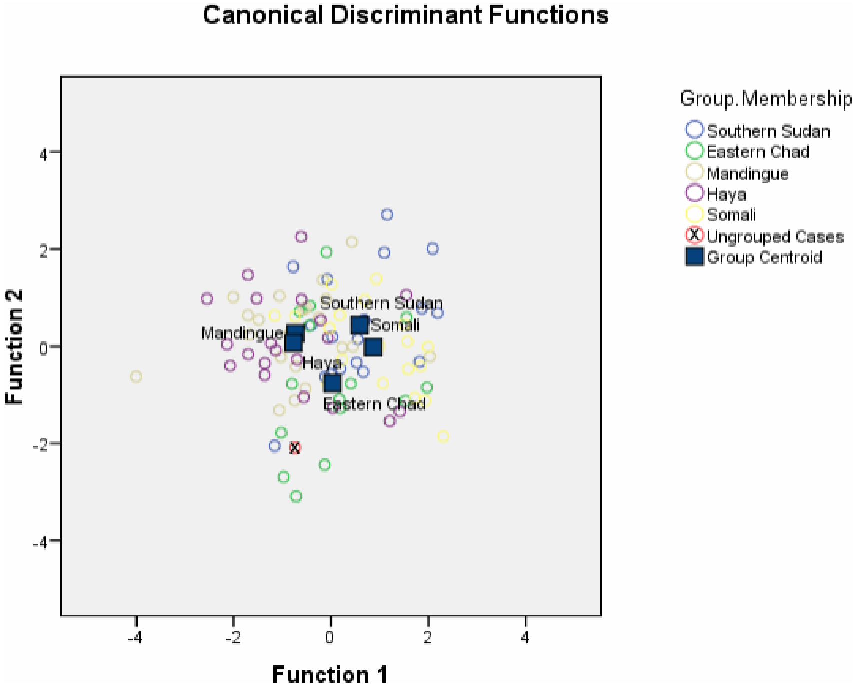
6.E.I.1. Individual: *Abu Tabari 02/1-7*

6.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

6.E.I.3. Data: *Scaled cranial measurements*
6.E.I.4. Classification: *Chad*

6.E.II. Analysis overview
6.E.II.1. Method: *Simultaneous entry*
6.E.II.2.a. Variables in matrix: *5*
6.E.II.2.b. Variables entered: *5*
6.E.II.3. Best predictors: *69c. Thickness of the mandibular symphysis (.930), 69. Height of the mandibular symphysis (.367), 62(a)3. 3rd internal dental arch length (md) (-.179), 63(2)b. 2nd internal dental arch breadth (md) (.761 - Function 2), 69. Height of the mandibular symphysis (.831 - Function 3), 63(2). Anterior palate breadth (md) (.650 - Function 4)*
6.E.II.4.a. Wilks' Lambda: *1 through 4: .492 (Sig. .000), 2 through 4: .715 (Sig. .001), 3 through 4: .849 (Sig. .013), 4: .972 (Sig. .246)*
6.E.II.4.b. Eigenvalues: *1: .454 (r: .559), 2: .187 (r: .397), 3: .145 (r: .356), 4: .029 (r: .167)*
6.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
6.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -23.085, Chad - -22.081, Mandinka - 20.750, Somalis - -22.080, Haya - -20.530), removed outliers: Southern Sudan E.1026-6 (D^2: 11.378; critical value: 11.070 - p 0.95, df 5), Mandinka 0.141-3 (D^2: 12.879; critical value: 11.070 - p 0.95, df 5), 105 - Somalis Af.15.0.48 (D^2: 12.259; critical value: 11.070 - p 0.95, df 5), no variables failed tolerance test*

6.E.III. Results
6.E.III.1.a. Within-groups covariance matrix: *Chad, 59.0%, Chad (D^2: 4.480), Mandinka (D^2: 6.795)*
6.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *49.5%*
6.E.III.1.c. Separate-groups covariance matrix: *Chad, 62.9%, Chad (D^2: 7.299), Haya (D^2: 5.861)*
6.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (4 Chad, 3 Mandinka, 2 Somalis, 1 Haya), Chad (2 Southern Sudan, 2 Mandinka, 2 Somalis, 2 Haya), Mandinka (2 Southern Sudan, 3 Chad, 2 Somalis, 4 Haya), Somalis (9 Southern Sudan, 3 Chad, 2 Mandinka, 1 Haya), Haya (1 Southern Sudan, 2 Chad, 4 Mandinka, 2 Somalis)*
6.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 1 Mandinka, 3 Somalis), Chad (1 Southern Sudan, 1 Mandinka, 3 Somalis, 3 Haya), Mandinka (1 Southern Sudan, 4 Chad, 2 Somalis, 3 Haya), Somalis (5 Southern Sudan, 1 Chad, 1 Mandinka, 2 Haya), Haya (1 Southern Sudan, 1 Chad, 3 Mandinka, 1 Somali)*
6.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.E.IV. Additional results

6.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 55.6%, 49.1%), separate-groups covariance matrix (Chad, 63.0%)*
6.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 52.8%, 50.9%), separate-groups covariance matrix (Haya, 56.5%), variables entered (3)*
6.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 61.1%, 53.7%; separate-groups covariance matrix - Chad, 63.9%), variables entered (6)*

6.F.I. Summary

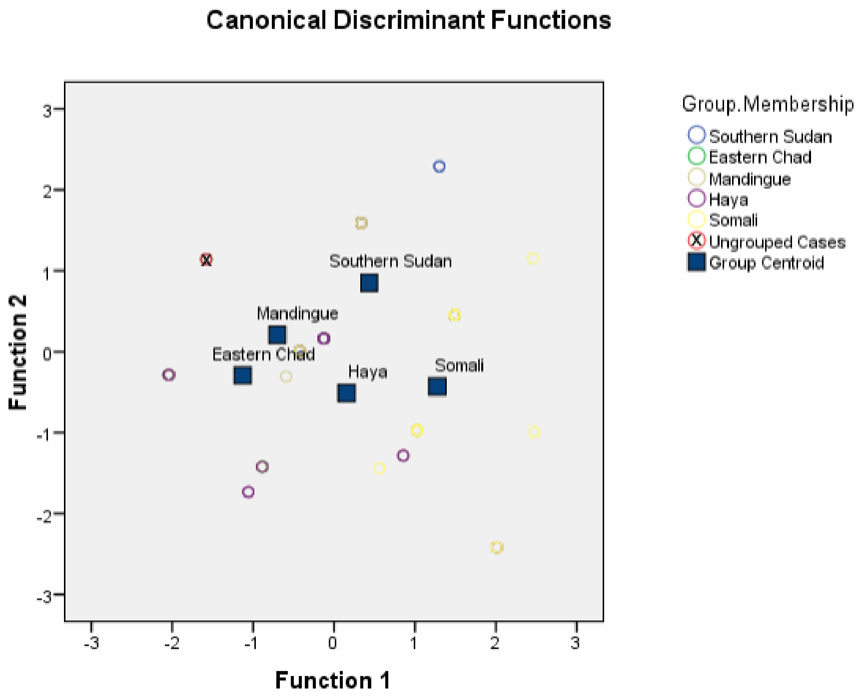
6.F.I.1. Individual:	*Abu Tabari 02/1-7*
6.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
6.F.I.3. Data:	*Non-metric cranial and dental traits*
6.F.I.4. Classification:	*Mandinka*

6.F.II. Analysis overview

6.F.II.1. Method:	*Simultaneous entry*
6.F.II.2.a. Variables in matrix:	*5*
6.F.II.2.b. Variables entered:	*5*
6.F.II.3. Best predictors:	*Premolar root number UP1 (.775), Alveolar prognathism (-.456), Symphyseal height (.242), Symphyseal height (.708 - Function 2), Mandibular torus (.737 - Function 3), Symphyseal height (.660 - Function 4)*
6.F.II.4.a. Wilks' Lambda:	*1 through 4: .395 (Sig. .000), 2 through 4: .686 (Sig. .000), 3 through 4: .881 (Sig. .047), 4: .963 (Sig. .146)*
6.F.II.4.b. Eigenvalues:	*1: .738 (r: .652), 2: .285 (r: .471), 3: .092 (r: .291), 4: .039 (r: .193)*
6.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
6.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - -11.813, Haya - 'singular'), removed outliers: Chad 17.593 (D^2: 13.626; critical value: 11.070 - p 0.95, df 5), no variables failed tolerance test*

6.F.III. Results

6.F.III.1.a. Within-groups covariance matrix:	*Mandinka, 52.8%, Mandinka (D^2: 2.083), Chad (D^2: 4.101)*
6.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*46.3%*
6.F.III.1.c. Separate-groups covariance matrix:	*Mandinka, 52.3%, Mandinka (D^2: 1.890), Chad (D^2: 5.062)*
6.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Mandinka, 6 Somalis, 4 Haya), Chad (1 Southern Sudan, 3 Mandinka, 1 Somali, 2 Haya), Mandinka (3 Southern Sudan, 7 Chad, 2 Somalis, 3 Haya), Somalis (2 Southern Sudan, 1 Mandinka, 3 Haya), Haya (4 Southern Sudan, 3 Chad, 2 Mandinka, 7 Somalis)*
6.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (3 Chad, 1 Mandinka, 6 Somalis), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali), Mandinka (4 Southern Sudan, 9 Chad, 2 Somalis, 2 Haya), Somalis (1 Southern Sudan, 1 Chad), Haya (4 Southern Sudan, 4 Chad, 1 Mandinka, 7 Somalis)*
6.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



6.F.IV. Additional results

6.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 52.8%, 46.3%), separate-groups covariance matrix (Mandinka, 53.7%)*

6.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 53.7%, 47.2%), separate-groups covariance matrix (Mandinka, 52.8%), variables entered (4)*

6.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 51.9%, 46.3%; separate-groups covariance matrix - Mandinka, 55.6%), variables entered (3)*

6.G.I. Summary

6.G.I.1. Individual: *Abu Tabari 02/1-7*

6.G.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.G.I.3. Data: *Cranial and dental measurements and non-metric traits*

6.G.I.4. Classification: *Malian Sahara*

6.G.II. Analysis overview

6.G.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.G.II.2.a. Variables in matrix: *13*

6.G.II.2.b. Variables entered: *5*

6.G.II.3. Best predictors: *69. Height of the mandibular symphysis (.648), Alveolar prognathism (.411), 62(a)3. 3rd internal dental arch length (md) (.386), Premolar root number UP1 (.737 - Function 2)*

6.G.II.4.a. Wilks' Lambda: *1 through 2: .279 (Sig. .000), 2: .632 (Sig. .000)*

6.G.II.4.b. Eigenvalues: *1: 1.267 (r: .748), 2: .581 (r: .606)*

6.G.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

6.G.II.6. Remarks: *Box's M (Sig. .006; Log determinants: A-Group - -4.395, Jebel Sahaba/Tushka - -3.655, Malian Sahara - -3.091), no outliers detected, no variables failed tolerance test*

6.G.III. Results

6.G.III.1.a. Within-groups covariance matrix: *Malian Sahara, 76.9%, Malian Sahara (D^2: 2.825), Jebel Sahaba/Tushka (D^2: 9.638)*

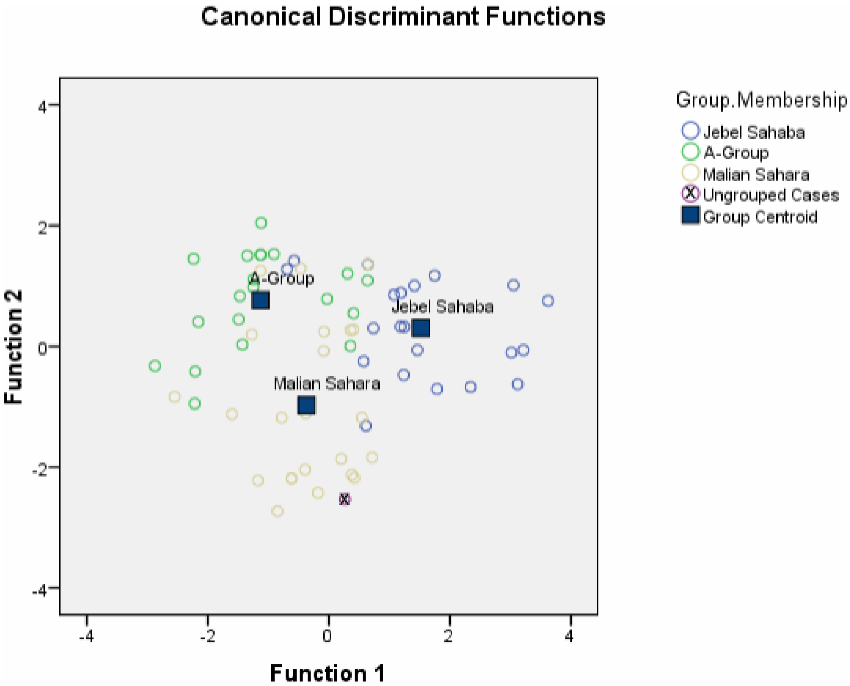
6.G.III.1.b. Within-groups covariance matrix (Leave-one-out): *72.3%*

6.G.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 80.0%, Malian Sahara (D^2: 2.063), Jebel Sahaba/Tushka (D^2: 17.244)*

6.G.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 2 Malian Sahara), Malian Sahara (5 A-Group, 3 Jebel Sahaba/Tushka)*

6.G.III.2.b. Misclassifications (separate-groups): *A-Group (3 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (4 A-Group, 3 Jebel Sahaba/Tushka)*

6.G.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.G.IV. Additional results

6.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 89.2%, 70.8%), separate-groups covariance matrix (Malian Sahara, 87.7%)*
6.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 76.9%, 73.8%), separate-groups covariance matrix (Malian Sahara, 78.5%), variables entered (5)*
6.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 90.4%, 75.9%; separate-groups covariance matrix - Malian Sahara, 91.6%), variables entered (9)*
6.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 88.0%, 77.1%; separate-groups covariance matrix - Malian Sahara, 90.4%), variables entered (11)*

6.H.I. Summary

6.H.I.1. Individual:	*Abu Tabari 02/1-7*
6.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
6.H.I.3. Data:	*Cranial and dental measurements and non-metric traits*
6.H.I.4. Classification:	*Southern Sudan*

6.H.II. Analysis overview

6.H.II.1. Method:	*Mahalanobis distance, simultaneous entry*
6.H.II.2.a. Variables in matrix:	*16*
6.H.II.2.b. Variables entered:	*8*
6.H.II.3. Best predictors:	*63(2)b. 2nd internal dental arch breadth (md) (.585), 81(1). Crown width UP1 (.583), Alveolar prognathism (.334), Alveolar prognathism (.599 - Function 2), 69c. Thickness of the mandibular symphysis (.544 - Function 3), Symphyseal height (.836 - Function 4)*
6.H.II.4.a. Wilks' Lambda:	*1 through 4: .257 (Sig. .000), 2 through 4: .422 (Sig. .000), 3 through 4: .600 (Sig. .000), 4: .807 (Sig. .001)*
6.H.II.4.b. Eigenvalues:	*1: .642 (r: .625), 2: .421 (r: .544), 3: .345 (r: .506), 4: .239 (r: .440)*
6.H.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
6.H.II.6. Remarks:	*Box's M (Sig. .029; Log determinants: Southern Sudan - -1.149, Chad - -1.736, Mandinka - -.903, Somalis - .606, Haya - .322), no outliers detected, no variables failed tolerance test*

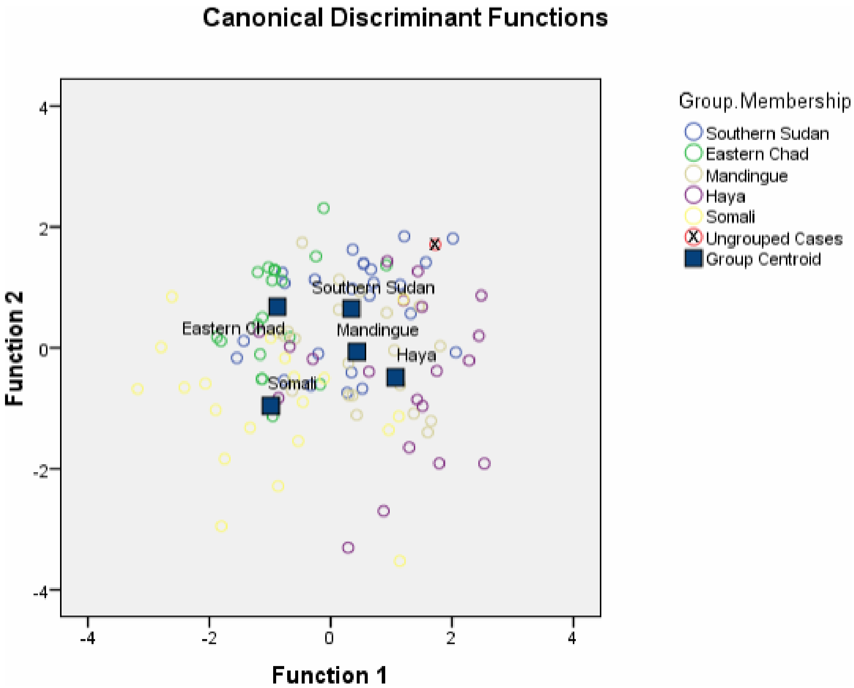
6.H.III. Results

6.H.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 66.7%, Southern Sudan (D^2: 5.310), Haya (D^2: 7.007)*
6.H.III.1.b. Within-groups covariance matrix (Leave-one-out):	*51.9%*
6.H.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 74.1%, Southern Sudan (D^2: 4.255), Haya (D^2: 5.147)*

6.H.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 2 Mandinka, 4 Somalis, 3 Haya), Chad (3 Southern Sudan, 2 Mandinka, 5 Somalis), Mandinka (2 Southern Sudan, 3 Chad, 1 Somali, 5 Haya), Somalis (3 Southern Sudan, 3 Chad, 2 Mandinka, 3 Haya), Haya (4 Southern Sudan, 2 Mandinka, 3 Somalis)*

6.H.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 1 Mandinka, 1 Haya), Chad (3 Southern Sudan, 2 Somalis), Mandinka (1 Southern Sudan, 1 Somali, 2 Haya), Somalis (3 Southern Sudan, 1 Mandinka, 2 Haya), Haya (4 Southern Sudan, 1 Chad, 2 Mandinka, 2 Somalis)*

6.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.H.IV. Additional results

6.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 73.1%, 57.4%), separate-groups covariance matrix (Haya, 77.8%)*

6.H.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 63.9%, 57.4%), separate-groups covariance matrix (Haya, 68.5%), variables entered (8)*

6.H.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 67.6%, 63.0%; separate-groups covariance matrix - Southern Sudan, 71.3%), variables entered (9)*

7. Abu Tabari 02/1-8

7.A.I. Summary

7.A.I.1. Individual: *Abu Tabari 02/1-8*

7.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

7.A.I.3. Data: *Dental measurements*

7.A.I.4. Classification: *Malian Sahara*

7.A.II. Analysis overview

7.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

7.A.II.2.a. Variables in matrix: *28*

7.A.II.2.b. Variables entered: *7*

7.A.II.3. Best predictors: *81. Crown length LI1 (.607), 81(1). Crown width UI2 (.578), 81(1). Crown width LI1 (.576), 81(1). Crown width LI1 (.464 - Function 2)*

7.A.II.4.a. Wilks' Lambda: *1 through 2: .088 (Sig. .000), 2: .377 (Sig. .000)*

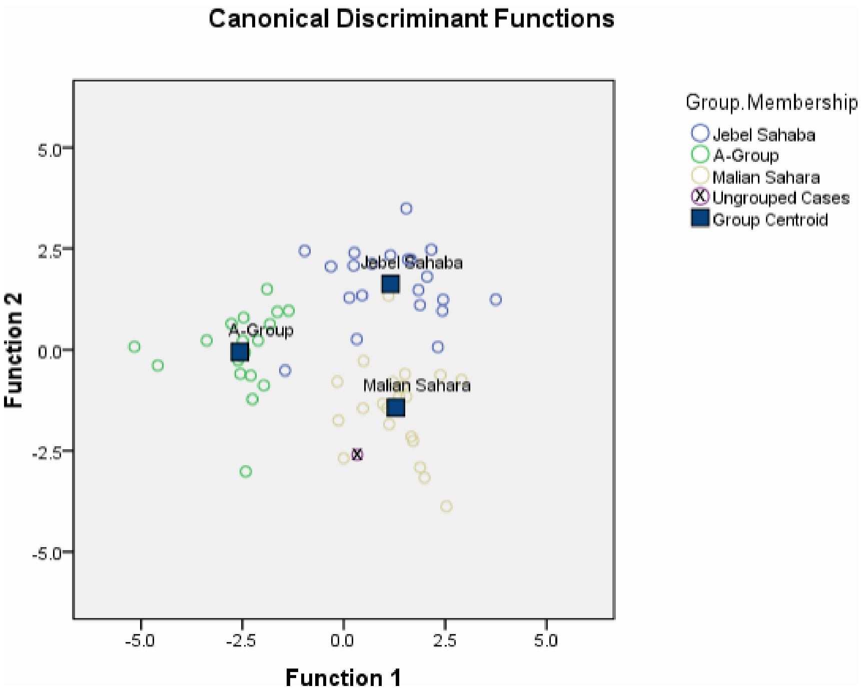
7.A.II.4.b. Eigenvalues: *1: 3.296 (r: .876), 2: 1.655 (r: .790)*

7.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

7.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -31.369, Jebel Sahaba/Tushka - -27.647, Malian Sahara - -26.844), no outliers detected, no variables failed tolerance test*

7.A.III. Results

7.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 95.4%, Malian Sahara (D^2: 2.281), A-Group (D^2: 14.869)*
7.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.8%*
7.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 3.167), A-Group (D^2: 20.951)*
7.A.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
7.A.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
7.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.A.IV. Additional results

7.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 83.1%), separate-groups covariance matrix (Malian Sahara, 98.5%)*
7.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 90.8%, 87.7%), separate-groups covariance matrix (Malian Sahara, 95.4%), variables entered (8)*
7.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 94.0%; separate-groups covariance matrix - Malian Sahara, 96.4%), variables entered (13)*
7.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 95.2%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (28)*

7.B.I. Summary

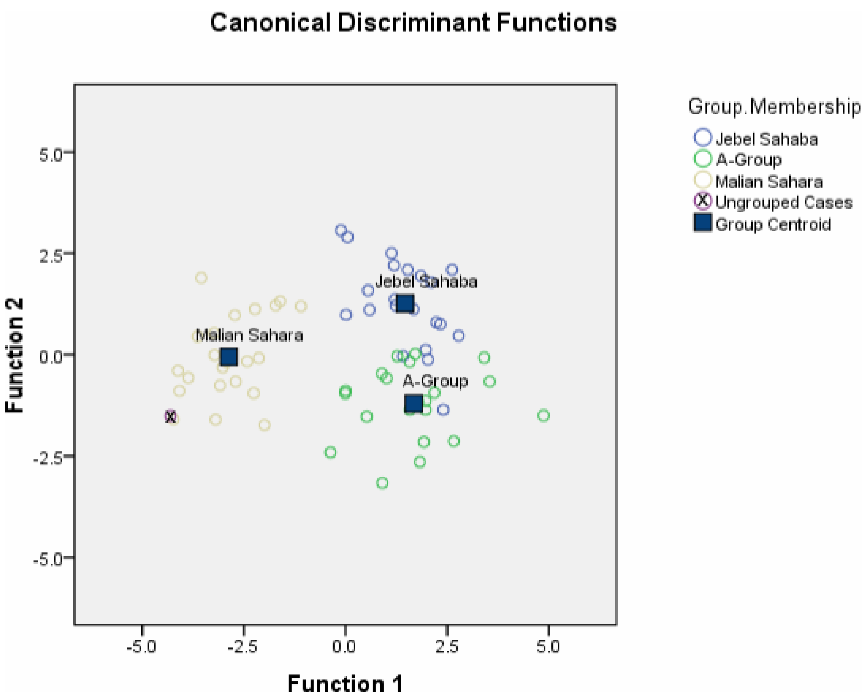
7.B.I.1. Individual:	*Abu Tabari 02/1-8*
7.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
7.B.I.3. Data:	*Scaled dental measurements*
7.B.I.4. Classification:	*Malian Sahara*

7.B.II. Analysis overview

7.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
7.B.II.2.a. Variables in matrix:	*20*
7.B.II.2.b. Variables entered:	*11*
7.B.II.3. Best predictors:	*81(1). Crown width LI1 (.398), 81(1). Crown width UM1 (.348), 81(1). Crown width (.224), 81(1), Crown width LI2 (.493 - Function 2)*
7.B.II.4.a. Wilks' Lambda:	*1 through 2: .085 (Sig. .000), 2: .491 (Sig. .000)*
7.B.II.4.b. Eigenvalues:	*1: 4.745 (r: .909), 2: 1.036 (r: .713)*
7.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
7.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -85.193, Jebel Sahaba/Tushka - -81.264, Malian Sahara - -79.346), no outliers detected, no variables failed tolerance test*

7.B.III. Results

7.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 95.4%, Malian Sahara (D^2: 4.185), A-Group (D^2: 35.940)*
7.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*81.5%*
7.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 95.4%, Malian Sahara (D^2: 3.645), A-Group (D^2: 23.041)*
7.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group), Malian Sahara (2 Jebel Sahaba/Tushka)*
7.B.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group)*
7.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.B.IV. Additional results

7.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 95.4%, 76.9%), separate-groups covariance matrix (Malian Sahara, 96.9%)*
7.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 90.8%, 83.1%), separate-groups covariance matrix (Malian Sahara, 87.7%), variables entered (8)*
7.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 92.8%, 83.1%; separate-groups covariance matrix - Malian Sahara, 92.8%), variables entered (11)*
7.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 97.6%, 94.0%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (18)*

7.C.I. Summary

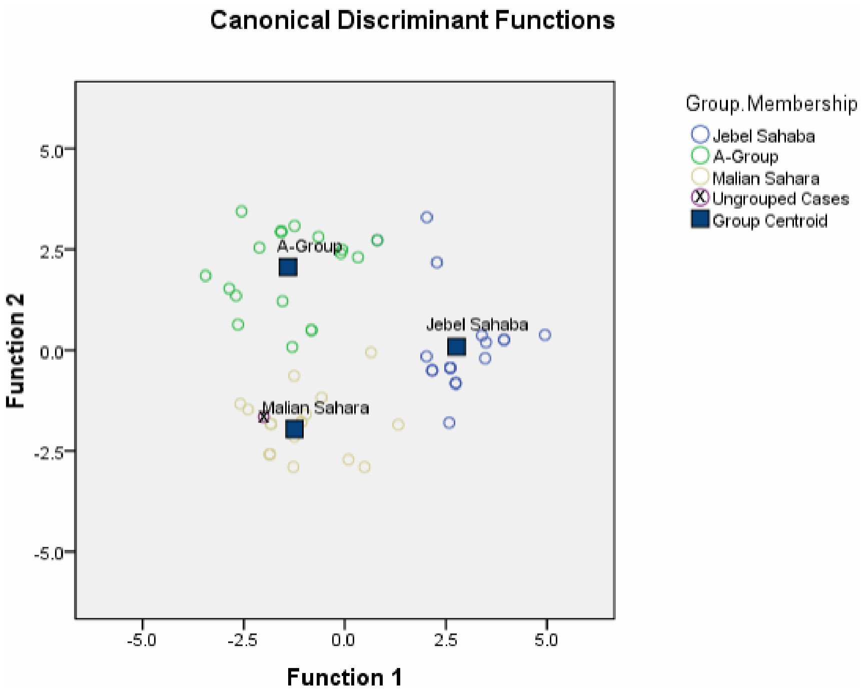
7.C.I.1. Individual:	*Abu Tabari 02/1-8*
7.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
7.C.I.3. Data:	*Non-metric cranial and dental traits*
7.C.I.4. Classification:	*Malian Sahara*

7.C.II. Analysis overview

7.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
7.C.II.2.a. Variables in matrix:	*25*
7.C.II.2.b. Variables entered:	*12*
7.C.II.3. Best predictors:	*Premolar lingual cusps LP2 (-.352), Cusp 7 LM1 (.277), Premolar root number UP1 (.266), Interruption groove (-.731 - Function 2)*
7.C.II.4.a. Wilks' Lambda:	*1 through 2: .054 (Sig. .000), 2: .259 (Sig. .000)*
7.C.II.4.b. Eigenvalues:	*1: 3.827 (r: .890), 2: 2.859 (r: .861)*
7.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
7.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

7.C.III. Results

7.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 95.4%, Malian Sahara (D^2: .673), A-Group (D^2: 14.139)*
7.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*83.1%*
7.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: .850), A-Group (D^2: 13.732)*
7.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (1 A-Group, 2 Jebel Sahaba/Tushka)*
7.C.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*
7.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.C.IV. Additional results

7.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 92.3%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
7.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 100.0%), variables entered (7)*
7.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 97.6%, 96.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (13)*
7.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 97.6%, 96.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (13)*

7.D.I. Summary

7.D.I.1. Individual:	*Abu Tabari 02/1-8*
7.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
7.D.I.3. Data:	*Dental measurements*
7.D.I.4. Classification:	*Southern Sudan*

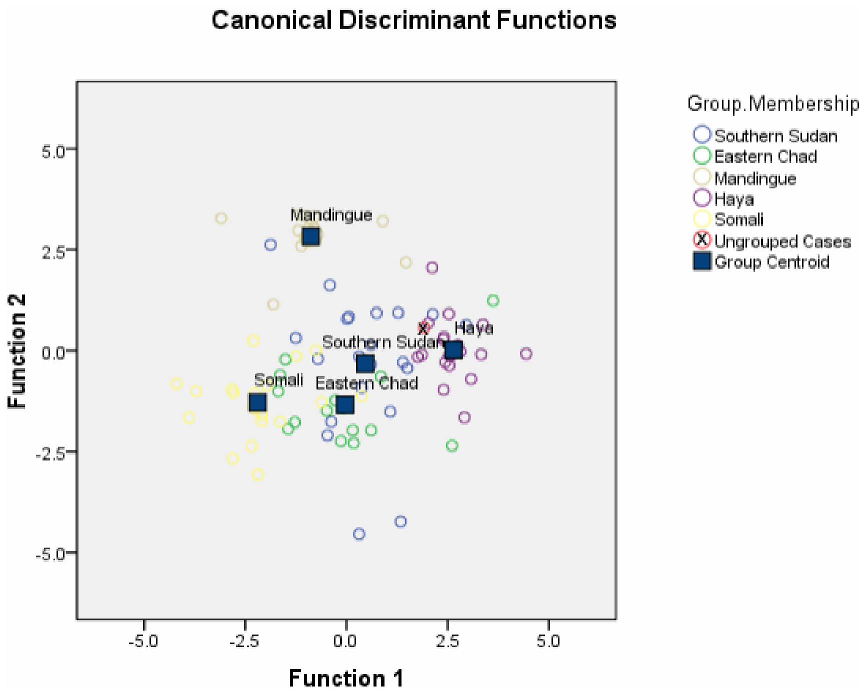
7.D.II. Analysis overview

7.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
7.D.II.2.a. Variables in matrix:	*16*
7.D.II.2.b. Variables entered:	*8*
7.D.II.3. Best predictors:	*81. Crown length LC (.820), 81(1). Crown width UC (-.445), 81(1). Crown width LC (.441), 81. Crown length UI2 (.772 - Function 2), 81. Crown length LM1 (.787 - Function 3), 81. Crown length LM1 (-.482 - Function 4)*
7.D.II.4.a. Wilks' Lambda:	*1 through 4: .055 (Sig. .000), 2 through 4: .194 (Sig. .000), 3 through 4: .667 (Sig. .000), 4: .906 (Sig. .078)*
7.D.II.4.b. Eigenvalues:	*1: 2.514 (r: .846), 2: 2.444 (r: .842), 3: .359 (r: .514), 4: .104 (r: .306)*
7.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*

7.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -29.646, Chad - -32.868, Mandinka - -71.456, Somalis - -31.781, Haya - -37.644), no outliers detected, no variables failed tolerance test*

7.D.III. Results

7.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 83.3%, Southern Sudan (D^2: 25.786), Chad (D^2: 34.499)*
7.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*74.1%*
7.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 88.9%, Southern Sudan (D^2: 12.735), Chad (D^2: 61.712)*
7.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (6 Chad, 2 Mandinka, 2 Somalis, 2 Haya), Chad (3 Southern Sudan, 4 Somalis, 1 Haya), Mandinka (1 Southern Sudan, 1 Somali), Somalis (4 Chad, 1 Mandinka), Haya (1 Southern Sudan)*
7.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (3 Chad, 1 Somali), Chad (3 Southern Sudan, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad)*
7.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.D.IV. Additional results

7.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 88.0%, 76.9%), separate-groups covariance matrix (Southern Sudan, 91.7%)*
7.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 82.4%, 78.7%), separate-groups covariance matrix (Southern Sudan, 88.0%), variables entered (8)*
7.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 100.0%, 98.1%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (33)*

7.E.I. Summary

7.E.I.1. Individual:	*Abu Tabari 02/1-8*
7.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
7.E.I.3. Data:	*Scaled dental measurements*
7.E.I.4. Classification:	*Southern Sudan*

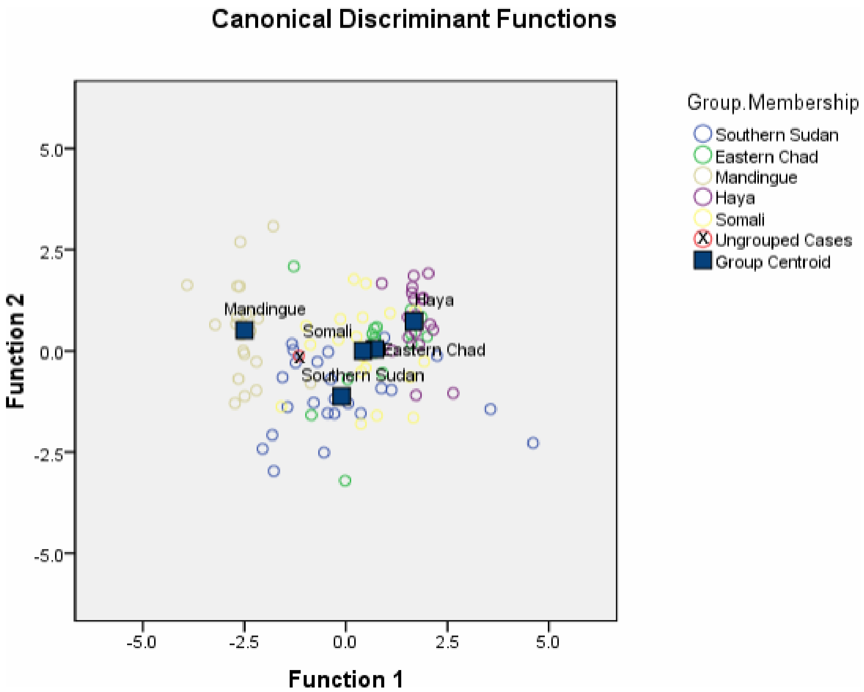
7.E.II. Analysis overview

7.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
7.E.II.2.a. Variables in matrix:	*8*
7.E.II.2.b. Variables entered:	*6*
7.E.II.3. Best predictors:	*81. Crown length UI2 (.740), 81(1). Crown width UC (.314), 81(1). Crown width UM1 (.129), 81. Crown length (.777 - Function 2), 81(1). Crown width UM3 (.625 - Function 3), 81(1). Crown width UM1 (-.744 - Function 4)*
7.E.II.4.a. Wilks' Lambda:	*1 through 4: .164 (Sig. .000), 2 through 4: .494 (Sig. .000), 3 through 4: .718 (Sig. .000), 4: .900 (Sig. .014)*

7.E.II.4.b. Eigenvalues:	*1: 2.021 (r: .818), 2: .453 (r: .558), 3: .254 (r: .450), 4: .111 (r: .316)*
7.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
7.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -37.074, Chad - -42.258, Mandinka - -70.901, Somalis - -38.967, Haya - -42.049), no outliers detected, no variables failed tolerance test*

7.E.III. Results

7.E.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 72.2%, Southern Sudan (D^2: 2.670), Mandinka (D^2: 2.725)*
7.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*65.7%*
7.E.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 77.8%, Southern Sudan (D^2: 2.163), Mandinka (D^2: 6.662)*
7.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 3 Mandinka, 2 Somalis, 2 Haya), Chad (3 Southern Sudan, 1 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan), Somalis (4 Southern Sudan, 3 Chad, 1 Mandinka, 4 Haya), Haya (1 Southern Sudan, 3 Chad, 2 Somalis)*
7.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 1 Mandinka, 3 Somalis, 1 Haya), Chad (1 Southern Sudan, 3 Somalis, 3 Haya), Mandinka (1 Southern Sudan), Somalis (4 Southern Sudan, 3 Chad, 1 Haya), Haya (1 Chad, 1 Somali)*
7.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.E.IV. Additional results

7.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 71.3%, 63.0%), separate-groups covariance matrix (Southern Sudan, 75.9%)*
7.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 69.4%, 67.6%), separate-groups covariance matrix (Southern Sudan, 78.7%), variables entered (5)*
7.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Mandinka, 99.1%, 91.7%; separate-groups covariance matrix - Chad, 98.1%), variables entered (26)*

7.F.I. Summary

7.F.I.1. Individual:	*Abu Tabari 02/1-8*
7.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
7.F.I.3. Data:	*Non-metric cranial and dental traits*
7.F.I.4. Classification:	*Southern Sudan*

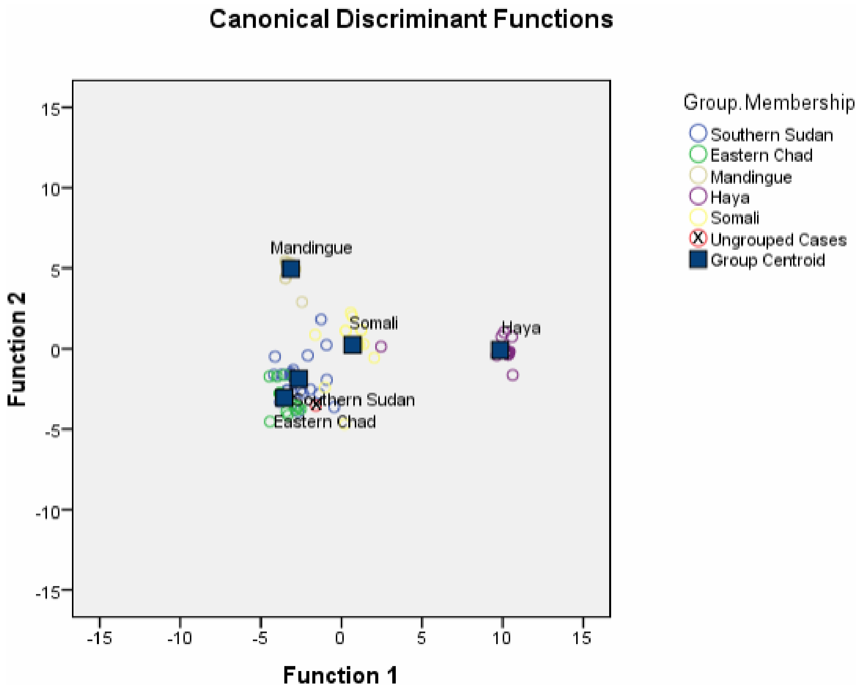
7.F.II. Analysis overview

7.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
7.F.II.2.a. Variables in matrix:	*28*
7.F.II.2.b. Variables entered:	*13*
7.F.II.3. Best predictors:	*Midline diastema (.747), Premolar mesial and distal accessory cusps UP1 (.416), Tuberculum dentale UI2*

	(.276), Tuberculum dentale UI2 (.690 - Function 2), Premolar mesial and distal accessory cusps UP1 (.574 - Function 3), Canine mesial ridge (.587 - Function 4)
7.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .005 (Sig. .000), 3 through 4: .044 (Sig. .000), 4: .279 (Sig. .000)*
7.F.II.4.b. Eigenvalues:	*1: 25.312 (r: .981), 2: 8.074 (r: .943), 3: 5.362 (r: .918), 4: 2.583 (r: .849)*
7.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
7.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

7.F.III. Results

7.F.III.1.a. Within-groups covariance matrix:	*Chad, 95.4%, Chad (D^2: .894), Southern Sudan (D^2: 19.977)*
7.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
7.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 97.2%, Southern Sudan (D^2: 10.066), Somalis (D^2: 17.379)*
7.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 1 Mandinka, 3 Somalis), Chad (1 Southern Sudan), Somalis (3 Southern Sudan), Haya (1 Somali)*
7.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Chad (2 Southern Sudan)*
7.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



7.F.IV. Additional results

7.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 95.4%, 89.8%), separate-groups covariance matrix (Southern Sudan, 97.2%)*
7.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 97.2%, 88.9%), separate-groups covariance matrix (Somalis, 97.2%), variables entered (12)*
7.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 97.2%, 90.7%; separate-groups covariance matrix - Southern Sudan, 98.1%), variables entered (18)*

8. Abu Tabari 02/28-2

8.A.I. Summary

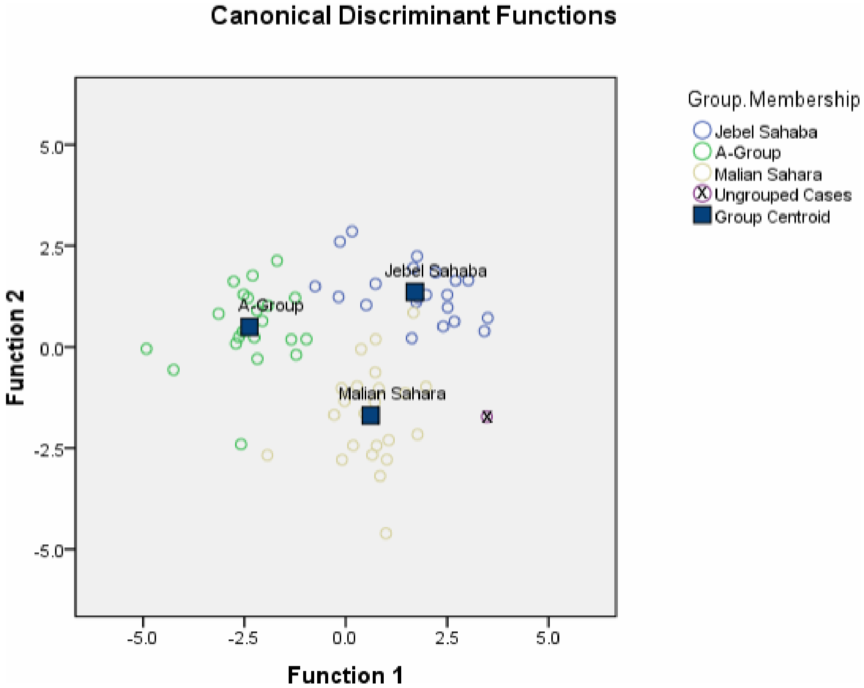
8.A.I.1. Individual:	*Abu Tabari 02/28-2*
8.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
8.A.I.3. Data:	*Dental measurements*
8.A.I.4. Classification:	*Malian Sahara*

8.A.II. Analysis overview

8.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
8.A.II.2.a. Variables in matrix:	*16*
8.A.II.2.b. Variables entered:	*14*

8.A.II.3. Best predictors: *81(1). Crown width LI2 (.769), 81(1). Crown width LI1 (.674), 81. Crown length LI1 (.636), 81. Crown length UI2 (.424 - Function 2)*
8.A.II.4.a. Wilks' Lambda: *1 through 2: .090 (Sig. .000), 2: .361 (Sig. .000)*
8.A.II.4.b. Eigenvalues: *1: 3.033 (r: .867), 2: 1.767 (r: .799)*
8.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
8.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -62.155, Jebel Sahaba/Tushka - -59.600, Malian Sahara - -60.959), no outliers detected, no variables failed tolerance test*

8.A.III. Results
8.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 95.4%, Malian Sahara (D^2: 8.027), Jebel Sahaba/Tushka (D^2: 12.615)*
8.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *81.5%*
8.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 96.9%, Malian Sahara (D^2: 12.664), Jebel Sahaba/Tushka (D^2: 20.155)*
8.A.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 1 Malian Sahara), Malian Sahara (2 A-Group, 4 Jebel Sahaba/Tushka)*
8.A.III.2.b. Misclassifications (separate-groups): *Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*
8.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



8.A.IV. Additional results
8.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 95.4%, 80.0%), separate-groups covariance matrix (Malian Sahara, 96.9%)*
8.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 83.1%, 81.5%), separate-groups covariance matrix (Malian Sahara, 84.6%), variables entered (4)*
8.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 94.0%, 89.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 92.8%), variables entered (10)*
8.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%, 92.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (14)*

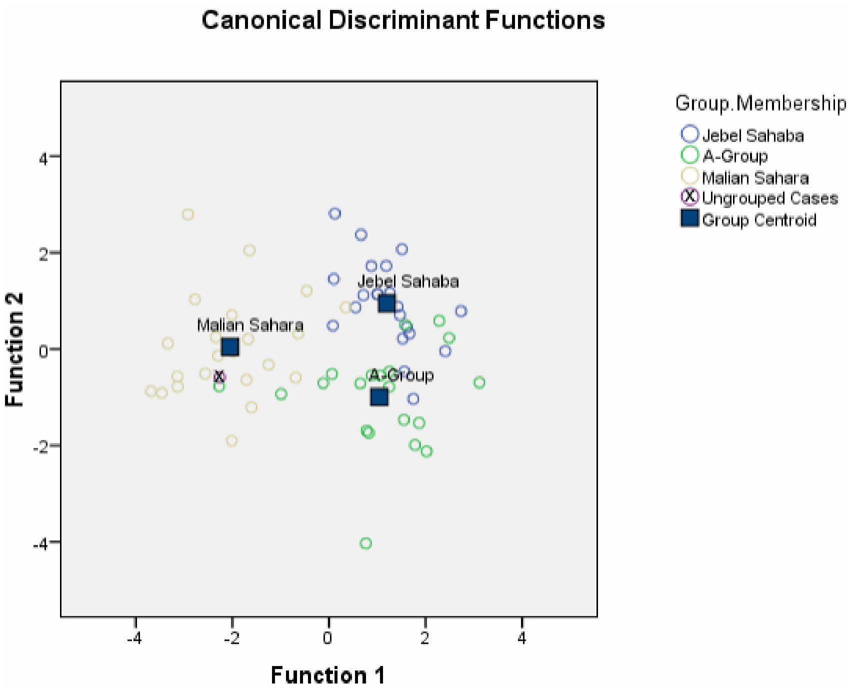
8.B.I. Summary
8.B.I.1. Individual: *Abu Tabari 02/28-2*
8.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
8.B.I.3. Data: *Scaled dental measurements*
8.B.I.4. Classification: *Malian Sahara*

8.B.II. Analysis overview
8.B.II.1. Method: *Mahalanobis distance simultaneous entry*

8.B.II.2.a. Variables in matrix:	*10*
8.B.II.2.b. Variables entered:	*7*
8.B.II.3. Best predictors:	*81(1). Crown width LI1 (.567), 81(1). Crown width UM1 (.489), 81(1). Crown width LI2 (.431), 81(1), Crown width LI2 (.560 - Function 2)*
8.B.II.4.a. Wilks' Lambda:	*1 through 2: .179 (Sig. .000), 2: .609 (Sig. .000)*
8.B.II.4.b. Eigenvalues:	*1: 2.412 (r: .841), 2: .641 (r: .625)*
8.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
8.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -52.857, Jebel Sahaba/Tushka - -52.347, Malian Sahara - -48.738), no outliers detected, no variables failed tolerance test*

8.B.III. Results

8.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 86.2%, Malian Sahara (D^2: .446), A-Group (D^2: 11.101)*
8.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*83.1%*
8.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 86.2%, Malian Sahara (D^2: .365), A-Group (D^2: 8.084)*
8.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group), Malian Sahara (3 Jebel Sahaba/Tushka)*
8.B.III.2.b. Misclassifications (separate-groups):	*A-Group (3 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*
8.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



8.B.IV. Additional results

8.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 84.6%, 81.5%), separate-groups covariance matrix (Malian Sahara, 89.2%)*
8.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 86.2%, 83.1%), separate-groups covariance matrix (Malian Sahara, 86.2%), variables entered (7)*
8.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 89.2%, 78.3%; separate-groups covariance matrix - Malian Sahara, 88.0%), variables entered (7)*
8.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 94.0; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (21)*

8.C.I. Summary

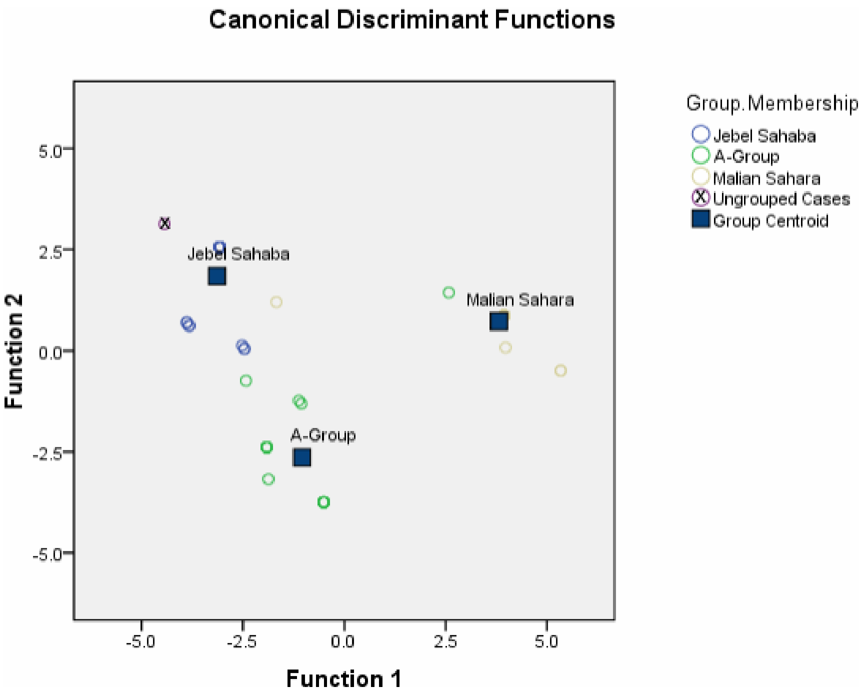
8.C.I.1. Individual:	*Abu Tabari 02/28-2*
8.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
8.C.I.3. Data:	*Non-metric cranial and dental traits*
8.C.I.4. Classification:	*Jebel Sahaba/Tushka*

8.C.II. Analysis overview

8.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
8.C.II.2.a. Variables in matrix:	*41*
8.C.II.2.b. Variables entered:	*5*
8.C.II.3. Best predictors:	*Tuberculum dentale UI2 (.837), Shovel UI1 (.201), Interruption groove (.173), Shovel UI1 (.652 - Function 2)*
8.C.II.4.a. Wilks' Lambda:	*1 through 2: .021 (Sig. .000), 2: .212 (Sig. .000)*
8.C.II.4.b. Eigenvalues:	*1: 9.108 (r: .949), 2: 3.712 (r: .888)*
8.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
8.C.II.6. Remarks:	*Box's M (test not possible: A-Group - -12.745, Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected (except ungrouped case - D^2: 11.916; critical value: 11.070 - p 0.95, df 5), no variables failed tolerance test*

8.C.III. Results

8.C.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 3.349), A-Group (D^2: 44.897)*
8.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.4%*
8.C.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 11.916), A-Group (D^2: 34.984)*
8.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
8.C.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara), Malian Sahara (1 A-Group)*
8.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



8.C.IV. Additional results

8.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 83.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%)*
8.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 96.9%, 95.4%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 96.9%), variables entered (5)*
8.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 97.6%, 92.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (14)*
8.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 98.8%, 96.4%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), variables entered (19)*

8.D.I. Summary

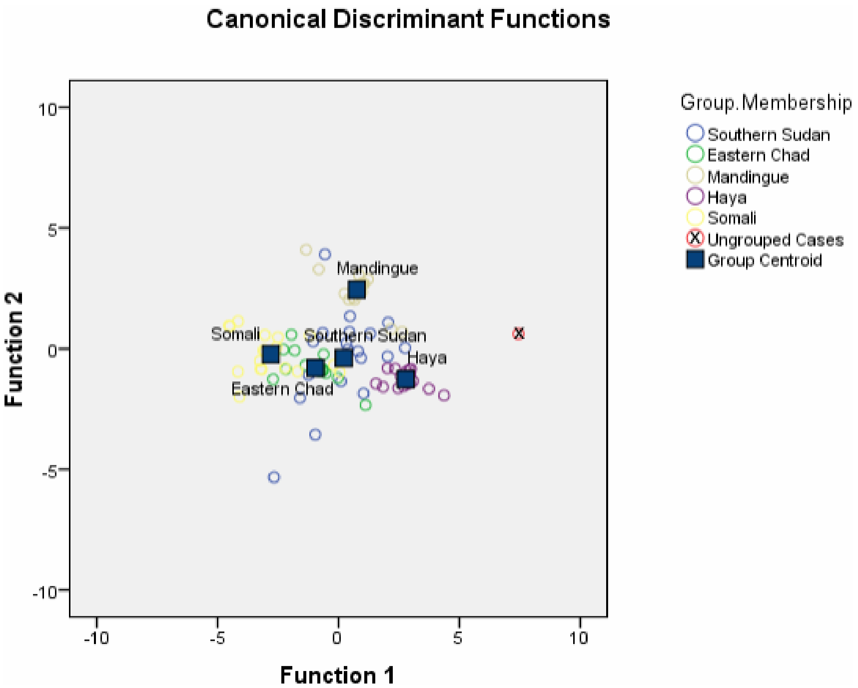
8.D.I.1. Individual:	*Abu Tabari 02/28-2*
8.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
8.D.I.3. Data:	*Dental measurements*
8.D.I.4. Classification:	*Southern Sudan*

8.D.II. Analysis overview

8.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
8.D.II.2.a. Variables in matrix:	*12*
8.D.II.2.b. Variables entered:	*6*
8.D.II.3. Best predictors:	*81(1). Crown width UI2 (.717), 81. Crown length LC (.616), 81. Crown length UI2 (.388), 81. Crown length UI2 (.828 - Function 2), 81. Crown length LM1 (.718 - Function 3), 81. Crown length LC (.546 - Function 4)*
8.D.II.4.a. Wilks' Lambda:	*1 through 4: .047 (Sig. .000), 2 through 4: .206 (Sig. .000), 3 through 4: .575 (Sig. .000), 4: .840 (Sig. .001)*
8.D.II.4.b. Eigenvalues:	*1: 3.352 (r: .878), 2: 1.788 (r: .801), 3: .460 (r: .561), 4: .190 (r: .400)*
8.D.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.2%)*
8.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -13.488, Chad - -15.127, Mandinka - -49.382, Somalis - -14.428, Haya - -18.739), removed outliers: Chad 17.585 (D^2: 14.044; critical value: 12.592 - p 0.95, df 6), Chad 18.835 (D^2: 13.165; critical value: 12.592 - p 0.95, df 6), Haya Af.23.019 (D^2: 13.553; critical value: 12.592 - p 0.95, df 6), no variables failed tolerance test*

8.D.III. Results

8.D.III.1.a. Within-groups covariance matrix:	*Haya, 83.3%, Haya (D^2: 24.166), Southern Sudan (D^2: 41.902)*
8.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*80.6%*
8.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 94.3%, Southern Sudan (D^2: 42.848), Somalis (D^2: 153.322)*
8.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 2 Somalis, 2 Haya), Chad (3 Southern Sudan, 3 Somalis, 1 Haya), Mandinka (2 Southern Sudan), Somalis (3 Chad, 1 Haya), Haya (1 Southern Sudan)*
8.D.III.2.b. Misclassifications (separate-groups):	*Chad (1 Southern Sudan, 2 Somalis), Somalis (1 Southern Sudan, 2 Chad)*
8.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



8.D.IV. Additional results

8.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 83.3%, 74.1%), separate-groups covariance matrix (Southern Sudan, 88.0%)*
8.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 83.3%, 80.6%), separate-groups covariance matrix (Southern Sudan, 89.8%), variables entered (6)*
8.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 97.2%, 90.7%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (17)*

8.E.I. Summary

8.E.I.1. Individual: *Abu Tabari 02/28-2*

8.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

8.E.I.3. Data: *Scaled cranial and dental measurements*

8.E.I.4. Classification: *Chad*

8.E.II. Analysis overview

8.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

8.E.II.2.a. Variables in matrix: *18*

8.E.II.2.b. Variables entered: *16*

8.E.II.3. Best predictors: *81. Crown length UI2 (.813), 48(1). Nasospinale-Prosthion height (.289), 69. Height of the mandibular symphysis (-.253), 81. Crown length (.664 - Function 2), 19a. Mastoid height (.455 - Function 3), 69c. Thickness of the mandibular symphysis (-.542 - Function 4)*

8.E.II.4.a. Wilks' Lambda: *1 through 4: .094 (Sig. .000), 2 through 4: .255 (Sig. .000), 3 through 4: .461 (Sig. .000), 4: .725 (Sig. .003)*

8.E.II.4.b. Eigenvalues: *1: 1.720 (r: .795), 2: .808 (r: .669), 3: .573 (r: .603), 4: .379 (r: .524)*

8.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

8.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -73.438, Chad - -76.695, Mandinka - -104.280, Somalis - -74.419, Haya - -75.520), no outliers detected, no variables failed tolerance test*

8.E.III. Results

8.E.III.1.a. Within-groups covariance matrix: *Chad, 80.6%, Chad (D^2: 3.914), Mandinka (D^2: 7.380)*

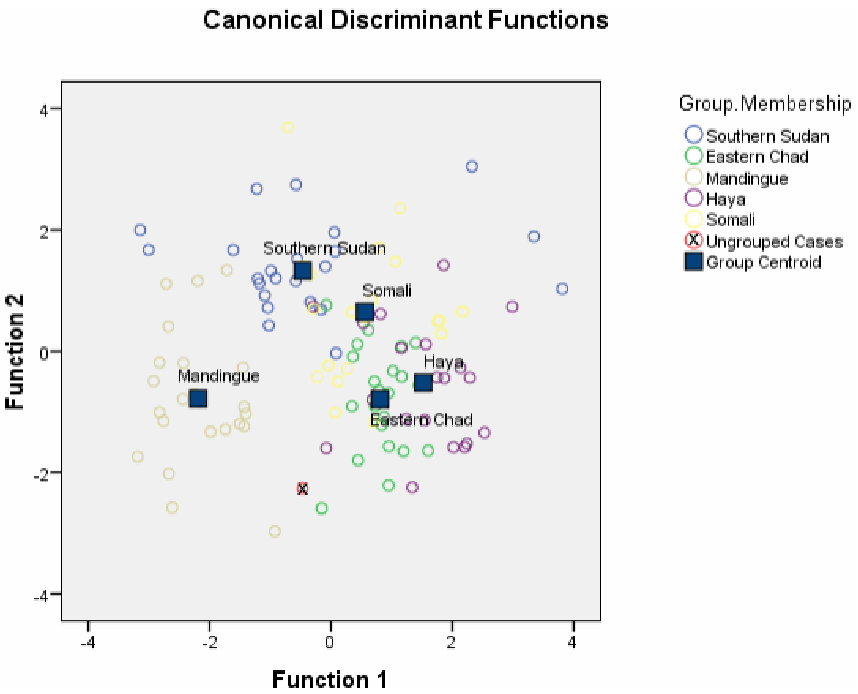
8.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.2%*

8.E.III.1.c. Separate-groups covariance matrix: *Chad, 85.2%, Chad (D^2: 12.297), Mandinka (D^2: 12.333)*

8.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 4 Mandinka, 4 Somalis, 1 Haya), Chad (3 Southern Sudan, 2 Somalis, 4 Haya), Mandinka (3 Southern Sudan, 2 Chad), Somalis (2 Southern Sudan, 2 Chad, 1 Mandinka, 3 Haya), Haya (1 Southern Sudan, 5 Chad, 4 Somalis)*

8.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka, 2 Somalis), Chad (1 Southern Sudan, 1 Somali, 1 Haya), Mandinka (2 Southern Sudan), Somalis (1 Southern Sudan, 2 Haya), Haya (1 Southern Sudan, 1 Chad, 2 Somalis)*

8.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



8.E.IV. Additional results

8.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 86.1%, 60.2%), separate-groups covariance matrix (Chad, 91.7%)*

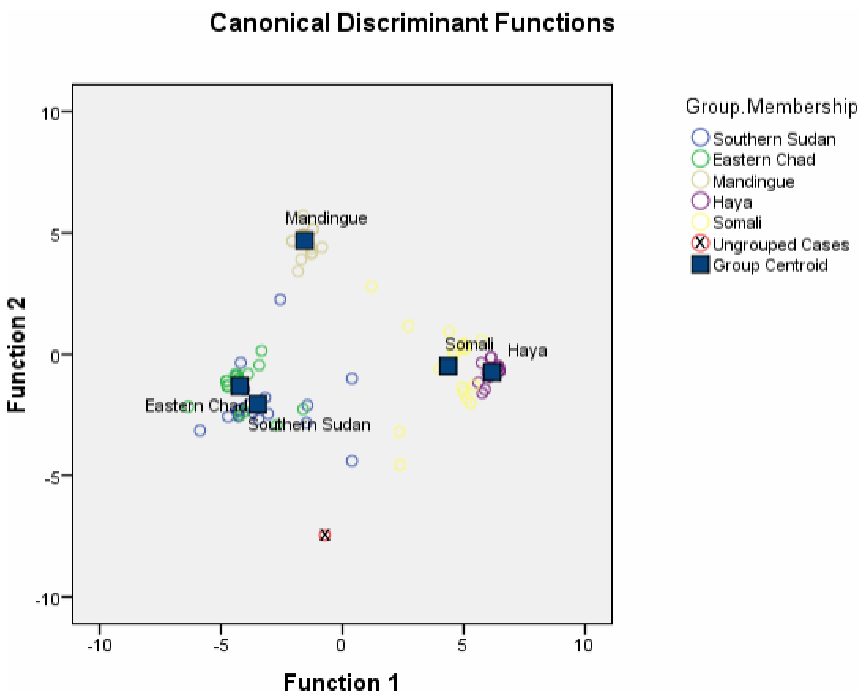
8.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 80.6%, 70.4%), separate-groups covariance matrix (Somalis, 85.2%), variables entered (8)*

8.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 96.3%, 88.0%; separate-groups covariance matrix - Southern Sudan, 97.2%), variables entered (17)*

8.F.I. Summary
8.F.I.1. Individual: *Abu Tabari 02/28-2*
8.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
8.F.I.3. Data: *Non-metric cranial and dental traits*
8.F.I.4. Classification: *Southern Sudan*

8.F.II. Analysis overview
8.F.II.1. Method: *Mahalanobis distance, simultaneous entry*
8.F.II.2.a. Variables in matrix: *44*
8.F.II.2.b. Variables entered: *13*
8.F.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.559), Shovel UI1 (.431), Carabelli's trait UM1 (.213), Tuberculum dentale UI2 (.628 - Function 2), Interruption groove UI2 (-.593 - Function 3), Deflecting wrinkle LM1 (.432 - Function 4)*
8.F.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .019 (Sig. .000), 3 through 4: .140 (Sig. .000), 4: .538 (Sig. .000)*
8.F.II.4.b. Eigenvalues: *1: 18.271 (r: .974), 2: 6.189 (r: .928), 3: 2.857 (r: .861), 4: .858 (r: .680)*
8.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
8.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - -35.118, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected (except ungrouped case - D^2: 34.689; critical value: 22.362 - p 0.95, df 13), no variables failed tolerance test*

8.F.III. Results
8.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 92.6%, Southern Sudan (D^2: 41.476), Chad (D^2: 62.450)*
8.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *87.0%*
8.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 95.4%, Southern Sudan (D^2: 34.689), Somalis (D^2: 43.862)*
8.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (4 Chad, 1 Mandinka, 2 Somalis), Chad (4 Southern Sudan), Somalis (1 Mandinka, 2 Haya)*
8.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad), Chad (3 Southern Sudan)*
8.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*

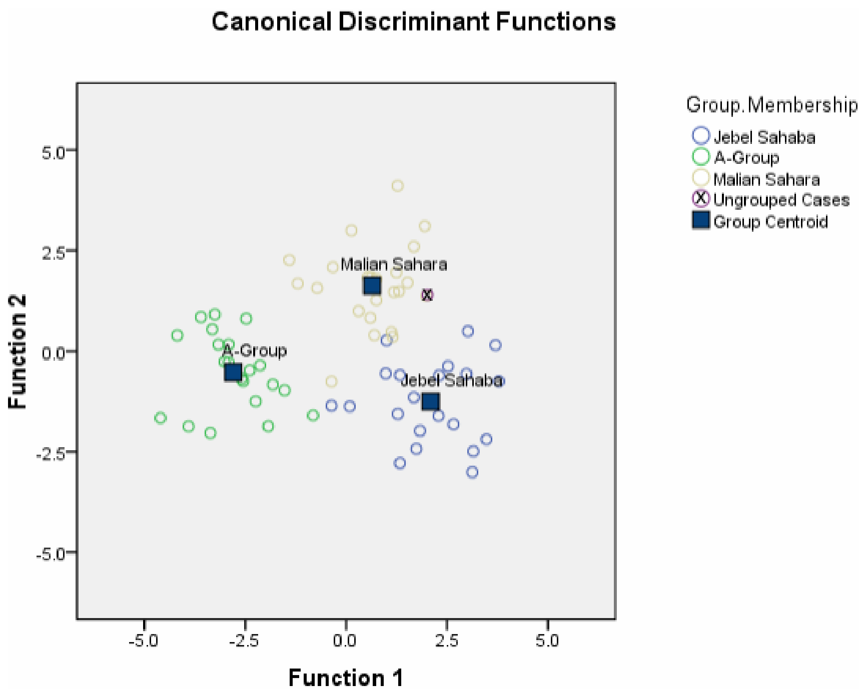


8.F.IV. Additional results
8.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 99.1%, 87.0%), separate-groups covariance matrix (Southern Sudan, 100.0%)*

8.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 93.5%, 88.9%), separate-groups covariance matrix (Southern Sudan, 94.4%), variables entered (13)*
8.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 95.4%, 90.7%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (16)*

9. Abu Tabari 02/28-3

9.A.I. Summary	
9.A.I.1. Individual:	*Abu Tabari 02/28-3*
9.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
9.A.I.3. Data:	*Cranial and dental measurements*
9.A.I.4. Classification:	*Malian Sahara*
9.A.II. Analysis overview	
9.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
9.A.II.2.a. Variables in matrix:	*24*
9.A.II.2.b. Variables entered:	*8*
9.A.II.3. Best predictors:	*81(1). Crown width LI2 (.650), 81. Crown length LI1 (.533), 81(1). Crown width UI2 (.508), 81. Crown length UI2 (-.456 - Function 2)*
9.A.II.4.a. Wilks' Lambda:	*1 through 2: .073 (Sig. .000), 2: .384 (Sig. .000)*
9.A.II.4.b. Eigenvalues:	*1: 4.282 (r: .900), 2: 1.607 (r: .785)*
9.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
9.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -25.834, Jebel Sahaba/Tushka - -20.851, Malian Sahara - -22.937), no outliers detected, no variables failed tolerance test*
9.A.III. Results	
9.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: 1.935), Jebel Sahaba/Tushka (D^2: 7.036)*
9.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.8%*
9.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: 2.357), Jebel Sahaba/Tushka (D^2: 6.879)*
9.A.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (1 A-Group, 2 Jebel Sahaba/Tushka)*
9.A.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
9.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



9.A.IV. Additional results	
9.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 83.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%)*

9.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 90.8%), separate-groups covariance matrix (Malian Sahara, 96.9%), variables entered (8)*
9.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%, 92.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (13)*
9.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%, 96.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (18)*

9.B.I. Summary

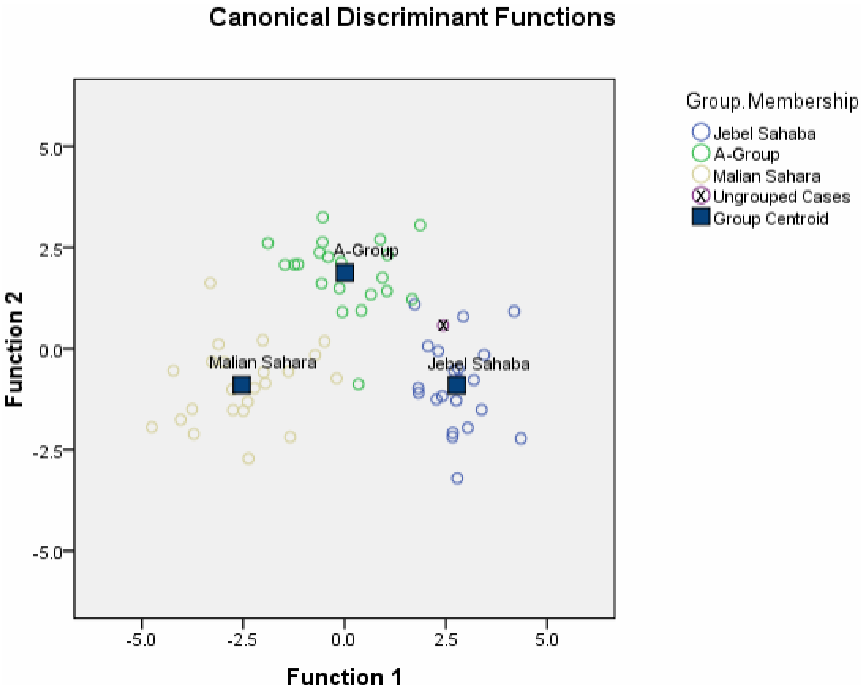
9.B.I.1. Individual:	*Abu Tabari 02/28-3*
9.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
9.B.I.3. Data:	*Scaled cranial and dental measurements*
9.B.I.4. Classification:	*Jebel Sahaba/Tushka*

9.B.II. Analysis overview

9.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
9.B.II.2.a. Variables in matrix:	*18*
9.B.II.2.b. Variables entered:	*15*
9.B.II.3. Best predictors:	*81(1). Crown width LI1 (.373), 81(1). Crown width LI2 (.559), 69(1). 81a. Minimum ramus width (.208), 81a. Minimum ramus width (-.399 - Function 2)*
9.B.II.4.a. Wilks' Lambda:	*1 through 2: .061 (Sig. .000), 2: .362 (Sig. .000)*
9.B.II.4.b. Eigenvalues:	*1: 4.981 (r: .913), 2: 1.762 (r: .799)*
9.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
9.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -109.313, Jebel Sahaba/Tushka - -107.969, Malian Sahara - -106.992), no outliers detected, no variables failed tolerance test*

9.B.III. Results

9.B.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 2.295), A-Group (D^2: 7.566)*
9.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*87.7%*
9.B.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 1.886), A-Group (D^2: 6.631)*
9.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 A-Group)*
9.B.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group)*
9.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



9.B.IV. Additional results

9.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%, 89.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%)*

9.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 95.4%, 90.8%), separate-groups covariance matrix (A-Group, 96.9%), variables entered (8)*

9.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%, 88.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (12)*

9.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 98.8%, 97.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (14)*

9.C.I. Summary

9.C.I.1. Individual: *Abu Tabari 02/28-3*

9.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

9.C.I.3. Data: *Non-metric cranial and dental traits*

9.C.I.4. Classification: *Malian Sahara*

9.C.II. Analysis overview

9.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

9.C.II.2.a. Variables in matrix: *23*

9.C.II.2.b. Variables entered: *14*

9.C.II.3. Best predictors: *Tuberculum dentale (.833), Shovel UI1 (.329), Interruption groove UI2 (.300), Shovel UI1 (.466 - Function 2)*

9.C.II.4.a. Wilks' Lambda: *1 through 2: .018 (Sig. .000), 2: .195 (Sig. .000)*

9.C.II.4.b. Eigenvalues: *1: 9.633 (r: .952), 2: 4.137 (r: .897)*

9.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

9.C.II.6. Remarks: *Box's M (test not possible: A-Group - -35.227, Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

9.C.III. Results

9.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 95.4%, Malian Sahara (D^2: .067), Jebel Sahaba/Tushka (D^2: 46.712)*

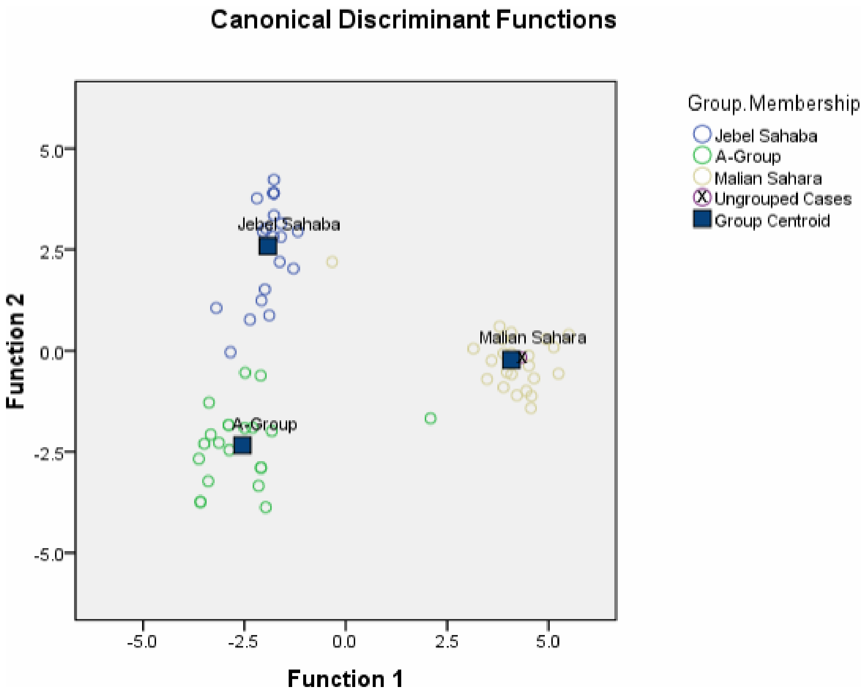
9.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *90.8%*

9.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .117), A-Group (D^2: 32.677)*

9.C.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*

9.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*

9.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*

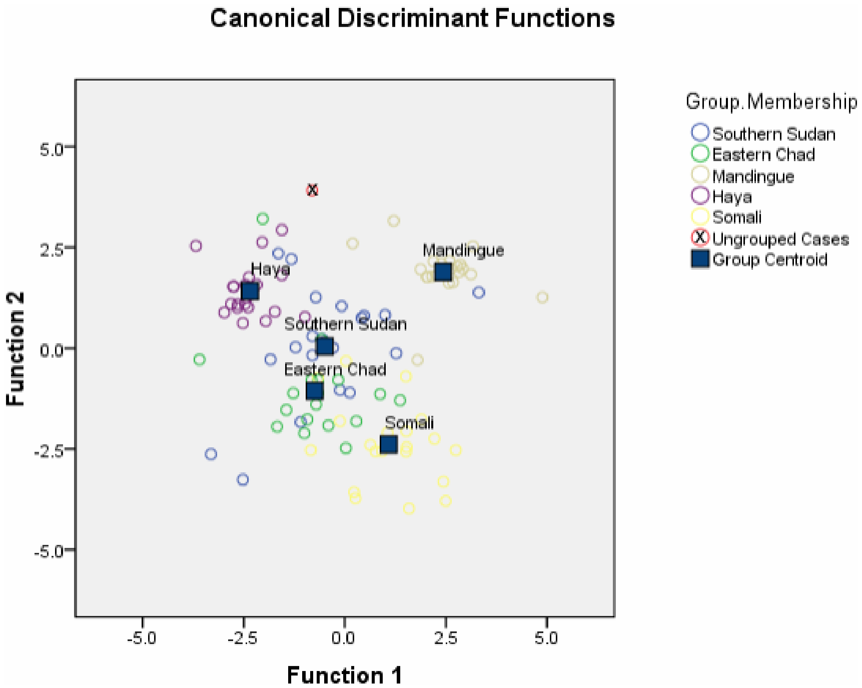


9.C.IV. Additional results	
9.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 89.2%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
9.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 96.9%), variables entered (7)*
9.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 96.4%, 91.6%; separate-groups covariance matrix - Malian Sahara, 97.6%), variables entered (11)*
9.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 94.0%; separate-groups covariance matrix - Malian Sahara, 97.6%), variables entered (9)*

9.D.I. Summary	
9.D.I.1. Individual:	*Abu Tabari 02/28-3*
9.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
9.D.I.3. Data:	*Cranial and dental measurements*
9.D.I.4. Classification:	*Chad*

9.D.II. Analysis overview	
9.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
9.D.II.2.a. Variables in matrix:	*13*
9.D.II.2.b. Variables entered:	*9*
9.D.II.3. Best predictors:	*81. Crown length LC (.659), 81. Crown length UI2 (.363), 81(1). Crown width UC (.360), 81. Crown length UI2 (.669 - Function 2), 81. Crown length LM1 (.651 - Function 3), 54. Nasal breadth (.634 - Function 4)*
9.D.II.4.a. Wilks' Lambda:	*1 through 4: .037 (Sig. .000), 2 through 4: .140 (Sig. .000), 3 through 4: .489 (Sig. .000), 4: .776 (Sig. .000)*
9.D.II.4.b. Eigenvalues:	*1: 2.740 (r: .856), 2: 2.499 (r: .845), 3: .588 (r: .609), 4: .289 (r: .473)*
9.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
9.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -22.512, Chad - -25.220, Mandinka - -63.105, Somalis - -24.507, Haya - -29.158), no outliers detected (except ungrouped case - D^2: 22.152; critical value: 16.919 - p 0.95, df 9), no variables failed tolerance test*

9.D.III. Results	
9.D.III.1.a. Within-groups covariance matrix:	*Haya, 87.0%, Haya (D^2: 11.645), Mandinka (D^2: 17.986)*
9.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*78.7%*
9.D.III.1.c. Separate-groups covariance matrix:	*Chad, 89.8%, Chad (D^2: 22.152), Haya (D^2: 26.717)*
9.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Chad, 2 Mandinka, 3 Haya), Chad (2 Southern Sudan, 2 Somalis, 1 Haya), Mandinka (1 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 4 Chad), Haya (2 Southern Sudan)*
9.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad), Chad (2 Southern Sudan, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan, 1 Chad), Somalis (1 Southern Sudan, 2 Chad)*
9.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



9.D.IV. Additional results

9.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 88.0%, 75.9%), separate-groups covariance matrix (Haya, 88.9%)*

9.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 87.0%, 78.7%), separate-groups covariance matrix (Chad, 89.8%), variables entered (9)*

9.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 99.1%, 88.0%; separate-groups covariance matrix - Southern Sudan, 99.1%), variables entered (24)*

9.E.I. Summary

9.E.I.1. Individual: *Abu Tabari 02/28-3*

9.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

9.E.I.3. Data: *Scaled cranial and dental measurements*

9.E.I.4. Classification: *Chad*

9.E.II. Analysis overview

9.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

9.E.II.2.a. Variables in matrix: *8*

9.E.II.2.b. Variables entered: *7*

9.E.II.3. Best predictors: *81. Crown length UI2 (.704), 81(1). Crown width UC (.291), 54. Nasal breadth (-.096), 81. Crown length LM1 (.775 - Function 2), 81(1). Crown width UC (.461 - Function 3), 54. Nasal breadth (-.872 - Function 4)*

9.E.II.4.a. Wilks' Lambda: *1 through 4: .157 (Sig. .000), 2 through 4: .511 (Sig. .000), 3 through 4: .794 (Sig. .010), 4: .941 (Sig. .185)*

9.E.II.4.b. Eigenvalues: *1: 2.258 (r: .832), 2: .553 (r: .597), 3: .185 (r: .395), 4: .063 (r: .244)*

9.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

9.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -36.771, Chad - -40.583, Mandinka - -70.537, Somalis - -38.412, Haya - -41.637), no outliers detected, no variables failed tolerance test*

9.E.III. Results

9.E.III.1.a. Within-groups covariance matrix: *Chad, 71.3%, Chad (D^2: 4.396), Somalis (D^2: 6.011)*

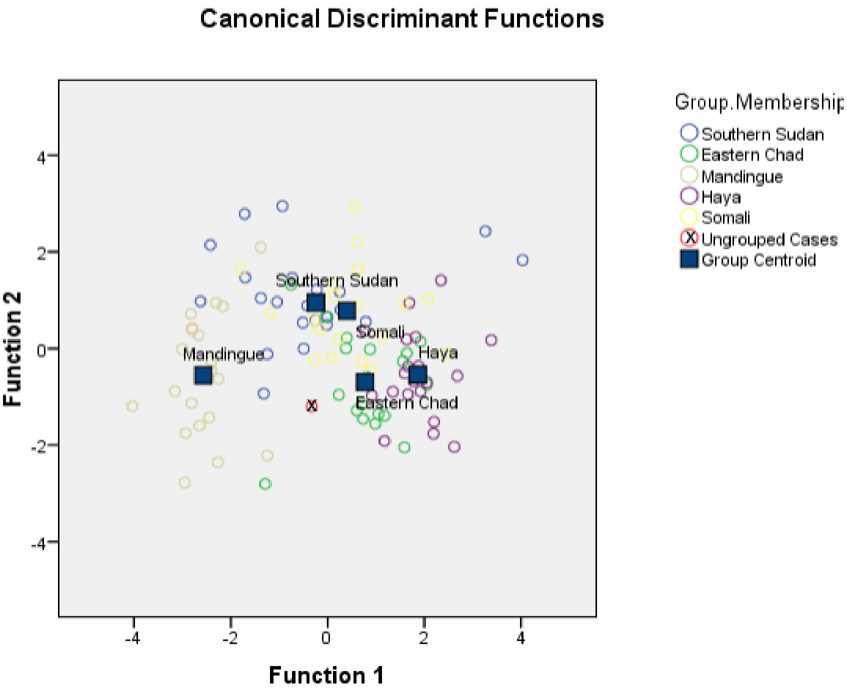
9.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *66.7%*

9.E.III.1.c. Separate-groups covariance matrix: *Chad, 77.8%, Chad (D^2: 6.990), Southern Sudan (D^2: 8.132)*

9.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 4 Mandinka, 3 Somalis, 3 Haya), Chad (2 Southern Sudan, 1 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan), Somalis (6 Southern Sudan, 2 Chad, 2 Haya), Haya (1 Southern Sudan, 5 Chad)*

9.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka, 6 Somalis, 1 Haya), Chad (2 Somalis, 4 Haya), Mandinka (1 Southern Sudan), Somalis (3 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Chad)*

9.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



9.E.IV. Additional results

9.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 71.3%, 63.0%), separate-groups covariance matrix (Chad, 75.9%)*

9.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 65.7%, 62.0%), separate-groups covariance matrix (Southern Sudan, 80.6%), variables entered (5)*

9.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 99.1%, 84.3%; separate-groups covariance matrix - Somalis, 99.1%), variables entered (24)*

9.F.I. Summary

9.F.I.1. Individual: *Abu Tabari 02/28-3*

9.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

9.F.I.3. Data: *Non-metric cranial and dental traits*

9.F.I.4. Classification: *Mandinka*

9.F.II. Analysis overview

9.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

9.F.II.2.a. Variables in matrix: *23*

9.F.II.2.b. Variables entered: *12*

9.F.II.3. Best predictors: *Tuberculum dentale (.691), Shovel UI1 (-.472), Cusp number LM2 (.254), Shovel UI1 (.515 - Function 2), Interruption groove UI2 (-.623 - Function 3), Sella nasi (main) (-.376 - Function 4)*

9.F.II.4.a. Wilks' Lambda: *1 through 4: .002 (Sig. .000), 2 through 4: .028 (Sig. .000), 3 through 4: .140 (Sig. .000), 4: .506 (Sig. .000)*

9.F.II.4.b. Eigenvalues: *1: 11.408 (r: .959), 2: 4.096 (r: .879), 3: 2.611 (r: .850), 4: .975 (r: .703)*

9.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

9.F.II.6. Remarks: *Box's M (test result not accepted; Sig. .318; Log determinants: Southern Sudan - -29.336, Chad - 'singular', Mandinka - 'singular', Somalis - -28.770, Haya - 'singular'), no outliers detected, no variables failed tolerance test*

9.F.III. Results

9.F.III.1.a. Within-groups covariance matrix: *Mandinka, 93.5%, Mandinka (D^2: 2.319), Somalis (D^2: 25.524)*

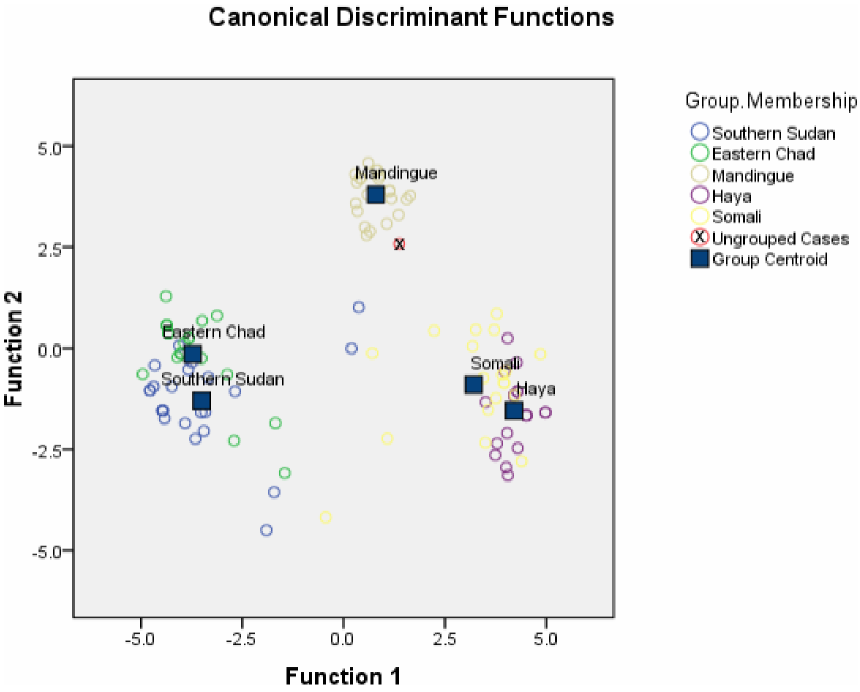
9.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *89.8%*

9.F.III.1.c. Separate-groups covariance matrix: *Mandinka, 94.4%, Mandinka (D^2: 7.431), Somalis (D^2: 18.315)*

9.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 1 Mandinka, 1 Somali), Chad (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Somali)*

9.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Chad), Chad (1 Southern Sudan), Somalis (1 Haya), Haya (1 Somali)*

9.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



9.F.IV. Additional results

9.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 97.2%, 88.0%), separate-groups covariance matrix (Mandinka, 99.1%)*

9.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 93.5%, 89.8%), separate-groups covariance matrix (Mandinka, 94.4%), variables entered (12)*

9.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 95.4%, 87.0%; separate-groups covariance matrix - Somalis, 96.3%), variables entered (12)*

10. Abu Tabari 02/28-4

no data

11. Abu Tabari 02/28-5

11.A.I. Summary

11.A.I.1. Individual: *Abu Tabari 02/28-5*

11.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

11.A.I.3. Data: *Cranial and dental measurements*

11.A.I.4. Classification: *Malian Sahara*

11.A.II. Analysis overview

11.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

11.A.II.2.a. Variables in matrix: *59*

11.A.II.2.b. Variables entered: *13*

11.A.II.3. Best predictors: *81(1). Crown width LM1 (.525), 81. Crown length LI1 (.415), 71a. Minimum ramus width (.402), 81. Crown length LI1 (-.365 - Function 2)*

11.A.II.4.a. Wilks' Lambda: *1 through 2:.042 (Sig. .000), 2: .252 (Sig. .000)*

11.A.II.4.b. Eigenvalues: *1: 4.942 (r: .912), 2: 2.970 (r: .865)*

11.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

11.A.II.6. Remarks: *Box's M (Sig. .006; Log determinants: A-Group - -22.246, Jebel Sahaba/Tushka - -19.797, Malian Sahara - -19.638), no outliers detected, no variables failed tolerance test*

11.A.III. Results

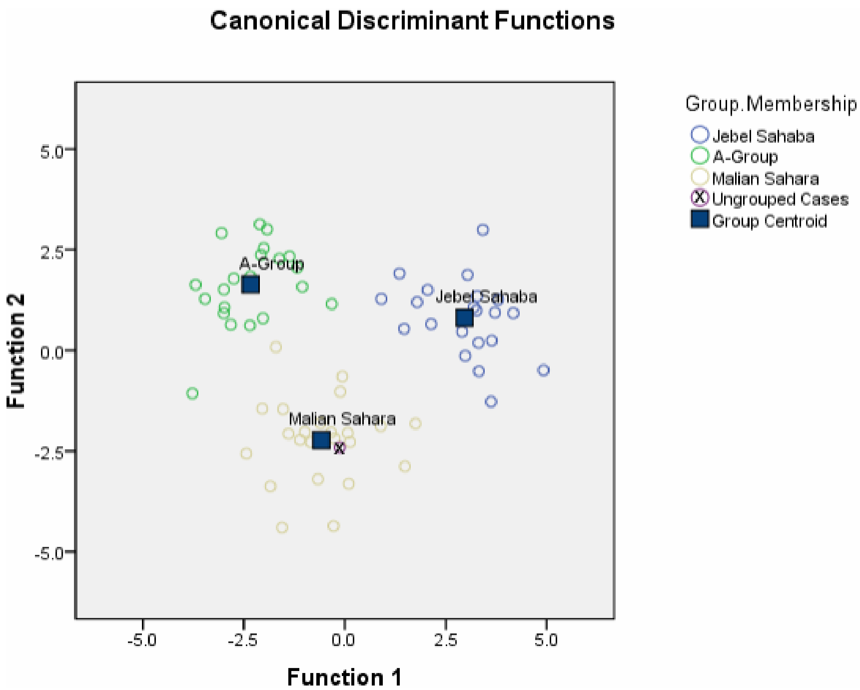
11.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: .243), Jebel Sahaba/Tushka (D^2: 19.898)*

11.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

11.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: .210), Jebel Sahaba/Tushka (D^2: 31.100)*

11.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

11.A.III.2.b. Misclassifications (separate-groups): *Malian Sahara (1 A-Group)*
11.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



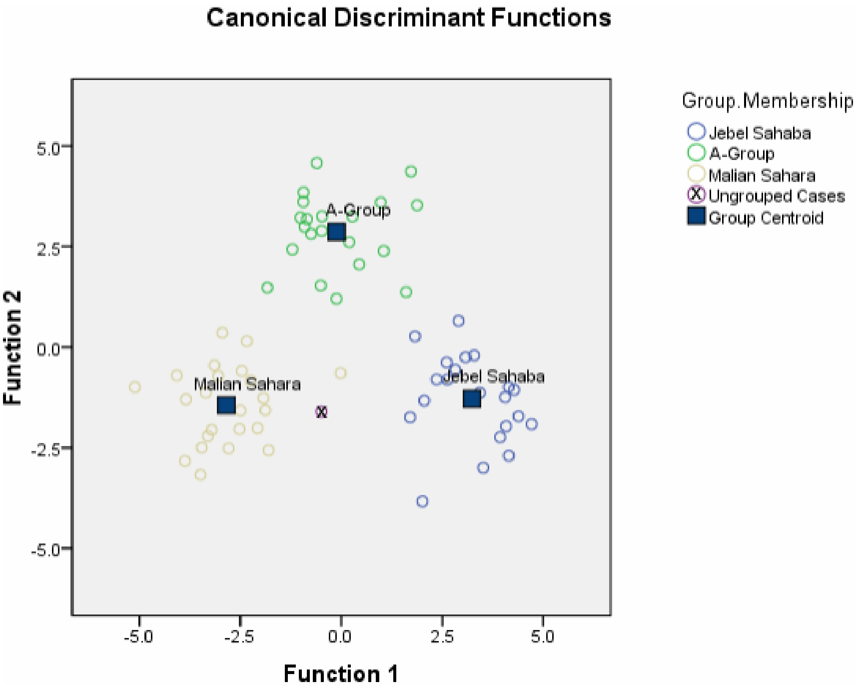
11.A.IV. Additional results
11.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 50.8%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
11.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 98.5%, 96.9%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (13)*
11.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (25)*
11.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 96.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (26)*

11.B.I. Summary
11.B.I.1. Individual: *Abu Tabari 02/28-5*
11.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
11.B.I.3. Data: *Scaled cranial and dental measurements*
11.B.I.4. Classification: *Malian Sahara*

11.B.II. Analysis overview
11.B.II.1. Method: *Mahalanobis distance, simultaneous entry*
11.B.II.2.a. Variables in matrix: *47*
11.B.II.2.b. Variables entered: *14*
11.B.II.3. Best predictors: *81(1). Crown width LI1 (.320), 48(1). Nasospinale-Prosthion height (258), 71a. Minimum ramus width (.188), 30. Bregma-Lambda chord (.289 - Function 2)*
11.B.II.4.a. Wilks' Lambda: *1 through 2: .026 (Sig. .000), 2: .196 (Sig. .000)*
11.B.II.4.b. Eigenvalues: *1: 6.556 (r: .931), 2: 4.110 (r: .897)*
11.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
11.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -85.159, Jebel Sahaba/Tushka - -77.493, Malian Sahara - -77.333), no outliers detected, no variables failed tolerance test*

11.B.III. Results
11.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 5.545), Jebel Sahaba/Tushka (D^2: 14.030)*
11.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.8%*
11.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 5.580), Jebel Sahaba/Tushka (D^2: 17.541)*
11.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

11.B.III.2.b. Misclassifications (separate-groups): *No misclassifications*
11.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*

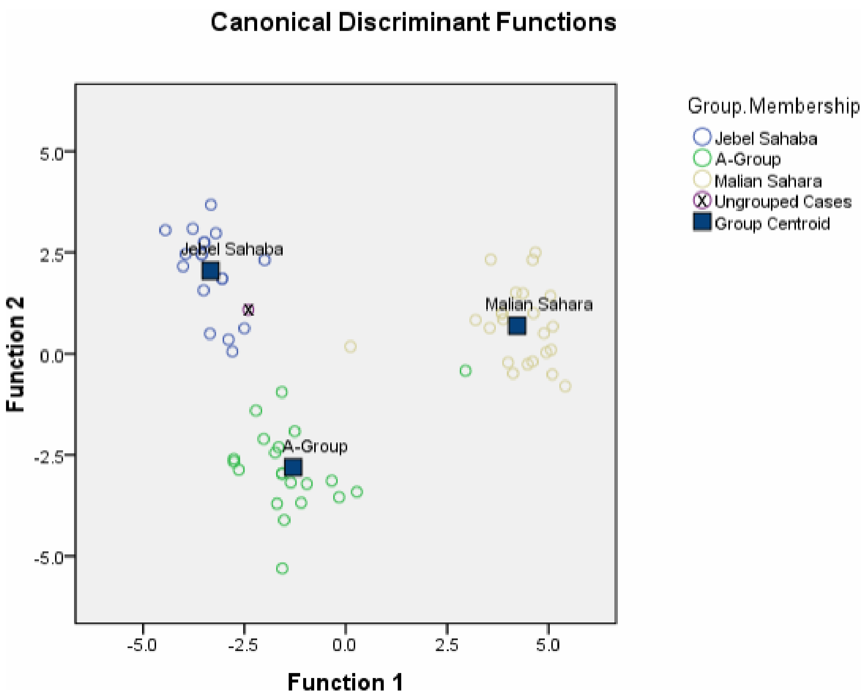


11.B.IV. Additional results
11.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 76.9%), separate-groups covariance matrix (A-Group, 100.0%)*
11.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (A-Group, 98.5%), variables entered (11)*
11.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 92.8%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (17)*
11.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 98.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (20)*

11.C.I. Summary
11.C.I.1. Individual: *Abu Tabari 02/28-5*
11.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
11.C.I.3. Data: *Non-metric cranial and dental traits*
11.C.I.4. Classification: *Jebel Sahaba/Tushka*

11.C.II. Analysis overview
11.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
11.C.II.2.a. Variables in matrix: *39*
11.C.II.2.b. Variables entered: *13*
11.C.II.3. Best predictors: *Tuberculum dentale (.768), Premolar root number UP1 (-.206), Interruption groove UI2 (.170), Interruption groove UI2 (.582 - Function 2)*
11.C.II.4.a. Wilks' Lambda: *1 through 2: .016 (Sig. .000), 2: .190 (Sig. .000)*
11.C.II.4.b. Eigenvalues: *1: 10.977 (r: .957), 2: 4.270 (r: .900)*
11.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
11.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

11.C.III. Results
11.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 1.798), A-Group (D^2: 16.383)*
11.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.8%*
11.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 3.140), A-Group (D^2: 15.775)*
11.C.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group), Malian Sahara (1 A-Group)*
11.C.III.2.b. Misclassifications (separate-groups): *A-Group (1 Malian Sahara), Malian Sahara (1 A-Group)*
11.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



11.C.IV. Additional results

11.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 86.2%), separate-groups covariance matrix (A-Group, 100.0%)*

11.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 96.9%, 95.4%), separate-groups covariance matrix (A-Group, 96.9%), variables entered (7)*

11.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 96.4%, 92.8%; separate-groups covariance matrix - Malian A-Group, 97.6%), variables entered (13)*

11.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 95.2%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), variables entered (21)*

11.D.I. Summary

11.D.I.1. Individual: *Abu Tabari 02/28-5*

11.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

11.D.I.3. Data: *Cranial and dental measurements*

11.D.I.4. Classification: *Southern Sudan*

11.D.II. Analysis overview

11.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

11.D.II.2.a. Variables in matrix: *46*

11.D.II.2.b. Variables entered: *14*

11.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.565), 80(4)b. 1st premolar dental arch length (mx) (.559), 81(1). Crown width UI2 (.299), 81. Crown length UI2 (.602 - Function 2), 81. Crown length LC (.607 - Function 3), 81. Crown length LM1 (-.487 - Function 4)*

11.D.II.4.a. Wilks' Lambda: *1 through 4: .003 (Sig. .000), 2 through 4: .037 (Sig. .000), 3 through 4: .164 (Sig. .000), 4: .542 (Sig. .000)*

11.D.II.4.b. Eigenvalues: *1: 10.584 (r: .956), 2: 3.432 (r: .880), 3: 2.309 (r: .835), 4: .844 (r: .677)*

11.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

11.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -28.345, Chad - -29.587, Mandinka - 'singular', Somalis - -35.546, Haya - -64.039), no outliers detected, no variables failed tolerance test*

11.D.III. Results

11.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 92.6%, Southern Sudan (D^2: 5.540), Mandinka (D^2: 15.807)*

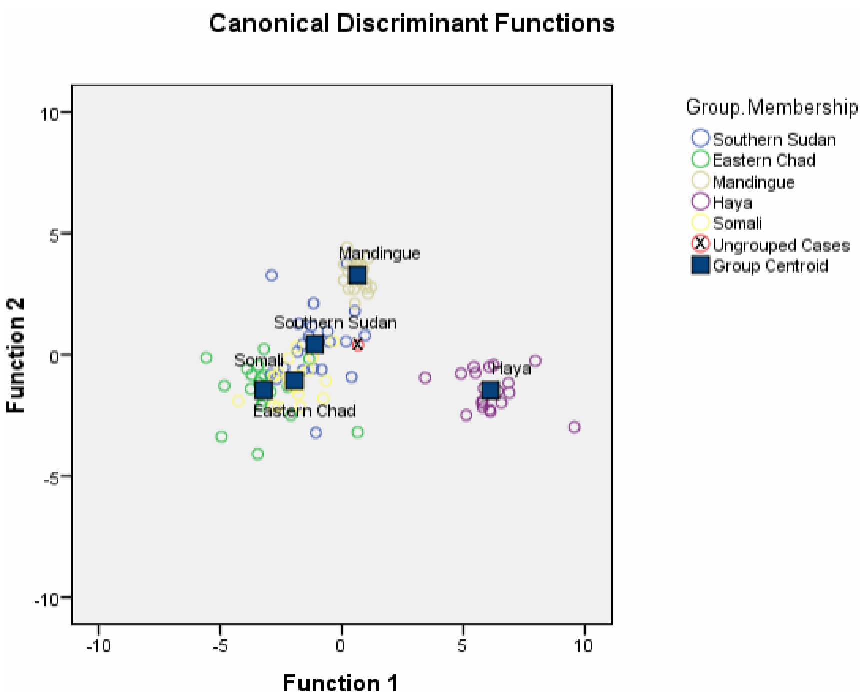
11.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *86.1%*

11.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 97.2%, Southern Sudan (D^2: 5.664), Chad (D^2: 15.812)*

11.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 3 Mandinka, 1 Somali), Chad (2 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 2 Chad), Haya (1 Somali)*

11.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Chad (1 Southern Sudan), Mandinka (1 Southern Sudan)*

11.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



11.D.IV. Additional results

11.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 100.0%, 81.5%), separate-groups covariance matrix (Chad, 100.0%)*

11.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 92.6%, 86.1%), separate-groups covariance matrix (Southern Sudan, 97.2%), variables entered (14)*

11.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 99.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (38)*

11.E.I. Summary

11.E.I.1. Individual: *Abu Tabari 02/28-5*

11.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

11.E.I.3. Data: *Scaled cranial and dental measurements*

11.E.I.4. Classification: *Southern Sudan*

11.E.II. Analysis overview

11.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

11.E.II.2.a. Variables in matrix: *36*

11.E.II.2.b. Variables entered: *14*

11.E.II.3. Best predictors: *80(4)a. Canine dental arch length (md) (-.504), 81. Crown length UI2 (.502), 48(1). Nasospinale-Prosthion height (.190), 80(1)c. 2nd premolar dental arch breadth (md) (-.408 - Function 2), 81. Crown length LM1 (.454 - Function 3), 8. Maximum cranial breadth (-.333 - Function 4)*

11.E.II.4.a. Wilks' Lambda: *1 through 4: .027 (Sig. .000), 2 through 4: .125 (Sig. .000), 3 through 4: .307 (Sig. .000), 4: .592 (Sig. .000)*

11.E.II.4.b. Eigenvalues: *1: 3.615 (r: .885), 2: 1.454 (r: .770), 3: .927 (r: .694), 4: .689 (r: .639)*

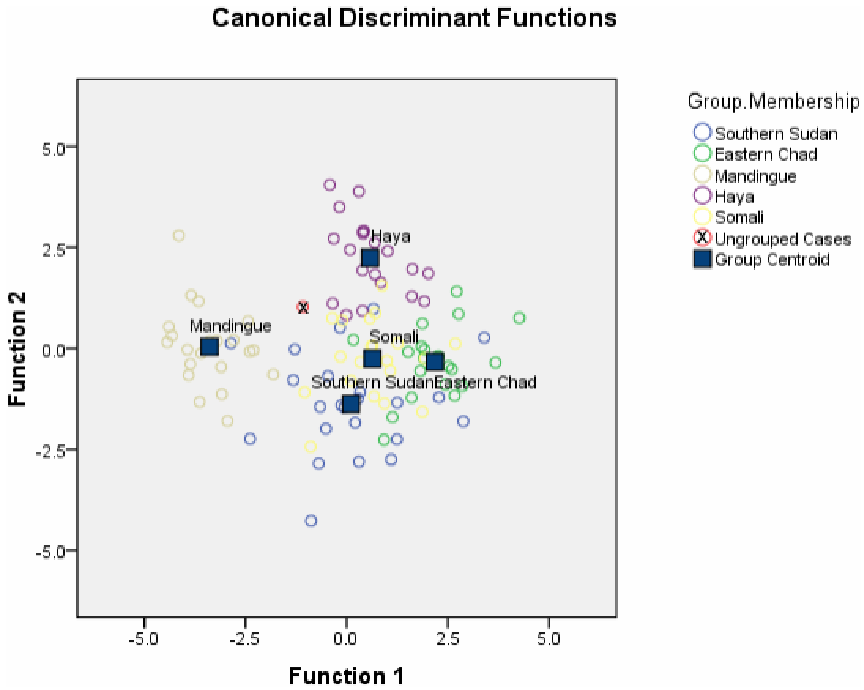
11.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

11.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -67.400, Chad - -77.009, Mandinka - -101.797, Somalis - -72.731, Haya - -74.673), no outliers detected, no variables failed tolerance test*

11.E.III. Results

11.E.III.1.a. Within-groups covariance matrix: *Haya, 92.6%, Haya (D^2: 5.952), Mandinka (D^2: 8.046)*

11.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*71.3%*
11.E.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 91.7%, Southern Sudan (D^2: 8.172), Haya (D^2: 11.514)*
11.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 2 Mandinka, 4 Somalis, 3 Haya), Chad (3 Southern Sudan, 2 Somalis, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Southern Sudan, 1 Chad, 3 Haya), Haya (4 Southern Sudan, 1 Chad, 1 Somali)*
11.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 1 Mandinka, 1 Haya), Chad (1 Southern Sudan, 1 Somali) Somalis (1 Southern Sudan, 1 Chad, 1 Haya), Haya (1 Southern Sudan)*
11.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



11.E.IV. Additional results	
11.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 97.2%, 73.1%), separate-groups covariance matrix (Haya, 97.2%)*
11.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 93.5%, 82.4%), separate-groups covariance matrix (Haya, 93.5%), variables entered (14)*
11.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 96.3%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (40)*

11.F.I. Summary	
11.F.I.1. Individual:	*Abu Tabari 02/28-5*
11.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
11.F.I.3. Data:	*Non-metric cranial and dental traits*
11.F.I.4. Classification:	*Southern Sudan*

11.F.II. Analysis overview	
11.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
11.F.II.2.a. Variables in matrix:	*43*
11.F.II.2.b. Variables entered:	*14*
11.F.II.3. Best predictors:	*Midline diastema (.836), Tuberculum dentale (.333), Cusp number LM2 (.156), Tuberculum dentale (.840 - Function 2), Interruption groove UI2 (.571 - Function 3), Interruption groove UI2 (.470 - Function 4)*
11.F.II.4.a. Wilks' Lambda:	*1 through 4: .001 (Sig. .000), 2 through 4: .023 (Sig. .000), 3 through 4: .151 (Sig. .000), 4: .728 (Sig. .001)*
11.F.II.4.b. Eigenvalues:	*1: 21.084 (r: .977), 2: 5.500 (r: .920), 3: 3.835 (r: .891), 4: .373 (r: .521)*
11.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
11.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

11.F.III. Results

11.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 91.7%, Southern Sudan (D^2: 4.995), Chad (D^2: 22.747)*

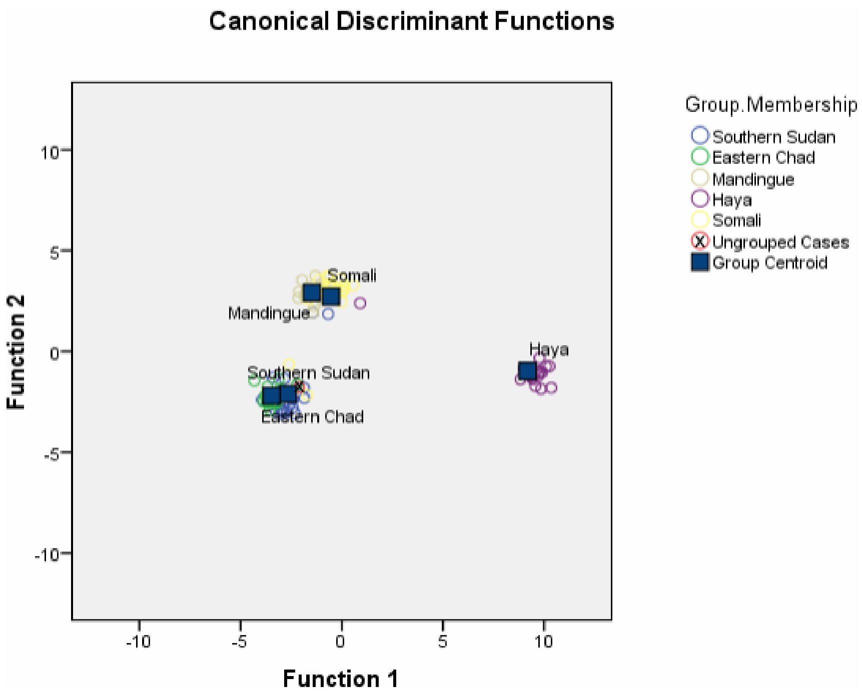
11.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*

11.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 96.3%, Southern Sudan (D^2: 4.290), Somalis (D^2: 13.840)*

11.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (4 Chad, 1 Mandinka, 1 Somali), Chad (2 Southern Sudan), Somalis (2 Southern Sudan, 1 Mandinka), Haya (1 Somali)*

11.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka), Chad (1 Southern Sudan), Somalis (1 Southern Sudan)*

11.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



11.F.IV. Additional results

11.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 99.1%, 85.2%), separate-groups covariance matrix (Somalis, 100.0%)*

11.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 94.4%, 89.8%), separate-groups covariance matrix (Somalis, 95.4%), variables entered (12)*

11.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 98.1%, 92.6%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (17)*

12. Abu Tabari 02/28-7

12.A.I. Summary

12.A.I.1. Individual: *Abu Tabari 02/28-7*

12.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

12.A.I.3. Data: *Dental measurements*

12.A.I.4. Classification: *Malian Sahara*

12.A.II. Analysis overview

12.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

12.A.II.2.a. Variables in matrix: *24*

12.A.II.2.b. Variables entered: *13*

12.A.II.3. Best predictors: *81(1). Crown width LI2 (-.485), 81. Crown length LI2 (-.464), 81. Crown length LC (.399), 81(1). Crown width LI2 (.739 - Function 2)*

12.A.II.4.a. Wilks' Lambda: *1 through 2: .081 (Sig. .000), 2: .327 (Sig. .000)*

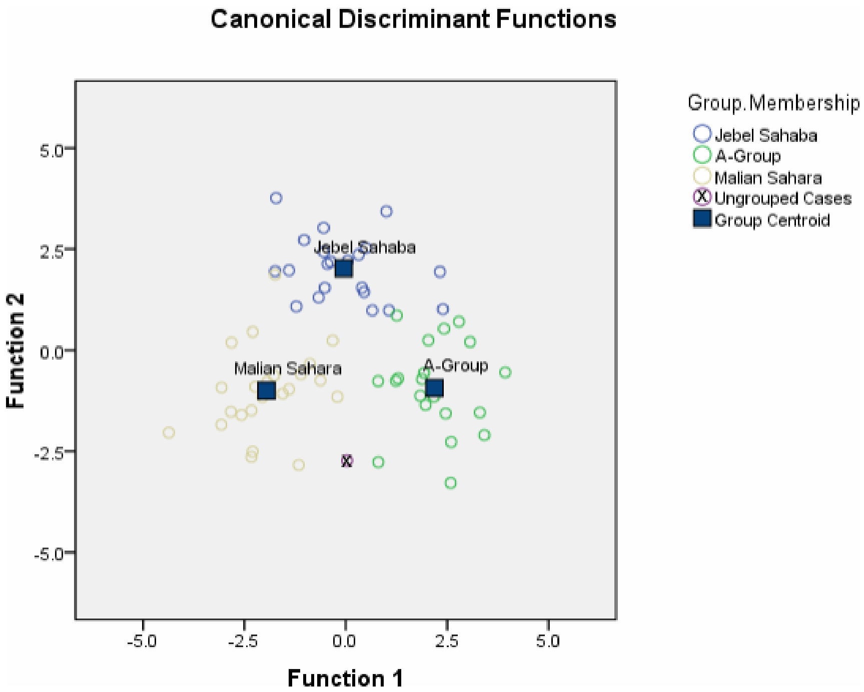
12.A.II.4.b. Eigenvalues: *1: 3.042 (r: .868), 2: 2.057 (r: .820)*

12.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

12.A.II.6. Remarks: *Box's M (Sig. .007; Log determinants: A-Group - -45.175, Jebel Sahaba/Tushka - -48.259, Malian Sahara - -42.469), no outliers detected, no variables failed tolerance test*

12.A.III. Results

12.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 6.936), A-Group (D^2: 7.906)*
12.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*84.6%*
12.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 95.4%, Malian Sahara (D^2: 9.135), A-Group (D^2: 9.574)*
12.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (4 A-Group, 2 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
12.A.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*
12.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



12.A.IV. Additional results

12.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 98.5%, 78.5%), separate-groups covariance matrix (A-Group, 98.5%)*
12.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 90.8%, 83.1%), separate-groups covariance matrix (Malian Sahara, 92.3%), variables entered (8)*
12.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 85.5%; separate-groups covariance matrix - Malian Sahara, 97.6%), variables entered (13)*
12.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 91.6%; separate-groups covariance matrix - Malian Sahara, 97.6%), variables entered (14)*

12.B.I. Summary

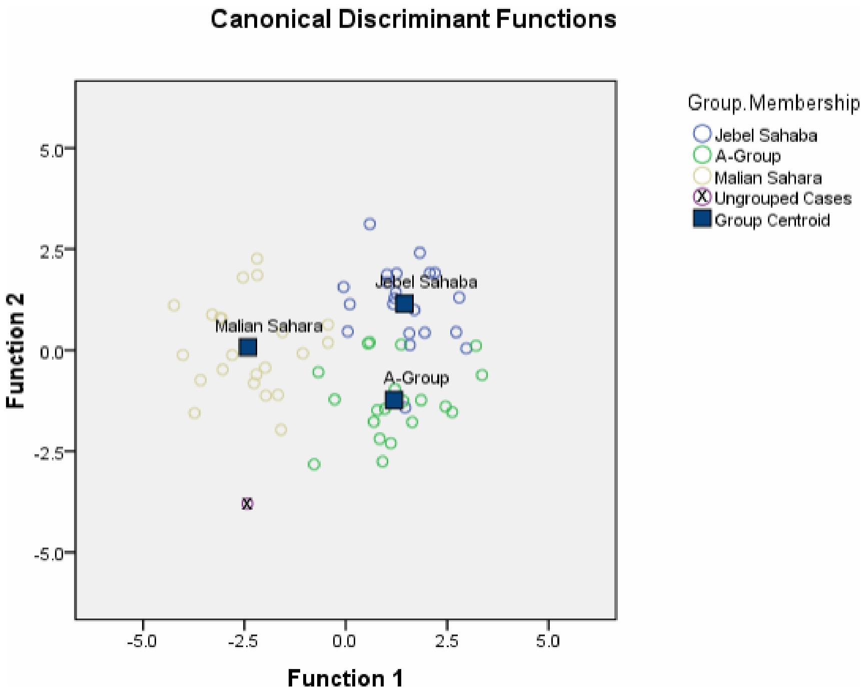
12.B.I.1. Individual:	*Abu Tabari 02/28-7*
12.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
12.B.I.3. Data:	*Dental measurements*
12.B.I.4. Classification:	*Malian Sahara*

12.B.II. Analysis overview

12.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
12.B.II.2.a. Variables in matrix:	*18*
12.B.II.2.b. Variables entered:	*14*
12.B.II.3. Best predictors:	*81(1). Crown width UM1 (.415), 81(1). Crown width LI2 (.370), 81(1). Crown width LC (.266), 81(1), Crown width LI2 (.445 - Function 2)*
12.B.II.4.a. Wilks' Lambda:	*1 through 2: .117 (Sig. .000), 2: .509 (Sig. .000)*
12.B.II.4.b. Eigenvalues:	*1: 3.346 (r: .877), 2: .965 (r: .701)*
12.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
12.B.II.6. Remarks:	*Box's M (Sig. .002; Log determinants: A-Group - -104.463, Jebel Sahaba/Tushka - -105.438, Malian*

Sahara - -101.049), no outliers detected, no variables failed tolerance test

12.B.III. Results
12.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 89.2%, Malian Sahara (D^2: 14.989), A-Group (D^2: 19.656)*
12.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *69.2%*
12.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 90.8%, Malian Sahara (D^2: 12.520), A-Group (D^2: 15.275)*
12.B.III.2.a. Misclassifications (leave-one-out): *A-Group (5 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (6 A-Group, 2 Malian Sahara), Malian Sahara (2 A-Group, 2 Jebel Sahaba/Tushka)*
12.B.III.2.b. Misclassifications (separate-groups): *A-Group (4 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group)*
12.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



12.B.IV. Additional results
12.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 90.8%, 73.8%), separate-groups covariance matrix (A-Group, 93.8%)*
12.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 83.1%, 76.9%), separate-groups covariance matrix (Malian Sahara, 86.2%), variables entered (8)*
12.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 85.5%, 79.5%; separate-groups covariance matrix - A-Group, 84.3%), variables entered (8)*
12.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 92.8%, 81.9%; separate-groups covariance matrix - Malian Sahara, 92.8%), variables entered (14)*

12.C.I. Summary
12.C.I.1. Individual: *Abu Tabari 02/28-7*
12.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
12.C.I.3. Data: *Non-metric cranial and dental traits*
12.C.I.4. Classification: *Jebel Sahaba/Tushka*

12.C.II. Analysis overview
12.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
12.C.II.2.a. Variables in matrix: *18*
12.C.II.2.b. Variables entered: *13*
12.C.II.3. Best predictors: *Distal accessory ridge UC (.572), Shovel UI1 (.288), Alveolar prognathism (.130), Premolar mesial and distal accessory cusps (.330 - Function 2)*
12.C.II.4.a. Wilks' Lambda: *1 through 2: .014 (Sig. .000), 2: .311 (Sig. .000)*
12.C.II.4.b. Eigenvalues: *1: 21.792 (r: .978), 2: 2.220 (r: .830)*
12.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

12.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

12.C.III. Results

12.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 92.3%, Jebel Sahaba/Tushka (D^2: .978), Malian Sahara (D^2: 18.564)*

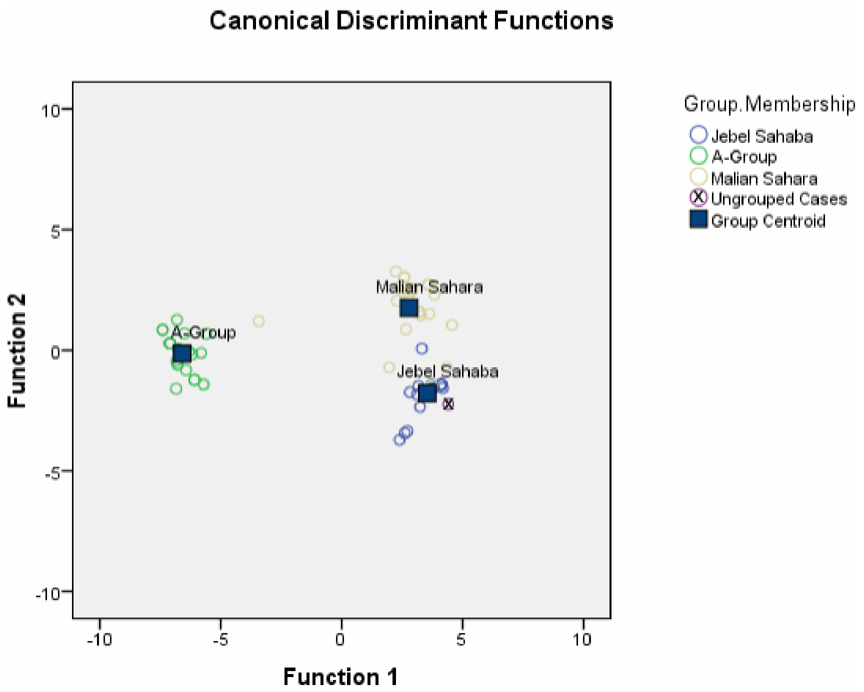
12.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *92.3%*

12.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 7.121), Malian Sahara (D^2: 10.756)*

12.C.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (1 A-Group, 3 Jebel Sahaba/Tushka)*

12.C.III.2.b. Misclassifications (separate-groups): *Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 Jebel Sahaba/Tushka)*

12.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



12.C.IV. Additional results

12.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 93.8%, 89.2%), separate-groups covariance matrix (Malian Sahara, 95.4%)*

12.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 93.8%, 89.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 95.4%), variables entered (8)*

12.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 86.7%, 85.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 90.4%), variables entered (9)*

12.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 92.8%, 85.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 92.8%), variables entered (11)*

12.D.I. Summary

12.D.I.1. Individual: *Abu Tabari 02/28-7*

12.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

12.D.I.3. Data: *Dental measurements*

12.D.I.4. Classification: *Southern Sudan*

12.D.II. Analysis overview

12.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

12.D.II.2.a. Variables in matrix: *14*

12.D.II.2.b. Variables entered: *13*

12.D.II.3. Best predictors: *81. Crown length LC (.852), 81(1). Crown width UC (-.453), 81(1). Crown width LC (.437), 81(1). Crown width LC (-.359 - Function 2), 81. Crown length LM1 (.548 - Function 3), 81. Crown length UM3 (.278 - Function 4)*

12.D.II.4.a. Wilks' Lambda: *1 through 4: .092 (Sig. .000), 2 through 4: .306 (Sig. .000), 3 through 4: .544 (Sig. .000), 4: .774 (Sig. .005)*

12.D.II.4.b. Eigenvalues: *1: 2.309 (r: .835), 2: .778 (r: .661), 3: .422 (r: .545), 4: .292 (r: .475)*

12.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

12.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -45.429, Chad - -52.496, Mandinka - -48.746, Somalis - -50.317, Haya - -52.095), no outliers detected, no variables failed tolerance test*

12.D.III. Results

12.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 80.6%, Southern Sudan (D^2: 7.540), Chad (D^2: 15.626)*

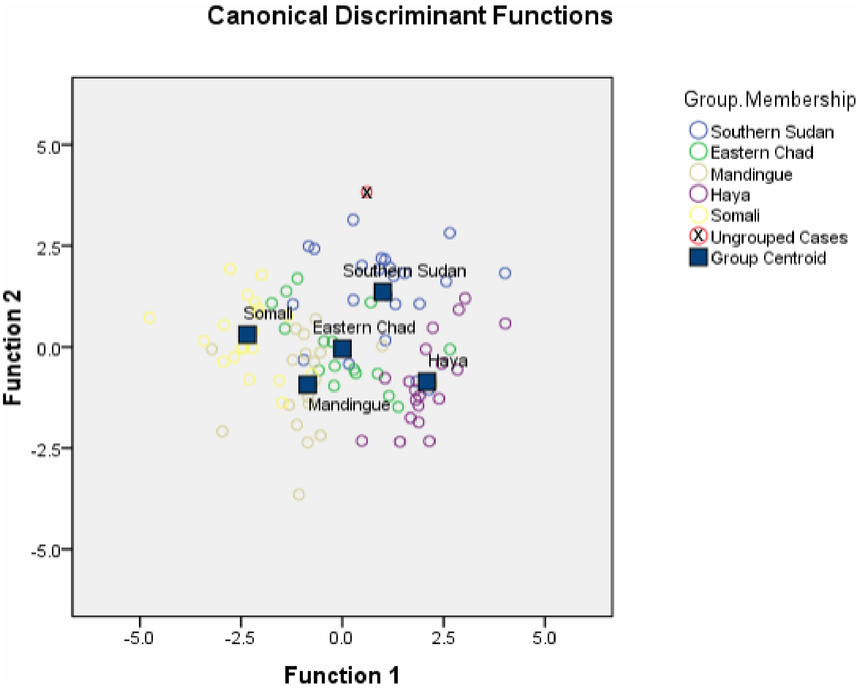
12.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *63.0%*

12.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 87.0%, Southern Sudan (D^2: 4.927), Mandinka (D^2: 31.339)*

12.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 4 Mandinka, 1 Somali, 2 Haya), Chad (2 Southern Sudan, 1 Mandinka, 4 Somalis, 3 Haya), Mandinka (2 Chad, 4 Somalis, 2 Haya), Somalis (2 Chad, 3 Mandinka), Haya (4 Southern Sudan, 3 Chad, 1 Mandinka)*

12.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Mandinka, 1 Haya), Chad (2 Southern Sudan, 1 Haya), Mandinka (3 Chad, 1 Haya), Somalis (1 Mandinka), Haya (2 Southern Sudan, 1 Chad)*

12.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



12.D.IV. Additional results

12.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 79.6%, 62.0%), separate-groups covariance matrix (Southern Sudan, 84.3%)*

12.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 74.1%, 69.4%), separate-groups covariance matrix (Southern Sudan, 79.6%), variables entered (7)*

12.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 87.0%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (27)*

12.E.I. Summary

12.E.I.1. Individual: *Abu Tabari 02/28-7*

12.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

12.E.I.3. Data: *Scaled dental measurements*

12.E.I.4. Classification: *Southern Sudan*

12.E.II. Analysis overview

12.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

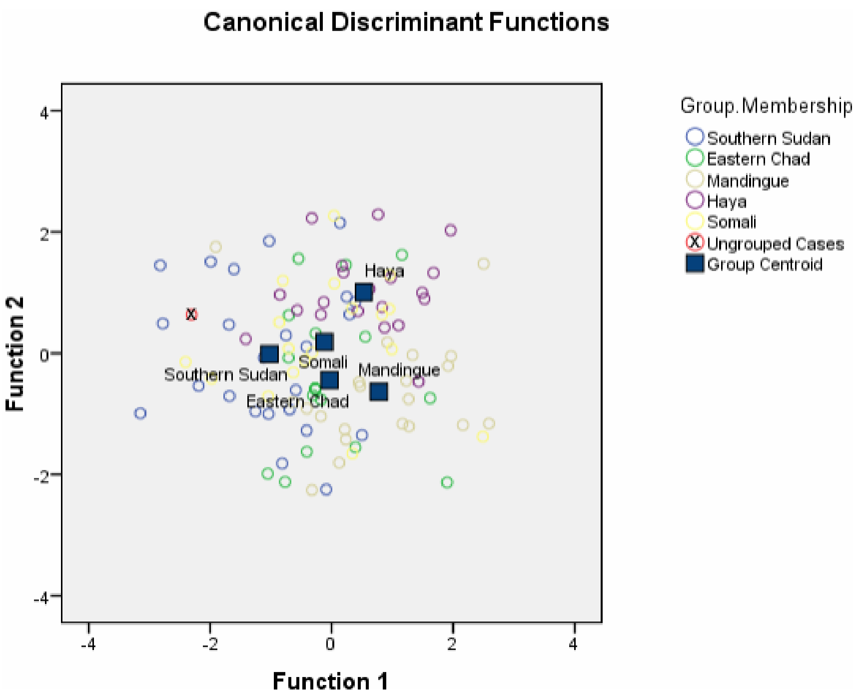
12.E.II.2.a. Variables in matrix: *7*

12.E.II.2.b. Variables entered: *6*

12.E.II.3. Best predictors:	*81. Crown length UM1 (.639), 81.Crown length UM2 (.539), 81(1). Crown width UC (.410), 81(1). Crown width UC (.755 - Function 2), 81(1). Crown width UM3 (.775 - Function 3), 81(1). Crown width UM1 (-.423 - Function 4)*
12.E.II.4.a. Wilks' Lambda:	*1 through 4: .405 (Sig. .000), 2 through 4: .581 (Sig. .000), 3 through 4: .774 (Sig. .001), 4: .896 (Sig. .011)*
12.E.II.4.b. Eigenvalues:	*1: .434 (r: .550), 2: .333 (r: .500), 3: .157 (r: .369), 4: .117 (r: .323)*
12.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
12.E.II.6. Remarks:	*Box's M (Sig. .007; Log determinants: Southern Sudan - -38.478, Chad - -43.440, Mandinka - -39.610, Somalis - -39.551, Haya - -41.162), removed outliers: Chad 17.588 (D^2: 13.282; critical value: 12.592 - p 0.95, df 6), no variables failed tolerance test*

12.E.III. Results

12.E.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 57.0%, Southern Sudan (D^2: 6.693), Somalis (D^2: 7.565)*
12.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*48.6%*
12.E.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 66.4%, Southern Sudan (D^2: 5.078), Somalis (D^2: 6.691)*
12.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Chad, 2 Mandinka, 3 Somalis, 4 Haya), Chad (1 Southern Sudan, 4 Mandinka, 2 Somalis, 4 Haya), Mandinka (2 Southern Sudan, 2 Chad, 4 Somalis, 1 Haya), Somalis (5 Southern Sudan, 2 Chad, 3 Mandinka, 4 Haya), Haya (3 Southern Sudan, 3 Chad, 2 Somalis)*
12.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 3 Mandinka, 3 Somalis, 3 Haya), Chad (1 Southern Sudan, 2 Mandinka, 1 Haya), Mandinka (1 Southern Sudan, 2 Chad, 1 Haya), Somalis (4 Southern Sudan, 4 Chad, 2 Mandinka, 3 Haya), Haya (1 Southern Sudan, 2 Chad, 1 Somali)*
12.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



12.E.IV. Additional results

12.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 58.3%, 46.3%), separate-groups covariance matrix (Somalis, 65.7%)*
12.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 54.6%,49.1%), separate-groups covariance matrix (Somalis, 67.6%), variables entered (5)*
12.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 92.6%, 81.5%; separate-groups covariance matrix - Somalis, 95.4%), variables entered (18)*

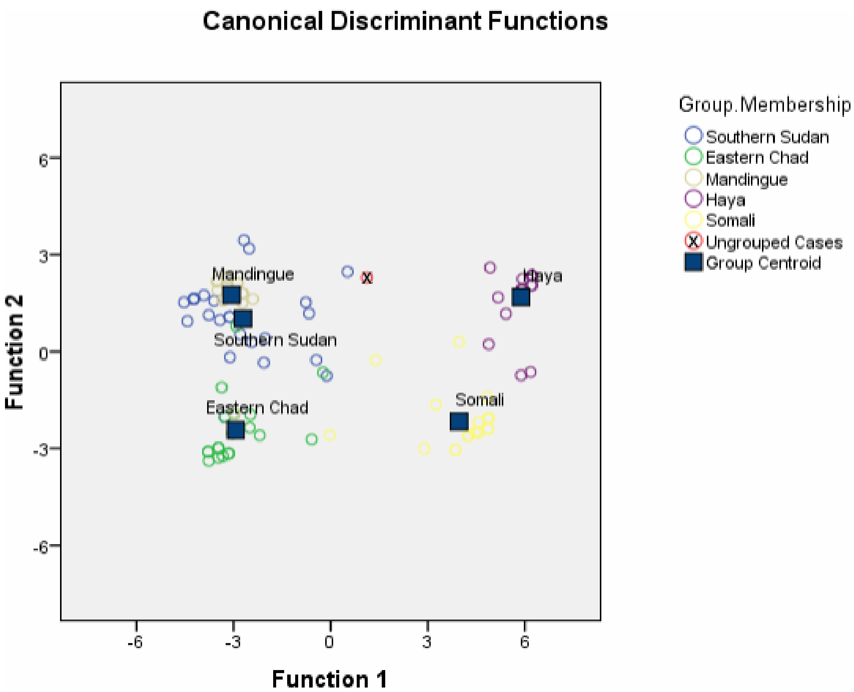
12.F.I. Summary

12.F.I.1. Individual:	*Abu Tabari 02/28-7*
12.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*

12.F.I.3. Data:	*Non-metric cranial and dental traits*
12.F.I.4. Classification:	*Southern Sudan*

12.F.II. Analysis overview	
12.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
12.F.II.2.a. Variables in matrix:	*20*
12.F.II.2.b. Variables entered:	*13*
12.F.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.629), Shovel UI1 (-.490), Cusp number LM2 (.216), Canine mesial ridge (.749 - Function 2), Double shovel UI1 (.619 - Function 3), Cusp 5 UM1 (.566 - Function 4)*
12.F.II.4.a. Wilks' Lambda:	*1 through 4: .003 (Sig. .000), 2 through 4: .052 (Sig. .000), 3 through 4: .239 (Sig. .000), 4: .600 (Sig. .000)*
12.F.II.4.b. Eigenvalues:	*1: 15.321 (r: .969), 2: 3.625 (r: .885), 3: 1.511 (r: .776), 4: .666 (r: .632)*
12.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
12.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -30.195, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

12.F.III. Results	
12.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 91.7%, Southern Sudan (D^2: 20.803), Mandinka (D^2: 22.403)*
12.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*85.2%*
12.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 96.3%, Southern Sudan (D^2: 13.360), Chad (D^2: 38.228)*
12.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 3 Mandinka, 1 Somali), Chad (2 Southern Sudan, 1 Mandinka), Mandinka (1 Chad), Somalis (1 Chad, 2 Haya), Haya (2 Somalis)*
12.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Chad (2 Southern Sudan), Mandinka (1 Chad)*
12.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



12.F.IV. Additional results	
12.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Mandinka, 91.7%, 82.4%), separate-groups covariance matrix (Southern Sudan, 95.4%)*
12.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Mandinka, 88.9%, 83.3%), separate-groups covariance matrix (Southern Sudan, 95.4%), variables entered (8)*
12.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 90.7%, 82.4%; separate-groups covariance matrix - Southern Sudan, 88.9%), variables entered (11)*

13. Abu Tabari 02/28-8

13.A.I. Summary

13.A.I.1. Individual: *Abu Tabari 02/28-8*

13.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

13.A.I.3. Data: *Cranial and dental measurements*

13.A.I.4. Classification: *Malian Sahara*

13.A.II. Analysis overview

13.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

13.A.II.2.a. Variables in matrix: *30*

13.A.II.2.b. Variables entered: *13*

13.A.II.3. Best predictors: *81(1). Crown width LI2 (.668), 81. Crown length LI2 (.340), 81(1). Crown width UM2 (.311), 81. Crown length LP1 (-.347 - Function 2)*

13.A.II.4.a. Wilks' Lambda: *1 through 2: .057 (Sig. .000), 2: .294 (Sig. .000)*

13.A.II.4.b. Eigenvalues: *1: 4.116 (r: .897), 2: 2.404 (r: .840)*

13.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

13.A.II.6. Remarks: *Box's M (Sig. .002; Log determinants: A-Group - -37.305, Jebel Sahaba/Tushka - -39.059, Malian Sahara - -34.285), no outliers detected, no variables failed tolerance test*

13.A.III. Results

13.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 17.687), A-Group (D^2: 20.636)*

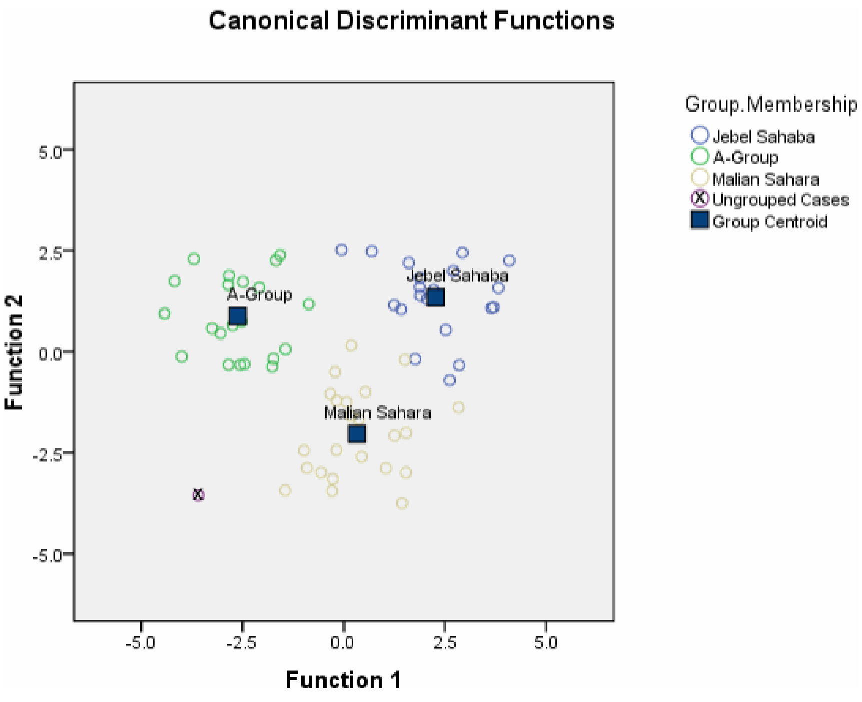
13.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *90.8%*

13.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 15.492), A-Group (D^2: 22.401)*

13.A.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (3 Jebel Sahaba/Tushka)*

13.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

13.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



13.A.IV. Additional results

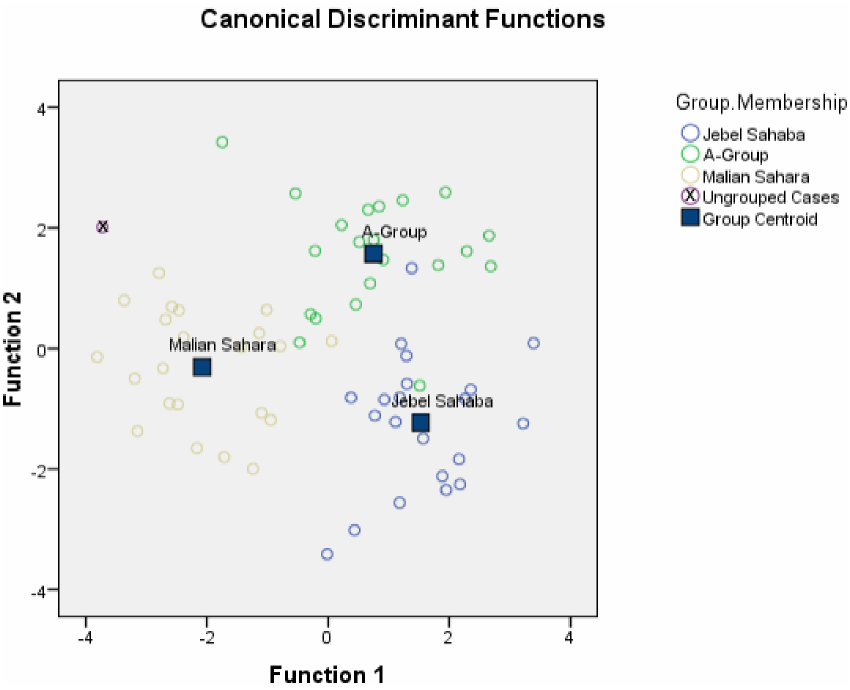
13.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 76.9%), separate-groups covariance matrix (Malian Sahara, 100.0%)*

13.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 92.3%, 83.1%), separate-groups covariance matrix (A-Group, 92.3%), variables entered (7)*

13.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 92.8%, 81.9%; separate-groups covariance matrix - A-Group, 94.0%), variables entered (13)*

13.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 97.6%, 91.6%; separate-groups covariance matrix - A-Group, 97.6%), variables entered (19)*

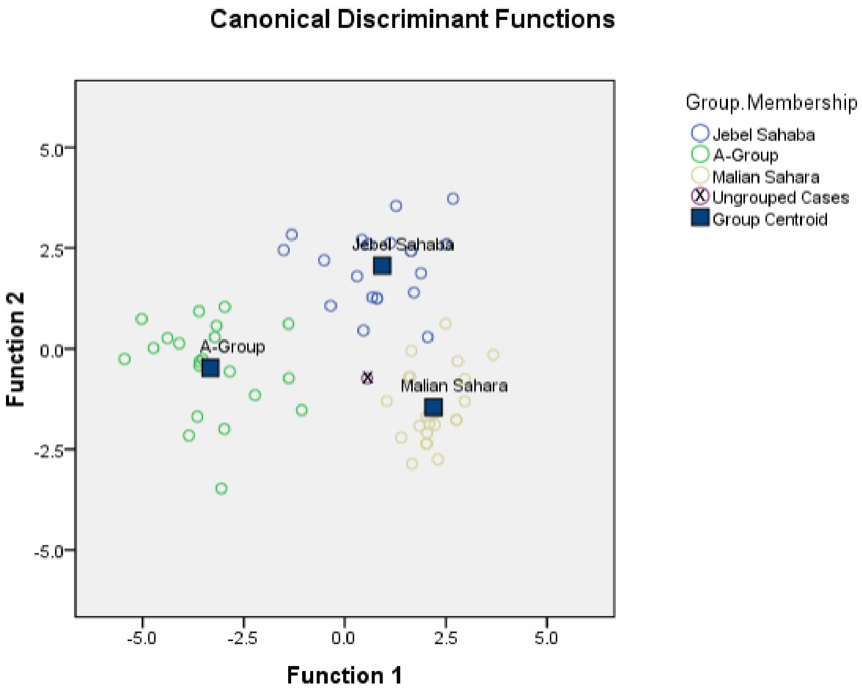
13.B.I. Summary	
13.B.I.1. Individual:	*Abu Tabari 02/28-8*
13.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
13.B.I.3. Data:	*Scaled cranial and dental measurements*
13.B.I.4. Classification:	*Malian Sahara*
13.B.II. Analysis overview	
13.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
13.B.II.2.a. Variables in matrix:	*23*
13.B.II.2.b. Variables entered:	*12*
13.B.II.3. Best predictors:	*81(1). Crown width UM1 (.463), 81(1). Crown width LI2 (.455), 81(1). Crown width LC (.296), 81(1), 30. Bregma-Lambda chord (.483 - Function 2)*
13.B.II.4.a. Wilks' Lambda:	*1 through 2: .117 (Sig. .000), 2: .420 (Sig. .000)*
13.B.II.4.b. Eigenvalues:	*1: 2.586 (r: .849), 2: 1.383 (r: .762)*
13.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
13.B.II.6. Remarks:	*Box's M (Sig. .001; Log determinants: A-Group - -81.384, Jebel Sahaba/Tushka - -77.910, Malian Sahara - -74.477), no outliers detected, no variables failed tolerance test*
13.B.III. Results	
13.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 8.109), A-Group (D^2: 20.237)*
13.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*87.7%*
13.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 93.8%, Malian Sahara (D^2: 8.287), A-Group (D^2: 15.503)*
13.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
13.B.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 A-Group)*
13.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



13.B.IV. Additional results	
13.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 76.9%), separate-groups covariance matrix (A-Group, 96.9%)*
13.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 83.1%, 76.9%), separate-groups covariance matrix (A-Group, 86.2%), variables entered (7)*
13.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 95.2%, 81.9%; separate-groups covariance matrix - Malian Sahara, 95.2%), variables entered (14)*
13.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 94.0%; separate-*

groups covariance matrix - “Sudanese Hotchpotch”, 100.0%), variables entered (18)

13.C.I. Summary	
13.C.I.1. Individual:	*Abu Tabari 02/28-8*
13.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
13.C.I.3. Data:	*Non-metric cranial and dental traits*
13.C.I.4. Classification:	*Malian Sahara*
13.C.II. Analysis overview	
13.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
13.C.II.2.a. Variables in matrix:	*37*
13.C.II.2.b. Variables entered:	*13*
13.C.II.3. Best predictors:	*Shovel UI1 (.578), Sella nasi (main) (-.291), Groove pattern LM2 (.244), Premolar root number UP1 (.417 - Function 2)*
13.C.II.4.a. Wilks’ Lambda:	*1 through 2: .044 (Sig. .000), 2: .303 (Sig. .000)*
13.C.II.4.b. Eigenvalues:	*1: 5.816 (r: .924), 2: 2.303 (r: .835)*
13.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
13.C.II.6. Remarks:	*Box’s M (test not possible: A-Group - ‘singular’, Jebel Sahaba/Tushka - ‘singular’, Malian Sahara - ‘singular’), no outliers detected, no variables failed tolerance test*
13.C.III. Results	
13.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.216), Jebel Sahaba/Tushka (D^2: 7.984)*
13.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.8%*
13.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 10.198), Jebel Sahaba/Tushka (D^2: 9.333)*
13.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
13.C.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (1 Malian Sahara)*
13.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



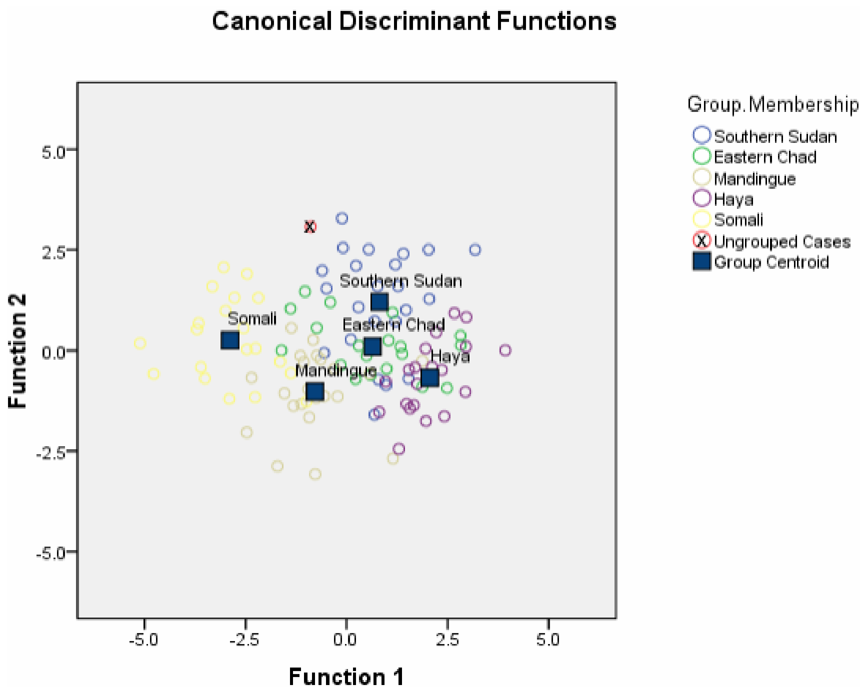
13.C.IV. Additional results	
13.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 69.2%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
13.C.IV.1.b. Wilk’s Lambda:	*Within-groups covariance matrix (Malian Sahara, 93.8%, 89.2%), separate-groups covariance matrix (A-Group, 95.4%), variables entered (8)*
13.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - “Sudanese Hotchpotch”, 97.6%, 92.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (17)*

13.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 95.2%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (20)*

13.D.I. Summary	
13.D.I.1. Individual:	*Abu Tabari 02/28-8*
13.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
13.D.I.3. Data:	*Cranial and dental measurements*
13.D.I.4. Classification:	*Southern Sudan*

13.D.II. Analysis overview	
13.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
13.D.II.2.a. Variables in matrix:	*21*
13.D.II.2.b. Variables entered:	*12*
13.D.II.3. Best predictors:	*81. Crown length (.763), 81(1). Crown width LC (.392), 81(1). Crown width UP1 (.320), 81(1). Crown width LC (-.344 - Function 2), 19a. Mastoid height (-.501 - Function 3), 30. Bregma-Lambda chord (.582 - Function 4)*
13.D.II.4.a. Wilks' Lambda:	*1 through 4: .093 (Sig. .000), 2 through 4: .353 (Sig. .000), 3 through 4: .588 (Sig. .000), 4: .858 (Sig. .088)*
13.D.II.4.b. Eigenvalues:	*1: 2.808 (r: .859), 2: .667 (r: .632), 3: .460 (r: .561), 4: .166 (r: .377)*
13.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
13.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -9.166, Chad - -13.316, Mandinka - -11.592, Somalis - -11.203, Haya - -12.986), no outliers detected, no variables failed tolerance test*

13.D.III. Results	
13.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 82.4%, Southern Sudan (D^2: 10.230), Chad (D^2: 18.534)*
13.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*70.4%*
13.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 87.0%, Southern Sudan (D^2: 9.132), Somalis (D^2: 16.916)*
13.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 3 Mandinka, 4 Haya), Chad (1 Southern Sudan, 2 Mandinka, 3 Somalis, 3 Haya), Mandinka (2 Chad, 3 Somalis, 2 Haya), Somalis (1 Chad, 2 Mandinka), Haya (2 Southern Sudan, 1 Chad)*
13.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (4 Chad, 1 Mandinka), Chad (1 Southern Sudan, 1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Chad, 2 Somalis, 1 Haya), Somalis (1 Mandinka)*
13.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



13.D.IV. Additional results

13.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 78.7%, 62.0%), separate-groups covariance matrix (Southern Sudan, 86.1%)*
13.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 66.7%, 60.2%), separate-groups covariance matrix (Southern Sudan, 74.1%), variables entered (7)*
13.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 93.5%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (22)*

13.E.I. Summary

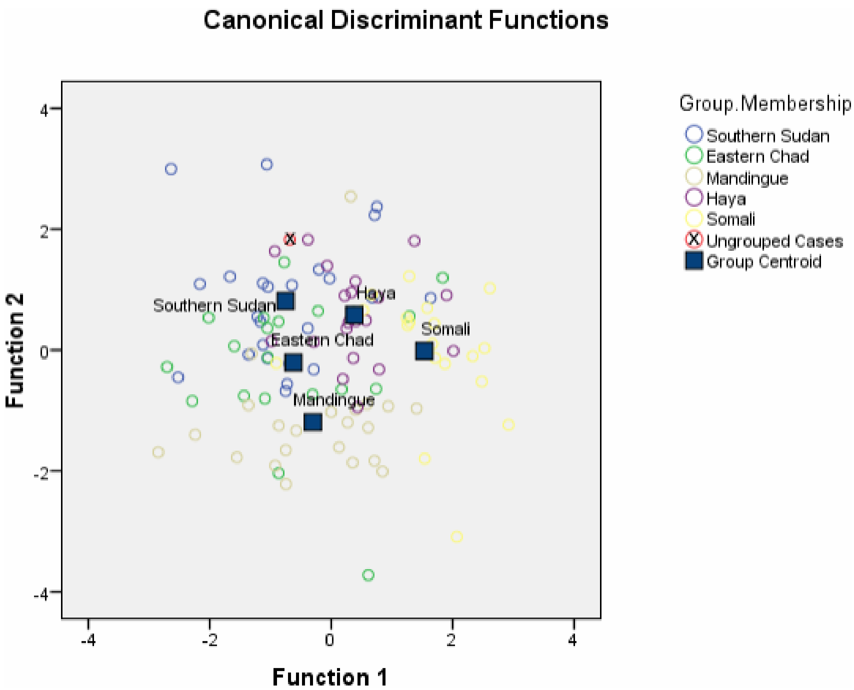
13.E.I.1. Individual:	*Abu Tabari 02/28-8*
13.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
13.E.I.3. Data:	*Scaled cranial and dental measurements*
13.E.I.4. Classification:	*Southern Sudan*

13.E.II. Analysis overview

13.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
13.E.II.2.a. Variables in matrix:	*13*
13.E.II.2.b. Variables entered:	*13*
13.E.II.3. Best predictors:	*19a. Mastoid height (.445), 1. Maximum cranial length (.367), 8. Maximum cranial breadth (.367), 81(1). Crown width UC (.697 - Function 2), 81. Crown length UM1 (.610 - Function 3), 81. Crown length UP1 (.501 - Function 4)*
13.E.II.4.a. Wilks' Lambda:	*1 through 4: .204 (Sig. .000), 2 through 4: .351 (Sig. .000), 3 through 4: .538 (Sig. .000), 4: .793 (Sig. .012)*
13.E.II.4.b. Eigenvalues:	*1: .721 (r: .647), 2: .532 (r: .589), 3: .475 (r: .567), 4: .260 (r: .455)*
13.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
13.E.II.6. Remarks:	*Box's M (Sig. .012; Log determinants: Southern Sudan - -57.823, Chad - -65.641, Mandinka - -60.384, Somalis - -60.536, Haya - -65.167), no outliers detected, no variables failed tolerance test*

13.E.III. Results

13.E.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 70.4%, Southern Sudan (D^2: 1.826), Chad (D^2: 6.094)*
13.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*50.9%*
13.E.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 73.1%, Southern Sudan (D^2: 1.845), Chad (D^2: 6.514)*
13.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (6 Chad, 3 Mandinka, 2 Somalis, 3 Haya), Chad (3 Southern Sudan, 2 Mandinka, 2 Somalis, 4 Haya), Mandinka (2 Southern Sudan, 2 Chad, 3 Somalis, 1 Haya), Somalis (3 Southern Sudan, 2 Chad, 1 Mandinka, 3 Haya), Haya (3 Southern Sudan, 4 Chad, 2 Mandinka, 2 Somalis)*
13.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (5 Chad, 1 Mandinka, 2 Somalis, 1 Haya), Chad (2 Southern Sudan, 1 Mandinka, 2 Somalis, 2 Haya), Mandinka (2 Southern Sudan, 1 Chad, 1 Somali, 1 Haya), Somalis (2 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Mandinka, 1 Somali)*
13.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



13.E.IV. Additional results

13.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 70.4%, 50.9%), separate-groups covariance matrix (Southern Sudan, 73.1%)*

13.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 64.8%, 50.9%), separate-groups covariance matrix (Southern Sudan, 69.4%), variables entered (8)*

13.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 98.1%, 88.9%; separate-groups covariance matrix - Southern Sudan, 99.1%), variables entered (16)*

13.F.I. Summary

13.F.I.1. Individual: *Abu Tabari 02/28-8*

13.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

13.F.I.3. Data: *Non-metric cranial and dental traits*

13.F.I.4. Classification: *Southern Sudan*

13.F.II. Analysis overview

13.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

13.F.II.2.a. Variables in matrix: *40*

13.F.II.2.b. Variables entered: *13*

13.F.II.3. Best predictors: *Shovel UI1 (.719), Double shovel UI1 (.355), Cusp number LM2 (-.321), Double shovel UI1 (.666 - Function 2), Cusp 5 UM1 (.671 - Function 3), Premolar root number UP1 (-.512 - Function 4)*

13.F.II.4.a. Wilks' Lambda: *1 through 4: .009 (Sig. .000), 2 through 4: .070 (Sig. .000), 3 through 4: .204 (Sig. .000), 4: .528 (Sig. .000)*

13.F.II.4.b. Eigenvalues: *1: 7.013 (r: .936), 2: 1.899 (r: .809), 3: 1.588 (r: .783), 4: .895 (r: .687)*

13.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

13.F.II.6. Remarks: *Box's M (test result not accepted; Sig. .194; Log determinants: Southern Sudan - -30.638, Chad - -30.157, Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

13.F.III. Results

13.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 86.1%, Southern Sudan (D^2: 6.769), Mandinka (D^2: 8.825)*

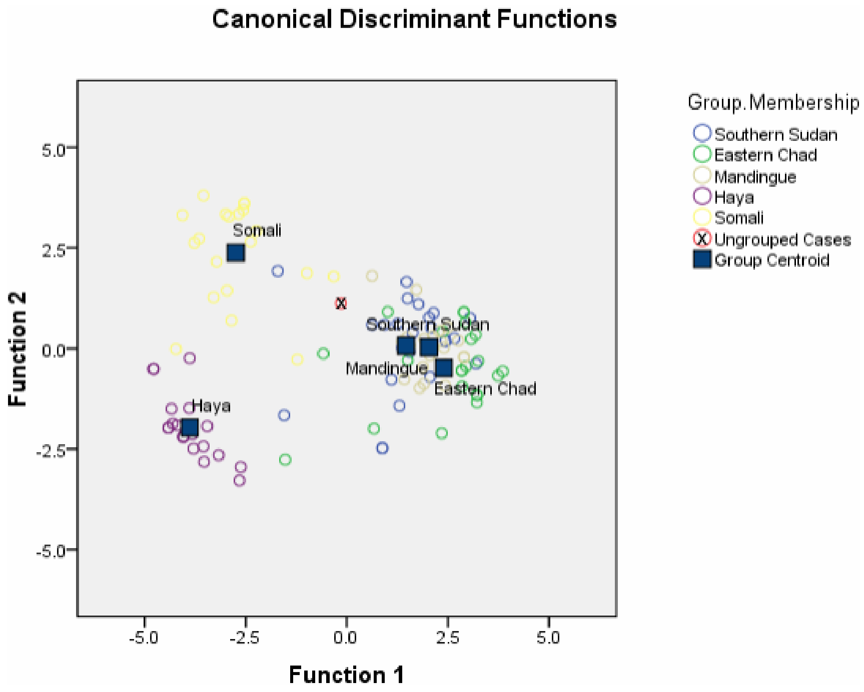
13.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *84.3%*

13.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 92.6%, Southern Sudan (D^2: 8.360), Somalis (D^2: 10.387)*

13.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 1 Mandinka, 1 Somali, 1 Haya), Chad (4 Southern Sudan, 2 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad, 1 Mandinka, 1 Haya)*

13.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Chad (2 Southern Sudan, 2 Mandinka), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan)*

13.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



13.F.IV. Additional results

13.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 96.3%, 77.8%), separate-groups covariance matrix (Mandinka, 96.3%)*

13.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 86.1%, 82.4%), separate-groups covariance matrix (Madingues, 85.2%), variables entered (9)*

13.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 90.7%, 85.2%; separate-groups covariance matrix - Southern Sudan, 93.5%), variables entered (14)*

14. Abu Tabari 02/28-11

14.A.I. Summary

14.A.I.1. Individual: *Abu Tabari 02/28-11*

14.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

14.A.I.3. Data: *Cranial measurements*

14.A.I.4. Classification: *Jebel Sahaba/Tushka*

14.A.II. Analysis overview

14.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

14.A.II.2.a. Variables in matrix: *2*

14.A.II.2.b. Variables entered: *1*

14.A.II.3. Best predictors: *9. Least frontal breadth (1.000)*

14.A.II.4.a. Wilks' Lambda: *1: .599 (Sig. .000)*

14.A.II.4.b. Eigenvalues: *1: .669 (r: .633)*

14.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

14.A.II.6. Remarks: *Box's M (Sig. .012; Log determinants: A-Group - -2.890, Jebel Sahaba/Tushka - -3.693, Malian Sahara - -2.397), no outliers detected, no variables failed tolerance test*

14.A.III. Results

14.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 76.9%, Jebel Sahaba/Tushka (D^2: .027), Malian Sahara (D^2: .957)*

14.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *76.9%*

14.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 73.8%, Jebel Sahaba/Tushka (D^2: .015), Malian Sahara (D^2: 1.973)*

14.A.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (3 A-Group, 4 Malian Sahara), Malian Sahara (2 A-Group, 3 Jebel Sahaba/Tushka)*

14.A.III.2.b. Misclassifications (separate-groups): *A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 7 Malian Sahara), Malian Sahara (2 A-Group, 2 Jebel Sahaba/Tushka)*
14.A.III.3. All groups scatter plot: *No histogram available*

14.A.IV. Additional results
14.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 70.8%, 70.8%), separate-groups covariance matrix (Malian Sahara, 72.3%)*
14.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 76.9%, 76.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 73.8%), variables entered (1)*
14.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%, 60.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%), variables entered (1)*
14.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%, 60.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%), variables entered (1)*

14.B.I. Summary
14.B.I.1. Individual: *Abu Tabari 02/28-11*
14.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
14.B.I.3. Data: *Scaled cranial measurements*
14.B.I.4. Classification: *Malian Sahara*

14.B.II. Analysis overview
14.B.II.1. Method: *Mahalanobis distance, simultaneous entry*
14.B.II.2.a. Variables in matrix: *2*
14.B.II.2.b. Variables entered: *1*
14.B.II.3. Best predictors: *9. Least frontal breadth (1.000)*
14.B.II.4.a. Wilks' Lambda: *1: .902 (Sig. .051)*
14.B.II.4.b. Eigenvalues: *1: .108 (r: .312)*
14.B.II.5. Prior classification probability: *33.5% (prior prob. + 25%: 41.8%)*
14.B.II.6. Remarks: *Box's M (Sig. .717; Log determinants: A-Group - -1.987, Jebel Sahaba/Tushka - -1.605, Malian Sahara - -1.816), removed outliers: A-Group 401/43 (D^2: 4.639; critical value: 3.841 - p 0.95, df 1), Malian Sahara MN10/H4 (D^2: 3.993; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

14.B.III. Results
14.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 54.1%, Malian Sahara (D^2: .001), A-Group (D^2: .118)*
14.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *54.1%*
14.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 54.1%, Malian Sahara (D^2: .001), A-Group (D^2: .143)*
14.B.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 9 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 7 Malian Sahara), Malian Sahara (1 A-Group, 6 Jebel Sahaba/Tushka)*
14.B.III.2.b. Misclassifications (separate-groups): *A-Group (3 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 6 Malian Sahara), Malian Sahara (2 A-Group, 6 Jebel Sahaba/Tushka)*
14.B.III.3. All groups scatter plot: *No histogram available*

14.B.IV. Additional results
14.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 55.4%, 52.3%), separate-groups covariance matrix (A-Group, 52.3%)*
14.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 56.9%, 56.9%), separate-groups covariance matrix (Malian Sahara, 52.3%), variables entered (1)*
14.B.IV.2. Alternative comparative prehistoric samples: *Simultaneous entry (within-groups covariance matrix - Malian Sahara, 47.0%, 45.8%; separate-groups covariance matrix - Malian Sahara, 49.4%), variables entered (1)*
14.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 47.0%, 45.8%; separate-groups covariance matrix - Malian Sahara, 49.4%), variables entered (1)*

14.C.I. Summary
14.C.I.1. Individual: *Abu Tabari 02/28-11*
14.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
14.C.I.3. Data: *Non-metric cranial and dental traits*
14.C.I.4. Classification: *Jebel Sahaba/Tushka*

14.C.II. Analysis overview

14.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

14.C.II.2.a. Variables in matrix: *6*

14.C.II.2.b. Variables entered: *5*

14.C.II.3. Best predictors: *Sella nasi (main) (.901), Orientation of the Processus frontales maxillae (.694), Sella nasi (additional tendency/superstructure) (-.241), Orientation of the Processus frontales maxillae (.492 - Function 2)*

14.C.II.4.a. Wilks' Lambda: *1 through 2: .486 (Sig. .000), 2: .842 (Sig. .035)*

14.C.II.4.b. Eigenvalues: *1: .731 (r: .650), 2: .188 (r: .397)*

14.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

14.C.II.6. Remarks: *Box's M (test result not accepted; Sig. .077; Log determinants: A-Group - -9.813, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -10.469), no outliers detected, no variables failed tolerance test*

14.C.III. Results

14.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 66.2%, Jebel Sahaba/Tushka (D^2: 3.798), A-Group (D^2: 6.570)*

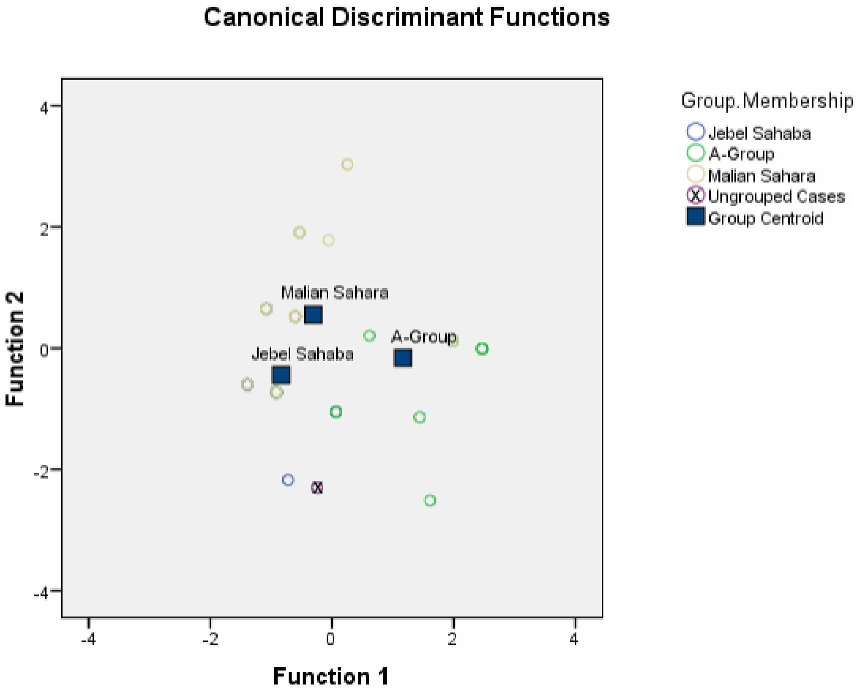
14.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *61.5%*

14.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 61.5%, Jebel Sahaba/Tushka (D^2: 5.361), Malian Sahara (D^2: 5.684)*

14.C.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 7 Malian Sahara), Malian Sahara (3 A-Group, 5 Jebel Sahaba/Tushka)*

14.C.III.2.b. Misclassifications (separate-groups): *A-Group (4 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group), Malian Sahara (3 A-Group, 15 Jebel Sahaba/Tushka)*

14.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



14.C.IV. Additional results

14.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 66.2%, 60.0%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 58.5%)*

14.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%, 60.0%), separate-groups covariance matrix (Malian Sahara, 50.8%), variables entered (2)*

14.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 54.2%, 50.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 49.4%), variables entered (4)*

14.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 50.6%, 49.4%; separate-groups covariance matrix - Malian Sahara, 68.7%), variables entered (4)*

14.D.I. Summary

14.D.I.1. Individual: *Abu Tabari 02/28-11*

14.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

14.D.I.3. Data: *Cranial measurements*

14.D.I.4. Classification: *Haya*

14.D.II. Analysis overview

14.D.II.1. Method: *Simultaneous entry*

14.D.II.2.a. Variables in matrix: *2*

14.D.II.2.b. Variables entered: *2*

14.D.II.3. Best predictors: *50(1). Interorbital breadth (.747), 9. Least frontal breadth (-.302), 9. Least frontal breadth (.953 - Function 2)*

14.D.II.4.a. Wilks' Lambda: *1 through 2: .848 (Sig. .032), 2: .971 (Sig. .394)*

14.D.II.4.b. Eigenvalues: *1: .146 (r: .357), 2: .030 (r: .170)*

14.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.2%)*

14.D.II.6. Remarks: *Box's M (Sig. .253; Log determinants: Southern Sudan - 4.397, Chad - 3.737, Mandinka - 4.335, Somalis - 3.923, Haya - 3.991), removed outliers: Mandinka 0.141-19 (D^2: 6.701; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.48 (D^2: 6.004; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

14.D.III. Results

14.D.III.1.a. Within-groups covariance matrix: *Haya, 28.3%, Haya (D^2: 4.933), Chad (D^2: 7.798)*

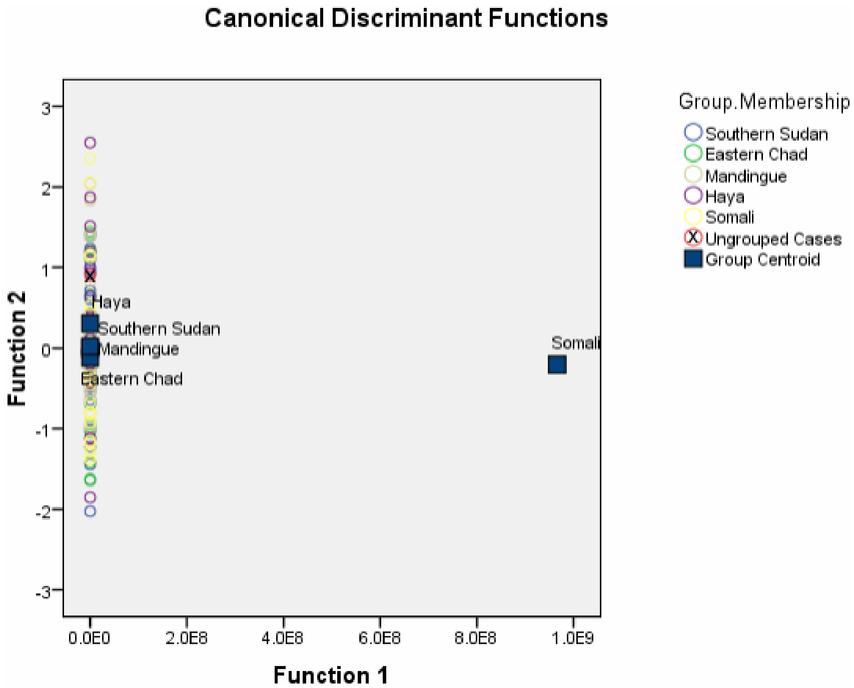
14.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *31.1%*

14.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 27.4%, Southern Sudan (D^2: 5.579), Haya (D^2: 6.755)*

14.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 3 Somalis, 6 Haya), Chad (12 Southern Sudan, 4 Somalis, 3 Haya), Mandinka (11 Southern Sudan, 3 Chad, 5 Somalis, 2 Haya), Somalis (3 Southern Sudan, 3 Chad, 5 Haya), Haya (5 Southern Sudan, 2 Chad, 4 Somalis)*

14.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (7 Chad, 4 Mandinka, 8 Haya), Chad (5 Southern Sudan, 2 Mandinka, 7 Haya), Mandinka (5 Southern Sudan, 6 Chad, 5 Haya), Somalis (8 Chad, 5 Mandinka, 6 Haya), Haya (2 Southern Sudan, 4 Chad, 3 Mandinka)*

14.D.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



14.D.IV. Additional results

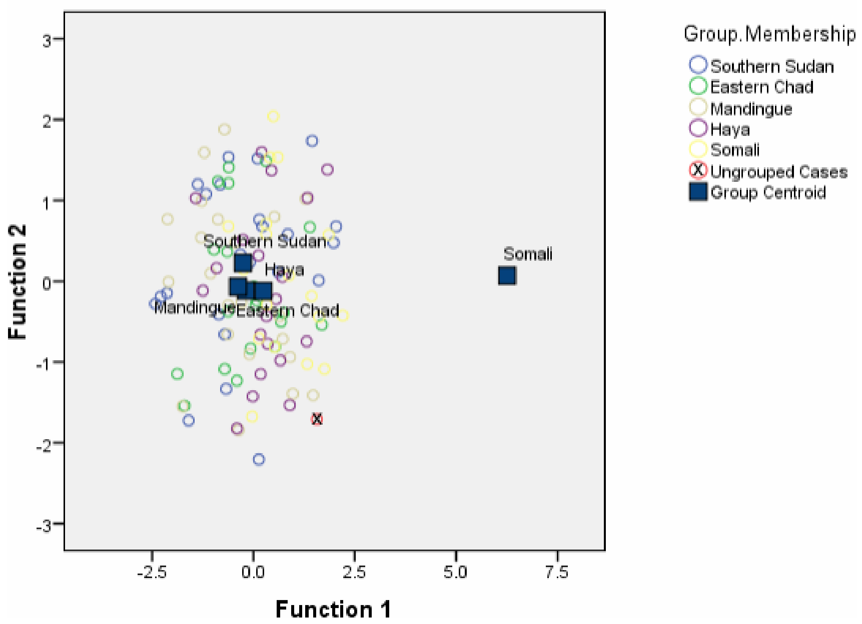
14.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 26.9%, 24.1%), separate-groups covariance matrix (Southern Sudan, 27.8%)*

14.D.IV.1.b. Wilk's Lambda: *No variables are qualify for the analysis*

14.D.IV.2. Raw matrix: *Simultaneous entry (within-groups covariance matrix - Haya, 26.9%, 24.1%; separate-groups covariance matrix - Southern Sudan, 27.8%), variables entered (2)*

14.E.I. Summary	
14.E.I.1. Individual:	*Abu Tabari 02/28-11*
14.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
14.E.I.3. Data:	*Scaled cranial measurements*
14.E.I.4. Classification:	*Haya*
14.E.II. Analysis overview	
14.E.II.1. Method:	*Simultaneous entry*
14.E.II.2.a. Variables in matrix:	*2*
14.E.II.2.b. Variables entered:	*2*
14.E.II.3. Best predictors:	*9. Least frontal breadth (.545), 50(1). Interorbital breadth (-.407), *50(1). Interorbital breadth (.913 - Function 2)*
14.E.II.4.a. Wilks' Lambda:	*1 through 2: .843 (Sig. .029), 2: .981 (Sig. .590)*
14.E.II.4.b. Eigenvalues:	*1: .164 (r: .375), 2: .019 (r: .137)*
14.E.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.12%)*
14.E.II.6. Remarks:	*Box's M (Sig. .394; Log determinants: Southern Sudan - -4.214, Chad - -5.242, Mandinka - -4.590, Somalis - -5.220, Haya - 5.020), removed outliers: Southern Sudan E.1028-10 (D^2: 7.375; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.1 (D^2: 8.098; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.41 (D^2: 6.295; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*
14.E.III. Results	
14.E.III.1.a. Within-groups covariance matrix:	*Haya, 28.6%, Haya (D^2: 4.268), Chad (D^2: 5.585)*
14.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*30.5%*
14.E.III.1.c. Separate-groups covariance matrix:	*Mandinka, 35.2%, Mandinka (D^2: 4.382), Haya (D^2: 5.177)*
14.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 7 Mandinka, 5 Somalis, 1 Haya), Chad (6 Southern Sudan, 5 Mandinka, 2 Somalis, 3 Haya), Mandinka (8 Southern Sudan, 3 Chad, 2 Somalis, 4 Haya), Somalis (7 Southern Sudan, 2 Chad, 2 Haya), Haya (5 Southern Sudan, 4 Chad, 2 Mandinka, 4 Somalis)*
14.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (7 Chad, 3 Mandinka, 4 Haya), Chad (6 Southern Sudan, 2 Mandinka, 4 Haya), Mandinka (3 Southern Sudan, 5 Chad, 6 Haya), Somalis (5 Southern Sudan, 4 Chad, 2 Mandinka, 7 Haya), Haya (4 Southern Sudan, 4 Chad, 2 Mandinka)*
14.E.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*

Canonical Discriminant Functions



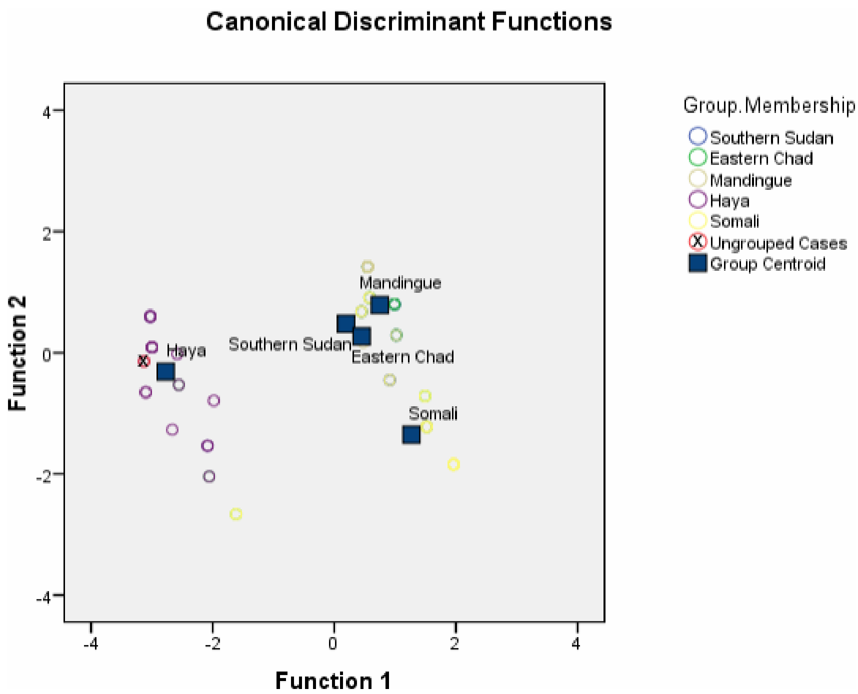
14.E.IV. Additional results	
14.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 28.7%, 30.6%), separate-groups covariance matrix (Mandinka, 33.3%)*
14.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 28.7%, 30.6%), separate-groups covariance matrix (Mandinka, 33.3%), variables entered (2)*

14.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 28.7%, 30.6%; separate-groups covariance matrix - Mandinka, 33.3%), variables entered (2)*

14.F.I. Summary
14.F.I.1. Individual: *Abu Tabari 02/28-11*
14.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
14.F.I.3. Data: *Non-metric cranial and dental traits*
14.F.I.4. Classification: *Haya*

14.F.II. Analysis overview
14.F.II.1. Method: *Simultaneous entry*
14.F.II.2.a. Variables in matrix: *6*
14.F.II.2.b. Variables entered: *5*
14.F.II.3. Best predictors: *Double shovel UI1 (.906), Sella nasi (main) (.203), Interorbital breadth (-.150), Sella nasi (main) (-.832 - Function 2), Interorbital breadth (.663 - Function 3), Interorbital breadth (-.627 - Function 4)*
14.F.II.4.a. Wilks' Lambda: *1 through 4: .200 (Sig. .000), 2 through 4: .603 (Sig. .000), 3 through 4: .951 (Sig. .543), 4: .993 (Sig. .706)*
14.F.II.4.b. Eigenvalues: *1: 2.009 (r: .817), 2: .577 (r: .605), 3: .044 (r: .205), 4: .007 (r: .083)*
14.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
14.F.II.6. Remarks: *Box's M (test result not accepted; Sig. .077; Log determinants: Southern Sudan - -9.299, Chad - -10.294, Mandinka - 'singular', Somalis - -11.788, Haya - 'singular'), removed outliers: Southern Sudan 9.956 (D^2: 15.813; critical value: 12.592 - p 0.95, df 6), Mandinka 9.547 (D^2: 11.336; critical value: 11.070 - p 0.95, df 5), variables failing tolerance test - removed: Sutura metopica*

14.F.III. Results
14.F.III.1.a. Within-groups covariance matrix: *Haya, 58.5%, Haya (D^2: 7.902), Southern Sudan (D^2: 18.123)*
14.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *50.9%*
14.F.III.1.c. Separate-groups covariance matrix: *Haya, 57.5%, Haya (D^2: 6.105), Southern Sudan (D^2: 11.769)*
14.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 7 Mandinka, 4 Somalis, 4 Haya), Chad (5 Southern Sudan, 10 Mandinka, 4 Somalis, 3 Haya), Mandinka (2 Southern Sudan, 3 Chad, 3 Somalis), Somalis (2 Southern Sudan, 1 Mandinka, 2 Haya)*
14.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (9 Mandinka, 2 Somalis, 4 Haya), Chad (4 Southern Sudan, 11 Mandinka, 5 Somalis, 2 Haya), Mandinka (2 Southern Sudan, 3 Somalis), Somalis (1 Southern Sudan, 2 Mandinka)*
14.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



14.F.IV. Additional results

14.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 57.4%, 52.8%), separate-groups covariance matrix (Haya, 58.3%)*
14.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 55.6%, 55.6%), separate-groups covariance matrix (Haya, 38.9%), variables entered (3)*
14.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 50.9%, 47.2%; separate-groups covariance matrix - Haya, 49.1%), variables entered (3)*

14.G.I. Summary

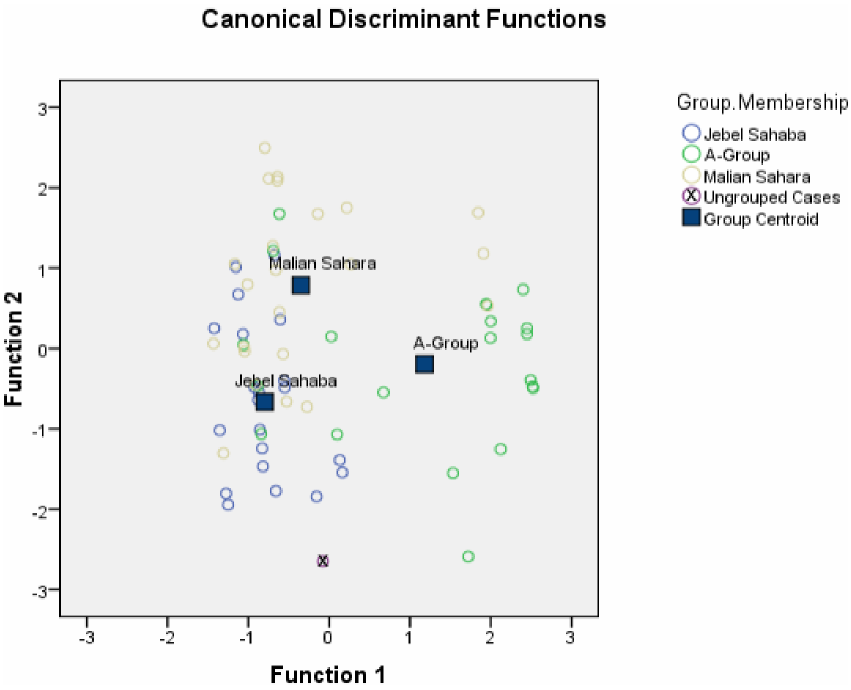
14.G.I.1. Individual:	*Abu Tabari 02/28-11*
14.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
14.G.I.3. Data:	*Cranial measurements and cranial and dental non-metric traits*
14.G.I.4. Classification:	*Jebel Sahaba/Tushka*

14.G.II. Analysis overview

14.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
14.G.II.2.a. Variables in matrix:	*8*
14.G.II.2.b. Variables entered:	*7*
14.G.II.3. Best predictors:	*Sella nasi (main) (.895), Orientation of the Processus frontales maxillae (.313), Interorbital breadth (.275), 9. Least frontal breadth (-.925 - Function 2)*
14.G.II.4.a. Wilks' Lambda:	*1 through 2: .415 (Sig. .000), 2: .719 (Sig. .003)*
14.G.II.4.b. Eigenvalues:	*1: .733 (r: .650), 2: .391 (r: .530)*
14.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
14.G.II.6. Remarks:	*Box's M (test result not accepted; Sig. .163; Log determinants: A-Group - -15.460, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -16.084), no outliers detected, no variables failed tolerance test*

14.G.III. Results

14.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 64.6%, Jebel Sahaba/Tushka (D^2: 4.447), A-Group (D^2: 7.602)*
14.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*58.5%*
14.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 70.8%, Jebel Sahaba/Tushka (D^2: 5.410), A-Group (D^2: 7.911)*
14.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (5 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 6 Malian Sahara), Malian Sahara (3 A-Group, 8 Jebel Sahaba/Tushka)*
14.G.III.2.b. Misclassifications (separate-groups):	*A-Group (3 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (2 Malian Sahara), Malian Sahara (3 A-Group, 8 Jebel Sahaba/Tushka)*
14.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



14.G.IV. Additional results

14.G.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 63.1%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 69.2%)*

14.G.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 61.5%, 61.5%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 52.3%), variables entered (2)*

14.G.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 59.0%, 57.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 59.0%), variables entered (5)*

14.G.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 65.1%, 61.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 79.5%), variables entered (6)*

14.H.I. Summary

14.H.I.1. Individual: *Abu Tabari 02/28-11*

14.H.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

14.H.I.3. Data: *Cranial measurements and cranial and dental non-metric traits*

14.H.I.4. Classification: *Haya*

14.H.II. Analysis overview

14.H.II.1. Method: *Simultaneous entry*

14.H.II.2.a. Variables in matrix: *8*

14.H.II.2.b. Variables entered: *7*

14.H.II.3. Best predictors: *Double shovel UI1 (.907), Sella nasi (main) (.168), Interorbital breadth (-.131), Sella nasi (main) (-.752 - Function 2), Interorbital breadth (.633 - Function 3), Orientation of the Processus frontales maxillae (.597 - Function 4)*

14.H.II.4.a. Wilks' Lambda: *1 through 4: .179 (Sig. .000), 2 through 4: .549 (Sig. .000), 3 through 4: .928 (Sig. .676), 4: .995 (Sig. .976)*

14.H.II.4.b. Eigenvalues: *1: 2.077 (r: .822), 2: .689 (r: .639), 3: .073 (r: .261), 4: .005 (r: .068)*

14.H.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

14.H.II.6. Remarks: *Box's M (test result not accepted; Sig. .095; Log determinants: Southern Sudan - -6.285, Chad - -7.023, Mandinka - 'singular', Somalis - -8.078, Haya - 'singular'), removed outliers: Southern Sudan 9.956 (D^2: 15.612; critical value: 15.507 - p 0.95, df 8), variables failing tolerance test - removed: Sutura metopica*

14.H.III. Results

14.H.III.1.a. Within-groups covariance matrix: *Haya, 52.3%, Haya (D^2: 9.570), Southern Sudan (D^2: 26.925)*

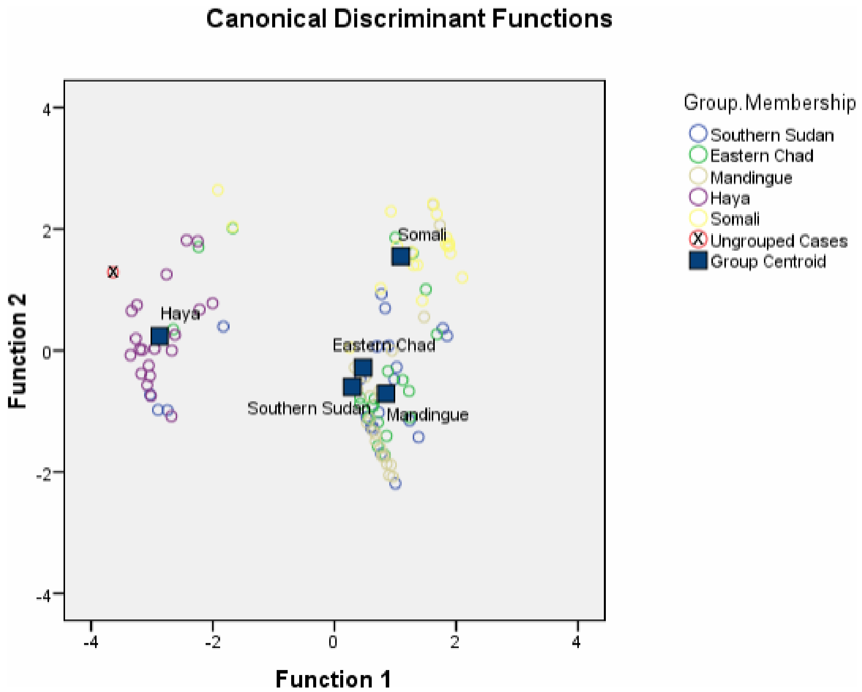
14.H.III.1.b. Within-groups covariance matrix (Leave-one-out): *43.9%*

14.H.III.1.c. Separate-groups covariance matrix: *Haya, 58.9%, Haya (D^2: 12.141), Southern Sudan (D^2: 22.198)*

14.H.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 8 Mandinka, 3 Somalis, 4 Haya), Chad (6 Southern Sudan, 10 Mandinka, 3 Somalis, 3 Haya), Mandinka (8 Southern Sudan, 4 Chad, 3 Somalis), Somalis (2 Southern Sudan, 1 Mandinka, 2 Haya)*

14.H.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Chad, 8 Mandinka, 1 Somali, 3 Haya), Chad (4 Southern Sudan, 11 Mandinka, 3 Somalis, 2 Haya), Mandinka (2 Chad, 3 Somalis), Somalis (1 Southern Sudan, 2 Chad, 1 Mandinka)*

14.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



14.H.IV. Additional results

14.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 53.7%, 44.4%), separate-groups covariance matrix (Haya, 60.2%)*

14.H.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 55.6%, 55.6%), separate-groups covariance matrix (Haya, 38.9%), variables entered (3)*

14.H.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 50.9%, 47.2%; separate-groups covariance matrix - Haya, 49.1%), variables entered (3)*

15. Abu Tabari 02/28-13

15.A.I. Summary

15.A.I.1. Individual: *Abu Tabari 02/28-13*

15.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

15.A.I.3. Data: *Dental measurements*

15.A.I.4. Classification: *Malian Sahara*

15.A.II. Analysis overview

15.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

15.A.II.2.a. Variables in matrix: *1*

15.A.II.2.b. Variables entered: *1*

15.A.II.3. Best predictors: *81. Crown length LI2 (1.000)*

15.A.II.4.a. Wilks' Lambda: *1: .603 (Sig. .000)*

15.A.II.4.b. Eigenvalues: *1: .658 (r: .630)*

15.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

15.A.II.6. Remarks: *Box's M (Sig. .612; Log determinants: A-Group - -3.065, Jebel Sahaba/Tushka - -3.037, Malian Sahara - -2.668), removed outliers: A-Group 401/14 (D^2: 6.110; critical value: 3.841 - p 0.95, df 1), Malian Sahara MN27/H2 (D^2: 5.168; critical value: 3.841 - p 0.95, df 1), Malian Sahara MN27/H3 (D^2: 3.901; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

15.A.III. Results

15.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 66.1%, Malian Sahara (D^2: .000), Jebel Sahaba/Tushka (D^2: .046)*

15.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *66.1%*

15.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 64.5%, Jebel Sahaba/Tushka (D^2: .052), Malian Sahara (D^2: .000)*

15.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 10 Malian Sahara), Malian Sahara (4 A-Group, 1 Jebel Sahaba/Tushka)*

15.A.III.2.b. Misclassifications (separate-groups): *A-Group (3 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (3 A-Group, 4 Malian Sahara), Malian Sahara (4 A-Group, 8 Jebel Sahaba/Tushka)*

15.A.III.3. All groups scatter plot: *No histogram available*

15.A.IV. Additional results

15.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 66.1%, 66.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 64.5%)*

15.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 66.1%, 66.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 64.5%), variables entered (1)*

15.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 60.2%, 60.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 61.4%), variables entered (1)*

15.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 56.6%, 56.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%), variables entered (1)*

15.C.I. Summary

15.C.I.1. Individual: *Abu Tabari 02/28-13*

15.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

15.C.I.3. Data: *Non-metric cranial traits*

15.C.I.4. Classification: *Jebel Sahaba/Tushka*

15.C.II. Analysis overview

15.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

15.C.II.2.a. Variables in matrix: *4*

15.C.II.2.b. Variables entered: *3*

15.C.II.3. Best predictors: *Sella nasi (main) (.910), Orientation of the Processus frontales maxillae (.824), Sella nasi (additional tendency/superstructure) (-.211), Sella nasi (additional tendency/superstructure) (.449 - Function 2)*

15.C.II.4.a. Wilks' Lambda: *1 through 2: .539 (Sig. .000), 2: .883 (Sig. .024)*

15.C.II.4.b. Eigenvalues: *1: .637 (r: .624), 2: .133 (r: .342)*

15.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.7%)*

15.C.II.6. Remarks: *Box's M (test result not accepted; Sig. .105; Log determinants: A-Group - -6.048, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -5.481), removed outliers: A-Group 401/43 (D^2: 8.086; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test*

15.C.III. Results

15.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 60.9%, Jebel Sahaba/Tushka (D^2: .390), Malian Sahara (D^2: 3.097)*

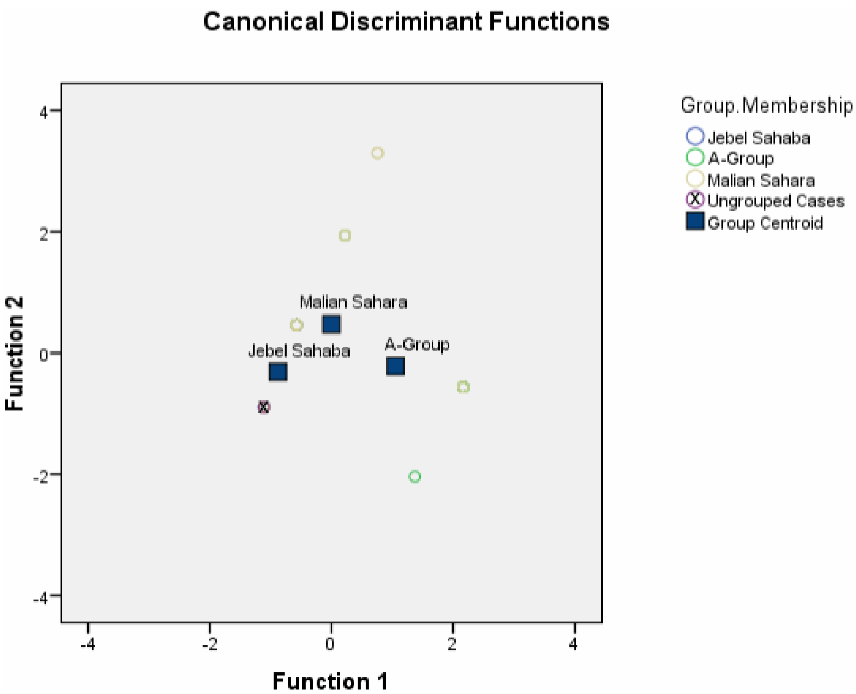
15.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.9%*

15.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 59.4%, Jebel Sahaba/Tushka (D^2: .714), Malian Sahara (D^2: 1.886)*

15.C.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (9 Malian Sahara), Malian Sahara (3 A-Group, 5 Jebel Sahaba/Tushka)*

15.C.III.2.b. Misclassifications (separate-groups): *A-Group (6 Jebel Sahaba/Tushka, 2 Malian Sahara), Malian Sahara (3 A-Group, 15 Jebel Sahaba/Tushka)*

15.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



15.C.IV. Additional results

15.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 61.5%, 61.5%), separate-groups covariance matrix (Malian Sahara, 50.8%)*

15.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 50.8%, 60.0%), separate-groups covariance matrix (Malian Sahara, 50.8%), variables entered (2)*

15.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 48.2%, 48.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 43.4%), variables entered (3)*

15.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 63.9%, 62.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%), variables entered (4)*

15.F.I. Summary

15.F.I.1. Individual: *Abu Tabari 02/28-13*

15.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

15.F.I.3. Data: *Non-metric cranial traits*

15.F.I.4. Classification: *Southern Sudan*

15.F.II. Analysis overview

15.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

15.F.II.2.a. Variables in matrix: *4*

15.F.II.2.b. Variables entered: *3*

15.F.II.3. Best predictors: *Sella nasi (additional tendency/superstructure) (.864), Orientation of the Processus frontales maxillae (-.565), Foramina paranasalia (.361), Foramina paranasalia (-.807 - Function 2), Orientation of the Processus frontales maxillae (.792 - Function 3)*

15.F.II.4.a. Wilks' Lambda: *1 through 3: .632 (Sig. .000), 2 through 3: .920 (Sig. .200), 3: .996 (Sig. .819)*

15.F.II.4.b. Eigenvalues: *1: .456 (r: .560), 2: .082 (r: .276), 3: .004 (r: .062)*

15.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

15.F.II.6. Remarks: *Box's M (Sig. .005; Log determinants: Southern Sudan - -4.782, Chad - -4.422, Mandinka - -4.849, Somalis - -7.485, Haya - -4.873), no outliers detected, no variables failed tolerance test*

15.F.III. Results

15.F.III.1.a. Within-groups covariance matrix: *Somalis, 37.0%, Somalis (D^2: 3.497), Mandinka (D^2: 3.828)*

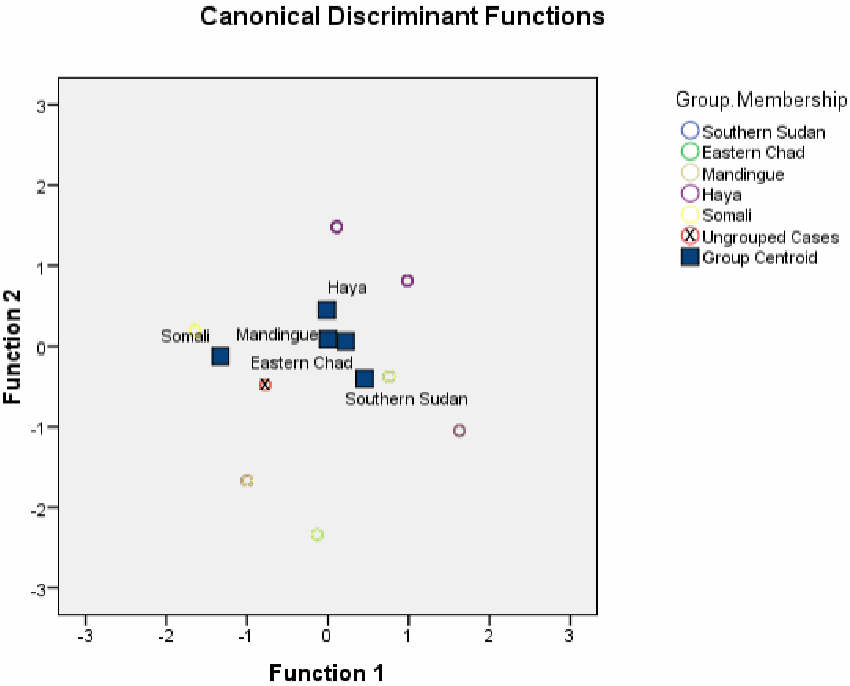
15.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *35.2%*

15.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 42.6%, Southern Sudan (D^2: 3.100), Haya (D^2: 3.524)*

15.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (4 Chad, 6 Mandinka, 8 Somalis), Chad (7 Southern Sudan, 4 Mandinka, 5 Somalis, 6 Haya),* Mandinka (7 Southern Sudan, 5 Somalis, 3 Haya), Somalis (2 Southern Sudan), Haya (1 Southern Sudan, 5 Mandinka, 7 Somalis)

15.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Somali, 6 Haya), Chad (7 Southern Sudan, 3 Somalis, 10 Haya), Mandinka (9 Southern Sudan, 3 Somalis, 10 Haya), Somalis (4 Southern Sudan, 1 Chad), Haya (6 Southern Sudan, 2 Somalis)*

15.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



15.F.IV. Additional results

15.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 38.9%, 35.2%), separate-groups covariance matrix (Haya, 43.5%)*

15.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 34.3%, 34.3%), separate-groups covariance matrix (Southern Sudan, 34.3%), variables entered (1)*

15.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 38.0%, 37.0%; separate-groups covariance matrix - Haya, 46.3%), variables entered (3)*

15.G.I. Summary

15.G.I.1. Individual: *Abu Tabari 02/28-13*

15.G.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

15.G.I.3. Data: *Dental measurements and cranial non-metric traits*

15.G.I.4. Classification: *Jebel Sahaba/Tushka*

15.G.II. Analysis overview

15.G.II.1. Method: *Simultaneous entry*

15.G.II.2.a. Variables in matrix: *5*

15.G.II.2.b. Variables entered: *5*

15.G.II.3. Best predictors: *81. Crown length LI2 (.767), Sella nasi (main) (-.694), Orientation of the Processus frontales maxillae (-.469), Orientation of the Processus frontales maxillae (.726 - Function 2)*

15.G.II.4.a. Wilks' Lambda: *1 through 2: .364 (Sig. .000), 2: .790 (Sig. .007)*

15.G.II.4.b. Eigenvalues: *1: 1.170 (r: .734), 2: .267 (r: .459)*

15.G.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

15.G.II.6. Remarks: *Box's M (test result not accepted; Sig. .409; Log determinants: A-Group - -10.683, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -10.518), no outliers detected, no variables failed tolerance test*

15.G.III. Results

15.G.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 63.1%, Jebel Sahaba/Tushka (D^2: .205), Malian Sahara (D^2: 2.709)*

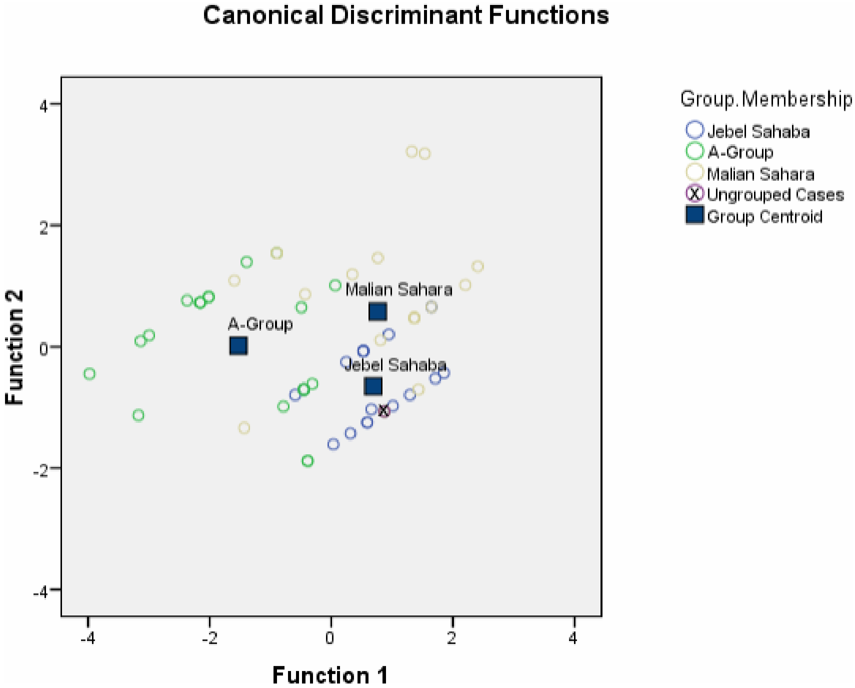
15.G.III.1.b. Within-groups covariance matrix (Leave-one-out): *56.9%*

15.G.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 73.8%, Jebel Sahaba/Tushka (D^2: .754), Malian Sahara (D^2: 1.780)*

15.G.III.2.a. Misclassifications (leave-one-out): *A-Group (7 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 6 Malian Sahara), Malian Sahara (5 A-Group, 5 Jebel Sahaba/Tushka)*

15.G.III.2.b. Misclassifications (separate-groups): *A-Group (3 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (4 A-Group, 6 Jebel Sahaba/Tushka)*

15.G.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



15.G.IV. Additional results

15.G.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 63.1%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 73.8%)*

15.G.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 66.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 50.8%), variables entered (3)*

15.G.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 73.5%, 68.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 77.1%), variables entered (4)*

15.G.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 73.5%, 68.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 77.1%), variables entered (4)*

16. Abu Tabari 02/28-14

16.A.I. Summary

16.A.I.1. Individual: *Abu Tabari 02/28-14*

16.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

16.A.I.3. Data: *Dental measurements*

16.A.I.4. Classification: *Malian Sahara*

16.A.II. Analysis overview

16.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

16.A.II.2.a. Variables in matrix: *24*

16.A.II.2.b. Variables entered: *10*

16.A.II.3. Best predictors: *81(1). Crown width LI2 (.646), 81. Crown length LI1 (.585), 81(1). Crown width UI2 (.558), 81(1). Crown width LI1 (.437 - Function 2)*

16.A.II.4.a. Wilks' Lambda: *1 through 2:.075 (Sig. .000), 2: .339 (Sig. .000)*

16.A.II.4.b. Eigenvalues: *1: 3.521 (r: .882), 2: 1.953 (r: .813)*

16.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

16.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -39.447, Jebel Sahaba/Tushka - -37.291, Malian Sahara - -37.167), no outliers detected, no variables failed tolerance test*

16.A.III. Results

16.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 96.9%, Malian Sahara (D^2: 4.706), Jebel Sahaba/Tushka (D^2: 7.785)*

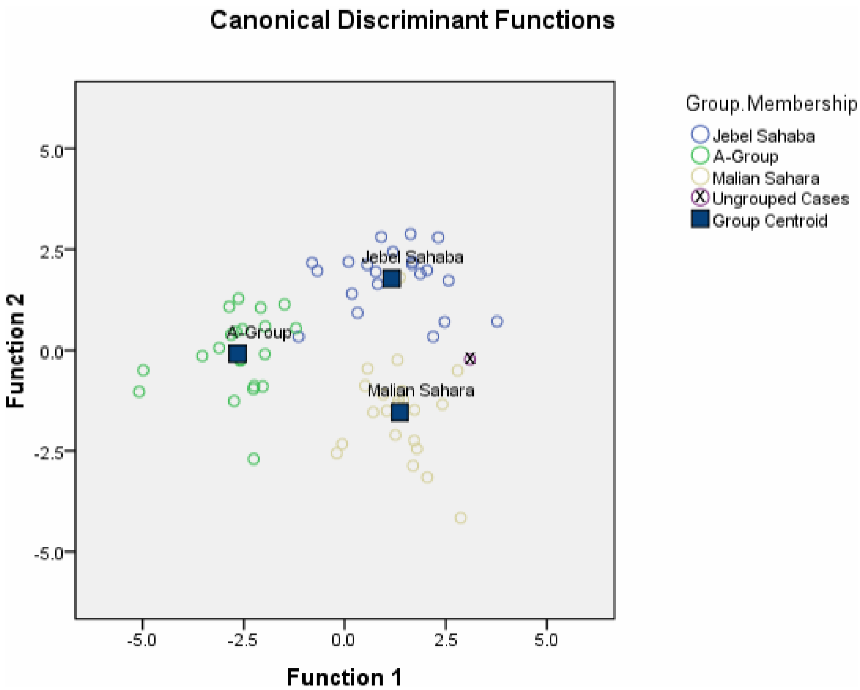
16.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.8%*

16.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 96.9%, Malian Sahara (D^2: 7.302), Jebel Sahaba/Tushka (D^2: 8.764)*

16.A.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*

16.A.III.2.b. Misclassifications (separate-groups): *Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*

16.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



16.A.IV. Additional results

16.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 98.5%, 83.1%), separate-groups covariance matrix (Malian Sahara, 98.5%)*

16.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 90.8%, 87.7%), separate-groups covariance matrix (Malian Sahara, 95.4%), variables entered (8)*

16.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 95.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (14)*

16.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 95.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (17)*

16.B.I. Summary

16.B.I.1. Individual: *Abu Tabari 02/28-14*

16.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

16.B.I.3. Data: *Scaled dental measurements*

16.B.I.4. Classification: *Malian Sahara*

16.B.II. Analysis overview

16.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

16.B.II.2.a. Variables in matrix: *17*

16.B.II.2.b. Variables entered: *10*

16.B.II.3. Best predictors: *81(1). Crown width LI1 (.405), 81(1). Crown width UM1 (.352), 81(1). Crown width LI2 (.301), 81(1), Crown width LI2 (.537 - Function 2)*

16.B.II.4.a. Wilks' Lambda: *1 through 2: .099 (Sig. .000), 2: .559 (Sig. .000)*

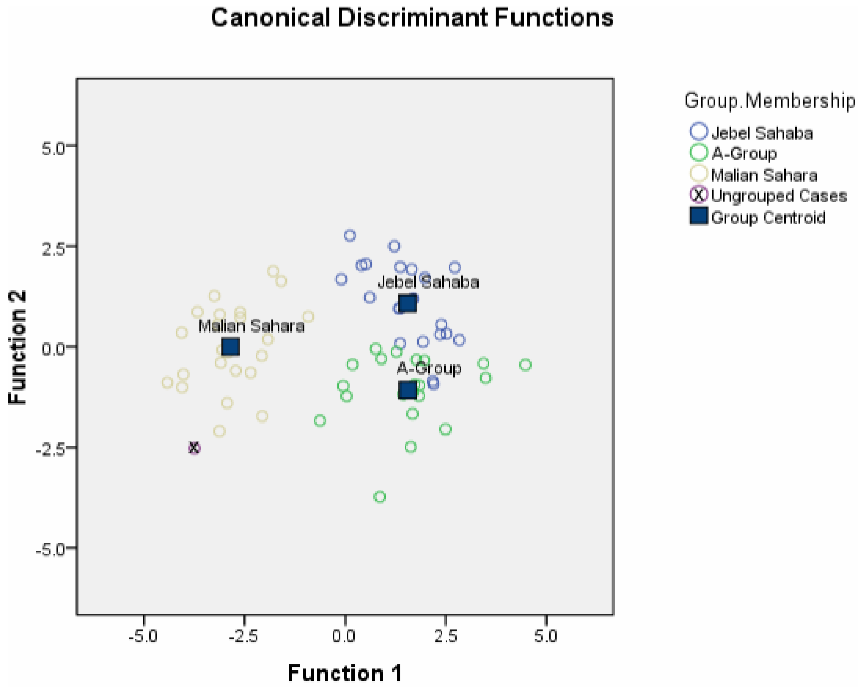
16.B.II.4.b. Eigenvalues: *1: 4.658 (r: .907), 2: .790 (r: .664)*

16.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

16.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -79.013, Jebel Sahaba/Tushka - -75.226, Malian Sahara - -73.250), no outliers detected, no variables failed tolerance test*

16.B.III. Results

16.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: 7.184), A-Group (D^2: 30.273)*
16.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*80.0%*
16.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: 5.900), A-Group (D^2: 19.251)*
16.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (6 A-Group), Malian Sahara (2 Jebel Sahaba/Tushka)*
16.B.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (2 A-Group)*
16.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



16.B.IV. Additional results

16.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 95.4%, 78.5%), separate-groups covariance matrix (Malian Sahara, 96.9%)*
16.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 90.8%, 84.6%), separate-groups covariance matrix (Malian Sahara, 89.2%), variables entered (7)*
16.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 91.6%, 83.1%; separate-groups covariance matrix - Malian Sahara, 94.0%), variables entered (11)*
16.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 94.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (17)*

16.C.I. Summary

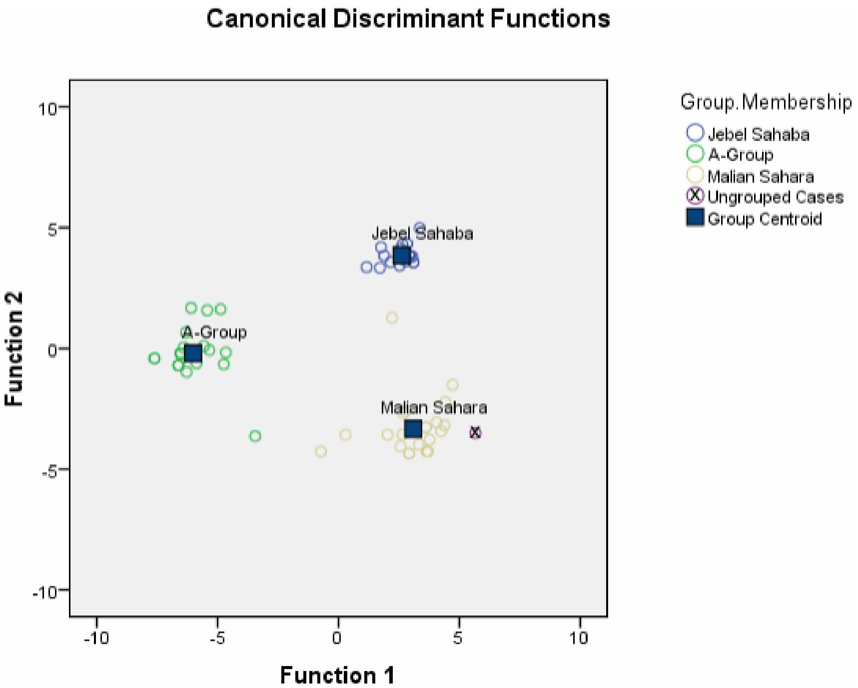
16.C.I.1. Individual:	*Abu Tabari 02/28-14*
16.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
16.C.I.3. Data:	*Non-metric cranial and dental traits*
16.C.I.4. Classification:	*Malian Sahara*

16.C.II. Analysis overview

16.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
16.C.II.2.a. Variables in matrix:	*22*
16.C.II.2.b. Variables entered:	*14*
16.C.II.3. Best predictors:	*Distal accessory ridge UC (.623), Shovel UI1 (.324), Tuberculum dentale UI2 (.316), Tuberculum dentale UI2 (-.738 - Function 2)*
16.C.II.4.a. Wilks' Lambda:	*1 through 2: .005 (Sig. .000), 2: .099 (Sig. .000)*
16.C.II.4.b. Eigenvalues:	*1: 18.097 (r: .973), 2: 9.141 (r: .949)*
16.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
16.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

16.C.III. Results

16.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 6.610), Jebel Sahaba/Tushka (D^2: 63.431)*
16.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.8%*
16.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 4.143), A-Group (D^2: 136.904)*
16.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
16.C.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
16.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



16.C.IV. Additional results

16.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 90.8%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
16.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 93.8%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (7)*
16.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 92.8%; separate-groups covariance matrix - Malian Sahara, 95.2%), variables entered (11)*
16.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (12)*

16.D.I. Summary

16.D.I.1. Individual:	*Abu Tabari 02/28-14*
16.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
16.D.I.3. Data:	*Dental measurements*
16.D.I.4. Classification:	*Southern Sudan*

16.D.II. Analysis overview

16.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
16.D.II.2.a. Variables in matrix:	*14*
16.D.II.2.b. Variables entered:	*12*
16.D.II.3. Best predictors:	*81. Crown length LC (.762), 81(1). Crown width UC (-.413), 81(1). Crown width LC (.399), 81. Crown length UI2 (.737 - Function 2), 81. Crown length LM1 (.674 - Function 3), 81. Crown length UM1 (.446 - Function 4)*
16.D.II.4.a. Wilks' Lambda:	*1 through 4: .038 (Sig. .000), 2 through 4: .147 (Sig. .000), 3 through 4: .537 (Sig. .000), 4: .824 (Sig. .025)*
16.D.II.4.b. Eigenvalues:	*1: 2.913 (r: .863), 2: 2.647 (r: .852), 3: .535 (r: .590), 4: .213 (r: .419)*
16.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
16.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -38.415, Chad - -43.502, Mandinka - -79.197, Somalis - -*

40.862, Haya - -46.885), no outliers detected (except ungrouped case - D^2: 66.666; critical value: 21.026 - p 0.95, df 12), no variables failed tolerance test

16.D.III. Results

16.D.III.1.a. Within-groups covariance matrix: *Haya, 85.2%, Haya (D^2: 98.705), Southern Sudan (D^2: 103.619)*

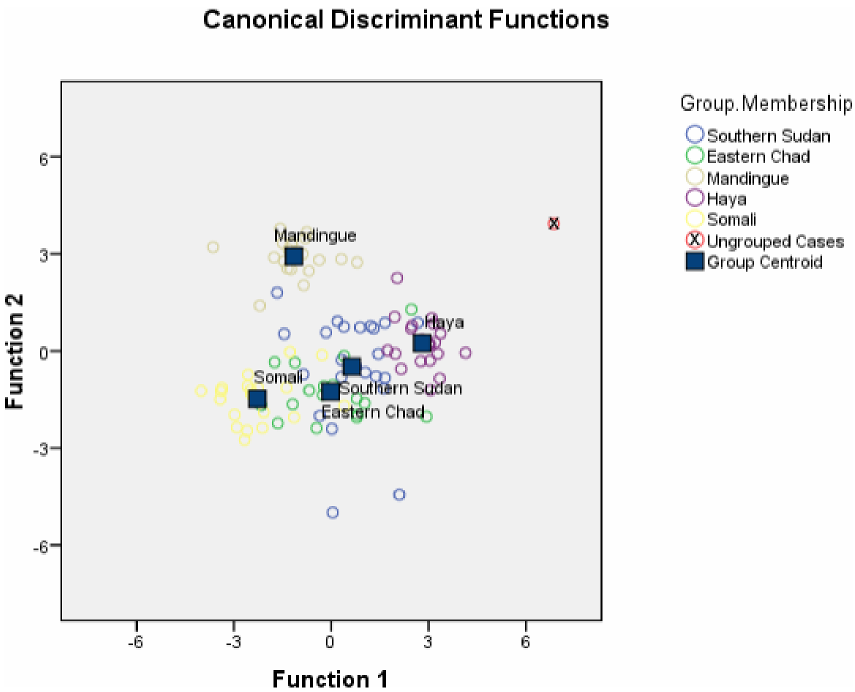
16.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *76.9%*

16.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 91.7%, Southern Sudan (D^2: 66.666), Chad (D^2: 146.539)*

16.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 1 Mandinka, 4 Somalis, 4 Haya), Chad (3 Southern Sudan, 4 Somalis, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 3 Chad), Haya (1 Southern Sudan, 1 Chad)*

16.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad), Chad (2 Southern Sudan, 2 Somalis, 1 Haya), Somalis (1 Southern Sudan, 1 Chad)*

16.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



16.D.IV. Additional results

16.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 86.1%, 72.2%), separate-groups covariance matrix (Southern Sudan, 89.8%)*

16.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 82.4%, 78.7%), separate-groups covariance matrix (Souther Sudan, 88.0%), variables entered (8)*

16.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 93.5%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (25)*

16.E.I. Summary

16.E.I.1. Individual: *Abu Tabari 02/28-14*

16.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

16.E.I.3. Data: *Scaled dental measurements*

16.E.I.4. Classification: *Southern Sudan*

16.E.II. Analysis overview

16.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

16.E.II.2.a. Variables in matrix: *7*

16.E.II.2.b. Variables entered: *6*

16.E.II.3. Best predictors: *81. Crown length UI2 (.931), 81(1). Crown width UM1 (.157), 81. Crown length UM1 (.061), 81. Crown length LM1 (.936 - Function 2), 81. Crown length UM1 (.566 - Function 3), 81(1). Crown width UM1 (-.775 - Function 4)*

16.E.II.4.a. Wilks' Lambda: *1 through 4: .245 (Sig. .000), 2 through 4: .566 (Sig. .000), 3 through 4: .797 (Sig. .003), 4: .914 (Sig. .028)*

16.E.II.4.b. Eigenvalues: *1: 1.307 (r: .753), 2: .410 (r: .539), 3: .146 (r: .357), 4: .094 (r: .293)*

16.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

16.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -36.182, Chad - -41.799, Mandinka - -69.197, Somalis - -37.966, Haya - -39.729), no outliers detected, no variables failed tolerance test*

16.E.III. Results

16.E.III.1.a. Within-groups covariance matrix: *Southern Sudan, 68.5%, Southern Sudan (D^2: .955), Mandinka (D^2: 1.821)*

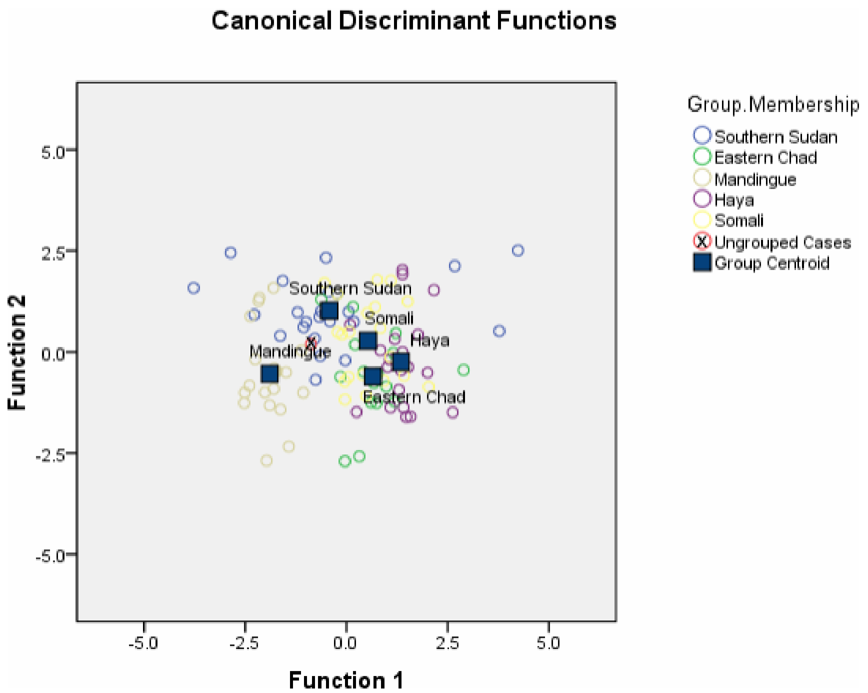
16.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *58.3%*

16.E.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 79.6%, Southern Sudan (D^2: 1.169), Somalis (D^2: 5.259)*

16.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 4 Mandinka, 1 Somali, 3 Haya), Chad (2 Southern Sudan, 2 Somalis, 5 Haya), Mandinka (4 Southern Sudan), Somalis (6 Southern Sudan, 5 Chad, 1), Haya (3 Southern Sudan, 6 Chad, 1 Somali)*

16.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka, 3 Somalis), Chad (2 Southern Sudan, 2 Somalis, 2 Haya), Mandinka (1 Southern Sudan), Somalis (3 Southern Sudan, 4 Chad), Haya (1 Chad, 3 Somalis)*

16.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



16.E.IV. Additional results

16.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 67.6%, 59.3%), separate-groups covariance matrix (Mandinka, 73.1%)*

16.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 68.5%, 60.2%), separate-groups covariance matrix (Mandinka, 75.0%), variables entered (5)*

16.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 98.1%, 91.7%; separate-groups covariance matrix - Haya, 100.0%), variables entered (28)*

16.F.I. Summary

16.F.I.1. Individual: *Abu Tabari 02/28-14*

16.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

16.F.I.3. Data: *Non-metric cranial and dental traits*

16.F.I.4. Classification: *Southern Sudan*

16.F.II. Analysis overview

16.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

16.F.II.2.a. Variables in matrix: *24*

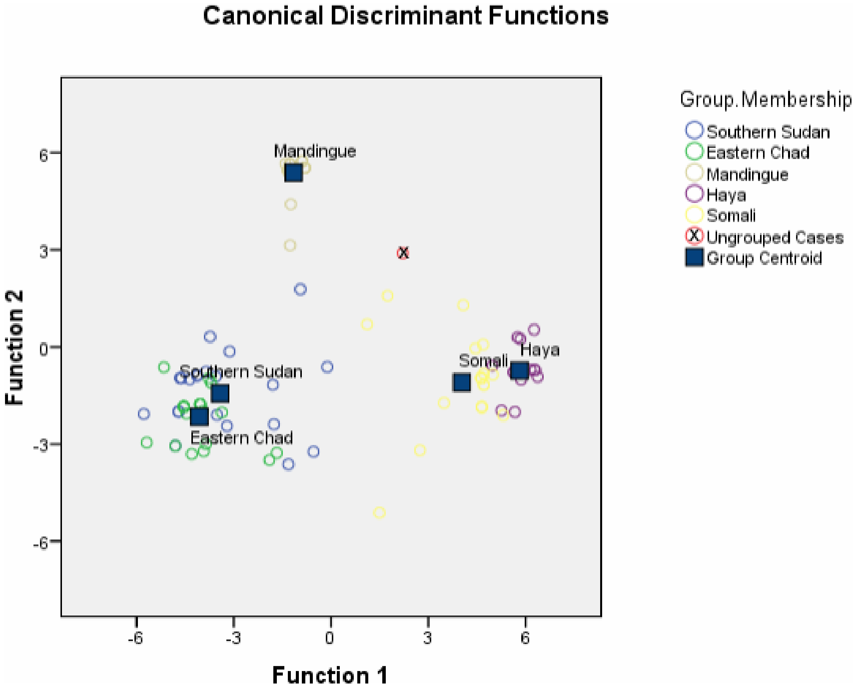
16.F.II.2.b. Variables entered: *14*

16.F.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.585), Tuberculum dentale UI2 (.497), Shovel UI1 (-.451), Tuberculum dentale UI2 (.524 - Function 2), Canine*

	mesial ridge UC (.621 - Function 3), Interruption groove UI2 (-.649 - Function 4)
16.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .007 (Sig. .000), 3 through 4: .066 (Sig. .000), 4: .287 (Sig. .000)*
16.F.II.4.b. Eigenvalues:	*1: 16.290 (r: .971), 2: 7.996 (r: .943), 3: 3.344 (r: .877), 4: 2.485 (r: .844)*
16.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
16.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -35.575, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected (except ungrouped case - D^2: 26.106; critical value: 23.685 - p 0.95, df 14), no variables failed tolerance test*

16.F.III. Results

16.F.III.1.a. Within-groups covariance matrix:	*Mandinka, 96.3%, Mandinka (D^2: 22.645), Haya (D^2: 30.094)*
16.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*92.6%*
16.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 97.2%, Southern Sudan (D^2: 26.106), Somalis (D^2: 32.683)*
16.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 1 Somali), Chad (2 Southern Sudan), Somalis (1 Haya), Haya (1 Somali)*
16.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Chad (2 Southern Sudan)*
16.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



16.F.IV. Additional results

16.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Mandinka, 95.4%, 89.8%), separate-groups covariance matrix (Somalis, 96.3%)*
16.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Mandinka, 96.3%, 91.7%), separate-groups covariance matrix (Somalis, 96.3%), variables entered (15)*
16.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Haya, 100.0%), variables entered (21)*

17. Abu Tabari 02/28-15

17.A.I. Summary

17.A.I.1. Individual:	*Abu Tabari 02/28-15*
17.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
17.A.I.3. Data:	*Cranial and dental measurements*
17.A.I.4. Classification:	*Malian Sahara*

17.A.II. Analysis overview

17.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
17.A.II.2.a. Variables in matrix:	*50*
17.A.II.2.b. Variables entered:	*15*

17.A.II.3. Best predictors: *71a. Minimum ramus width (.345), 48(1). Nasospinale-Prosthion height (.281), 61a(1). Canine alveolar breadth (md) (.277), 81(1). Crown width UI2 (-.446 - Function 2)*

17.A.II.4.a. Wilks' Lambda: *1 through 2:.037 (Sig. .000), 2: .222 (Sig. .000)*

17.A.II.4.b. Eigenvalues: *1: 5.032 (r: .913), 2: 3.496 (r: .882)*

17.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

17.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -30.395, Jebel Sahaba/Tushka - -28.435, Malian Sahara - -22.106), no outliers detected, no variables failed tolerance test*

17.A.III. Results

17.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 1.793), A-Group (D^2: 10.966)*

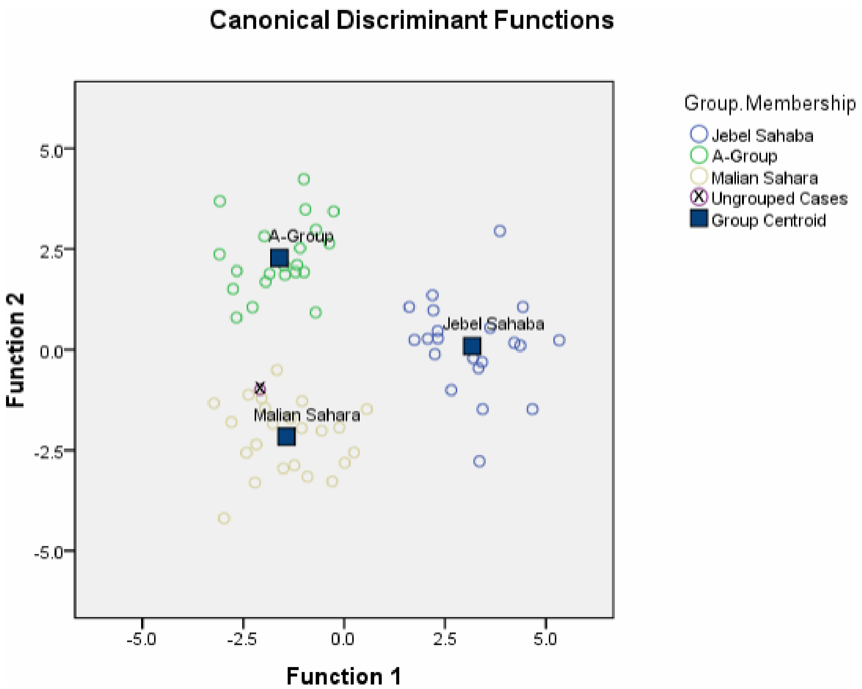
17.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

17.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 2.034), A-Group (D^2: 12.972)*

17.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

17.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

17.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



17.A.IV. Additional results

17.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 73.8%), separate-groups covariance matrix (A-Group, 100.0%)*

17.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 96.9%, 90.8), separate-groups covariance matrix (A-Group, 96.9%), variables entered (10)*

17.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 98.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (23)*

17.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 97.6%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (23)*

17.B.I. Summary

17.B.I.1. Individual: *Abu Tabari 02/28-15*

17.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

17.B.I.3. Data: *Scaled cranial and dental measurements*

17.B.I.4. Classification: *Malian Sahara*

17.B.II. Analysis overview

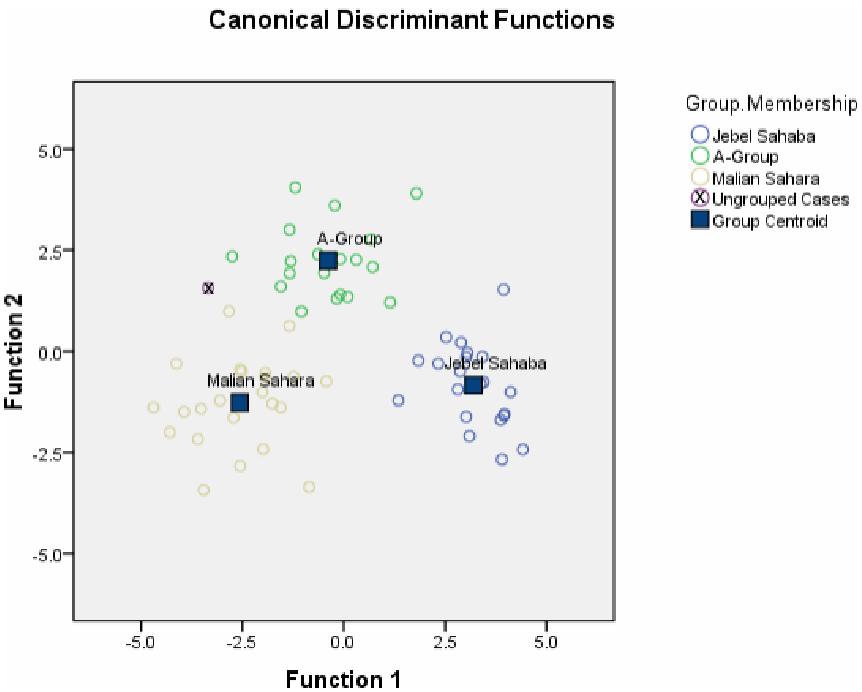
17.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

17.B.II.2.a. Variables in matrix: *39*

17.B.II.2.b. Variables entered: *15*

17.B.II.3. Best predictors: *81(1).Crown width LI2 (.330), 81(1). Crown width LI1 (.323), 71a. Minimum ramus width (.214), 71a. Minimum ramus width (-.296 - Function 2)*
17.B.II.4.a. Wilks' Lambda: *1 through 2: .041 (Sig. .000), 2: .282 (Sig. .000)*
17.B.II.4.b. Eigenvalues: *1: 5.961 (r: .925), 2: 2.543 (r: .847)*
17.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
17.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -96.944, Jebel Sahaba/Tushka - -96.001, Malian Sahara - -94.833), no outliers detected, no variables failed tolerance test*

17.B.III. Results
17.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 8.680), A-Group (D^2: 9.191)*
17.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.8%*
17.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 7.653), A-Group (D^2: 8.607)*
17.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (2 A-Group)*
17.B.III.2.b. Misclassifications (separate-groups): *No misclassifications*
17.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



17.B.IV. Additional results
17.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 81.5%), separate-groups covariance matrix (A-Group, 100.0%)*
17.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 95.4%, 93.8%), separate-groups covariance matrix (A-Group, 95.4%), variables entered (9)*
17.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 94.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), variables entered (17)*
17.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 94.0%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (25)*

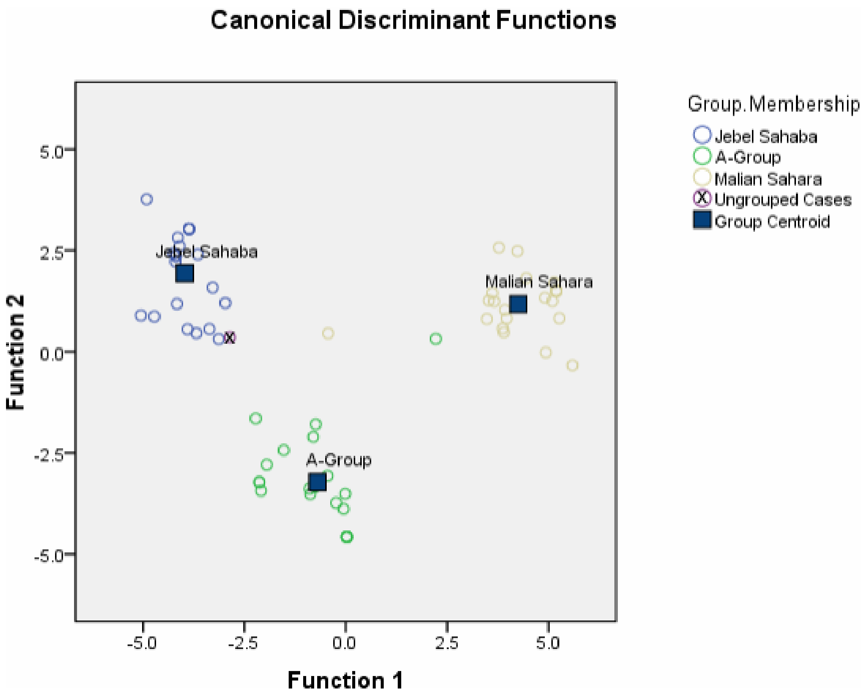
17.C.I. Summary
17.C.I.1. Individual: *Abu Tabari 02/28-15*
17.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
17.C.I.3. Data: *Non-metric cranial and dental traits*
17.C.I.4. Classification: *Jebel Sahaba/Tushka*

17.C.II. Analysis overview
17.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
17.C.II.2.a. Variables in matrix: *35*
17.C.II.2.b. Variables entered: *14*

17.C.II.3. Best predictors: *Tuberculum dentale UI2 (.699), Shovel UI1 (.134), Symphyseal height (-.125), Shovel UI1 (.570 - Function 2)*

17.C.II.4.a. Wilks' Lambda: *1 through 2: .012 (Sig. .000), 2: .159 (Sig. .000)*
17.C.II.4.b. Eigenvalues: *1: 12.227 (r: .961), 2: 5.299 (r: .917)*
17.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
17.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

17.C.III. Results
17.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 3.754), A-Group (D^2: 17.464)*
17.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*
17.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 96.9%, Jebel Sahaba/Tushka (D^2: 5.197), A-Group (D^2: 13.422)*
17.C.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
17.C.III.2.b. Misclassifications (separate-groups): *A-Group (1 Malian Sahara), Malian Sahara (1 A-Group)*
17.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



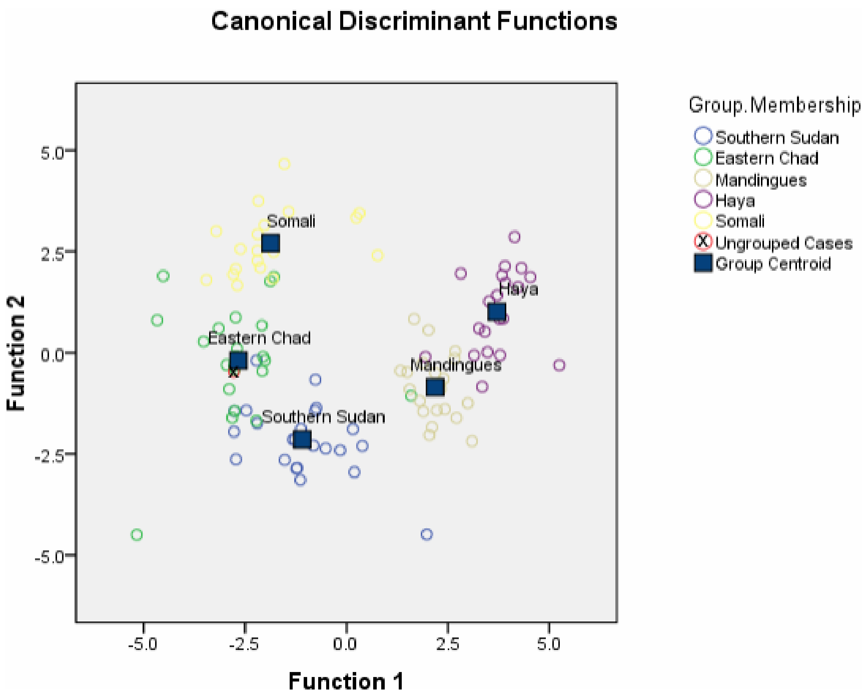
17.C.IV. Additional results
17.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 89.2%), separate-groups covariance matrix (A-Group, 100.0%)*
17.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 96.9%, 95.4%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 96.9%), variables entered (7)*
17.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%, 92.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (14)*
17.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 96.4%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), variables entered (18)*

17.D.I. Summary
17.D.I.1. Individual: *Abu Tabari 02/28-15*
17.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
17.D.I.3. Data: *Cranial and dental measurements*
17.D.I.4. Classification: *Chad*

17.D.II. Analysis overview
17.D.II.1. Method: *Mahalanobis distance, simultaneous entry*
17.D.II.2.a. Variables in matrix: *36*
17.D.II.2.b. Variables entered: *16*

17.D.II.3. Best predictors: *80(4)b. 1^{st} premolar dental arch length (mx) (.702), 81(1). Crown width UI2 (.471), 80(4)a. Canine dental arch length (md) (.447), 63(2)b. 2^{nd} internal dental arch breadth (mx) (-.320 - Function 2), 81. Crown length LC (-.676 - Function 3), 81. Crown length LM1 (.510 - Function 4)*
17.D.II.4.a. Wilks' Lambda: *1 through 4: .006 (Sig. .000), 2 through 4: .046 (Sig. .000), 3 through 4: .179 (Sig. .000), 4: .611 (Sig. .000)*
17.D.II.4.b. Eigenvalues: *1: 6.164 (r: .928), 2: 2.855 (r: .861), 3: 2.409 (r: .841), 4: .637 (r: .624)*
17.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
17.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -29.258, Chad - -32.718, Mandinka - -50.283, Somalis - -35.896, Haya - -34.683), no outliers detected, no variables failed tolerance test*

17.D.III. Results
17.D.III.1.a. Within-groups covariance matrix: *Chad, 97.2%, Chad (D^2: 2.263), Southern Sudan (D^2: 7.362)*
17.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*
17.D.III.1.c. Separate-groups covariance matrix: *Chad, 99.1%, Chad (D^2: 1.941), Southern Sudan (D^2: 5.391)*
17.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 3 Mandinka), Chad (2 Southern Sudan, 1 Haya) Somalis (2 Chad, 1 Haya)*
17.D.III.2.b. Misclassifications (separate-groups): *Chad (1 Southern Sudan)*
17.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



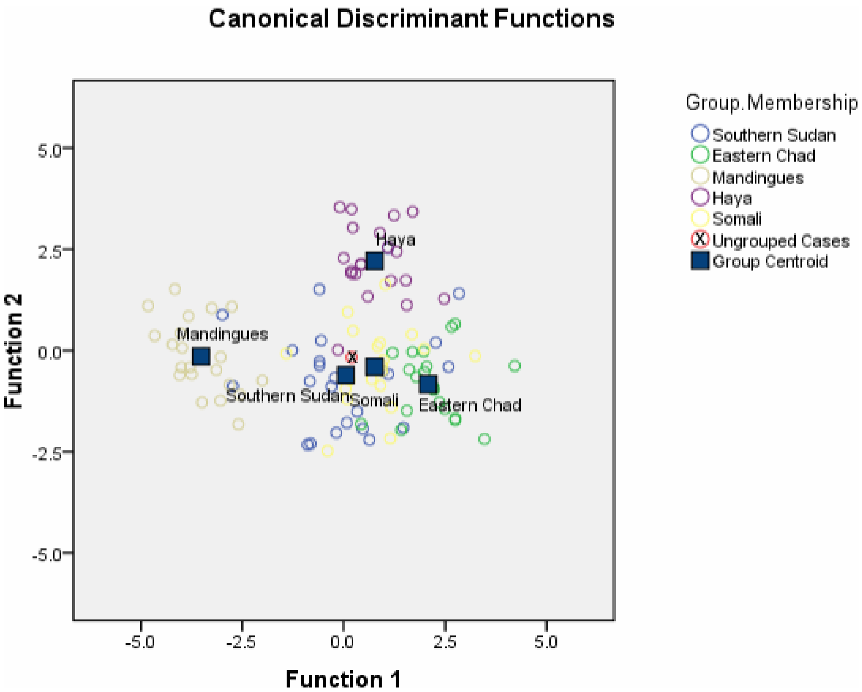
17.D.IV. Additional results
17.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 85.2%), separate-groups covariance matrix (Chad, 100.0%)*
17.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 94.4%, 88.0%), separate-groups covariance matrix (Southern Sudan, 96.3%), variables entered (15)*
17.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 100.0%, 98.1%; separate-groups covariance matrix - Mandinka, 100.0%), variables entered (38)*

17.E.I. Summary
17.E.I.1. Individual: *Abu Tabari 02/28-15*
17.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
17.E.I.3. Data: *Scaled cranial and dental measurements*
17.E.I.4. Classification: *Southern Sudan*

17.E.II. Analysis overview
17.E.II.1. Method: *Mahalanobis distance, simultaneous entry*
17.E.II.2.a. Variables in matrix: *26*
17.E.II.2.b. Variables entered: *16*

17.E.II.3. Best predictors:	*81. Crown length UI2 (.501), 80(4)a. Canine dental arch length (md) (-.484), 48(1). Nasospinale-Prosthion height (.186), 69c. Thickness of the mandibular symphysis (-.385 - Function 2), 81(1). Crown width UM1 (.430 - Function 3), 81. Crown length LM1 (.538 - Function 4)*
17.E.II.4.a. Wilks' Lambda:	*1 through 4: .036 (Sig. .000), 2 through 4: .172 (Sig. .000), 3 through 4: .382 (Sig. .000), 4: .688 (Sig. .001)*
17.E.II.4.b. Eigenvalues:	*1: 3.798 (r: .890), 2: 1.217 (r: .741), 3: .800 (r: .667), 4: .454 (r: .559)*
17.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
17.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -87.434, Chad - -97.276, Mandinka - -121.179, Somalis - -98.841, Haya - -91.217), no outliers detected, no variables failed tolerance test*

17.E.III. Results	
17.E.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 87.0%, Southern Sudan (D^2: 1.611), Chad (D^2: 6.098)*
17.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*75.9%*
17.E.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 89.8%, Southern Sudan (D^2: 1.143), Chad (D^2: 9.383)*
17.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 2 Mandinka, 1 Somali, 3 Haya), Chad (2 Southern Sudan, 1 Haya), Mandinka (1 Southern Sudan), Somalis (5 Southern Sudan, 1 Chad, 1 Mandinka, 2 Haya), Haya (1 Southern Sudan, 1 Chad, 2 Somalis)*
17.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (3 Chad, 1 Mandinka, 1 Somali, 1 Haya), Chad (1 Southern Sudan), Mandinka (1 Southern Sudan), Somalis (2 Southern Sudan), Haya (1 Southern Sudan)*
17.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



17.E.IV. Additional results	
17.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 91.7%, 70.4%), separate-groups covariance matrix (Southern Sudan, 91.7%)*
17.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 85.2%, 74.1%), separate-groups covariance matrix (Southern Sudan, 86.1%), variables entered (11)*
17.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Mandinka, 100.0%, 97.2%; separate-groups covariance matrix - Mandinka, 100.0%), variables entered (35)*

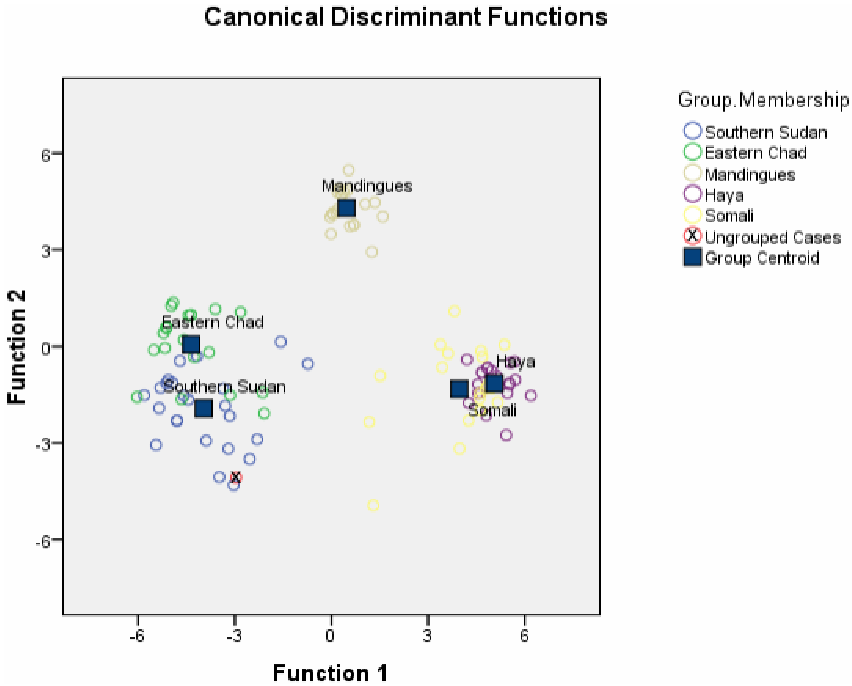
17.F.I. Summary	
17.F.I.1. Individual:	*Abu Tabari 02/28-15*
17.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
17.F.I.3. Data:	*Non-metric cranial and dental traits*
17.F.I.4. Classification:	*Southern Sudan*

17.F.II. Analysis overview

17.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
17.F.II.2.a. Variables in matrix:	*39*
17.F.II.2.b. Variables entered:	*16*
17.F.II.3. Best predictors:	*Tuberculum dentale UI2 (.573), Shovel UI1 (-.417), Premolar mesial and distal accessory cusps UP2 (.336), Tuberculum dentale UI2 (.418 - Function 2), Double shovel UI1 (.567 - Function 3), Parastyle UM3 (.514 - Function 4)*
17.F.II.4.a. Wilks' Lambda:	*1 through 4: .001 (Sig. .000), 2 through 4: .017 (Sig. .000), 3 through 4: .106 (Sig. .000), 4: .397 (Sig. .000)*
17.F.II.4.b. Eigenvalues:	*1: 15.788 (r: .970), 2: 5.408 (r: .919), 3: 2.742 (r: .856), 4: 1.517 (r: .776)*
17.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
17.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -42.548, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

17.F.III. Results

17.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 7.209), Chad (D^2: 29.740)*
17.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
17.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 100.0%, Southern Sudan (D^2: 5.204), Chad (D^2: 28.037)*
17.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 1 Mandinka, 1 Somali), Chad (4 Southern Sudan), Somalis (1 Chad, 2 Haya)*
17.F.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
17.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



17.F.IV. Additional results

17.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 99.1%, 86.1%), separate-groups covariance matrix (Southern Sudan, 100.0%)*
17.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 97.2%, 89.8%), separate-groups covariance matrix (Southern Sudan, 98.1%), variables entered (16)*
17.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 97.2%, 90.7%; separate-groups covariance matrix - Southern Sudan, 99.1%), variables entered (11)*

18. Abu Tabari 02/28-20

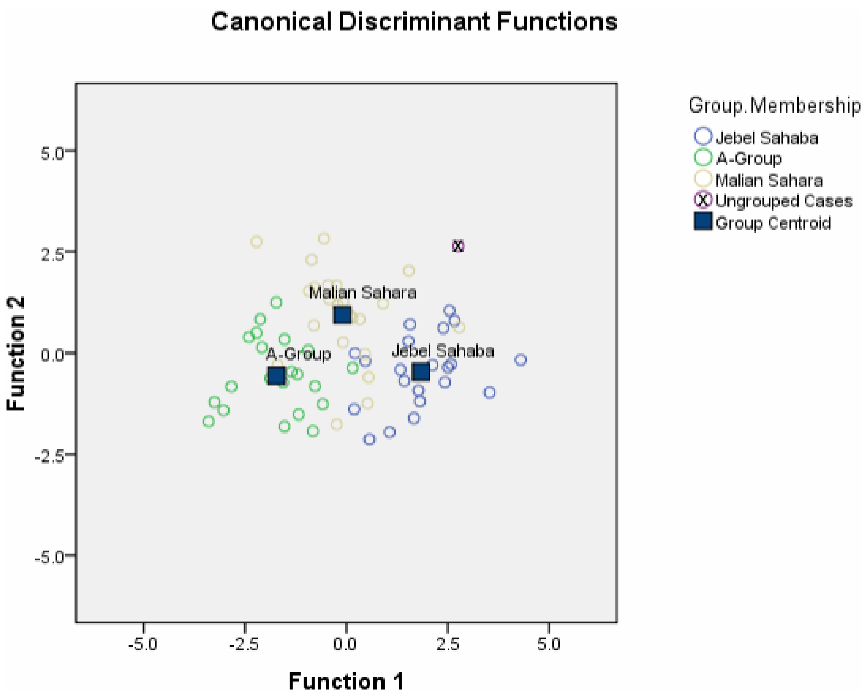
18.A.I. Summary

18.A.I.1. Individual:	*Abu Tabari 02/28-20*
18.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*

18.A.I.3. Data: *Dental measurements*
18.A.I.4. Classification: *Jebel Sahaba/Tushka*

18.A.II. Analysis overview
18.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
18.A.II.2.a. Variables in matrix: *8*
18.A.II.2.b. Variables entered: *6*
18.A.II.3. Best predictors: *81(1). Crown width LI2 (.909), 81(1). Crown width LM3 (.338), 81(1). Crown width UM3 (.217), 81. Crown length LP2 (.623 - Function 2)*
18.A.II.4.a. Wilks' Lambda: *1 through 2: .210 (Sig. .000), 2: .663 (Sig. .000)*
18.A.II.4.b. Eigenvalues: *1: 2.162 (r: .827), 2: .509 (r: .581)*
18.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
18.A.II.6. Remarks: *Box's M (Sig. .070; Log determinants: A-Group - -10.242, Jebel Sahaba/Tushka - -10.756, Malian Sahara - -9.123), no outliers detected, no variables failed tolerance test*

18.A.III. Results
18.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 86.2%, Jebel Sahaba/Tushka (D^2: 10.520), Malian Sahara (D^2: 11.037)*
18.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *83.1%*
18.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 86.2%, Jebel Sahaba/Tushka (D^2: 12.390), Malian Sahara (D^2: 12.666)*
18.A.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (2 A-Group, 3 Jebel Sahaba/Tushka)*
18.A.III.2.b. Misclassifications (separate-groups): *A-Group (2 Malian Sahara), Jebel Sahaba/Tushka (2 Malian Sahara), Malian Sahara (2 A-Group, 3 Jebel Sahaba/Tushka)*
18.A.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



18.A.IV. Additional results
18.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 86.2%, 76.9%), separate-groups covariance matrix (Malian Sahara, 86.2%)*
18.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 84.6%, 81.5%), separate-groups covariance matrix (Malian Sahara, 86.2%), variables entered (5)*
18.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 89.2%, 78.3%; separate-groups covariance matrix - Malian Sahara, 88.0%), variables entered (5)*
18.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 78.3%, 77.1%; separate-groups covariance matrix - Malian Sahara, 79.5%), variables entered (4)*

18.B.I. Summary

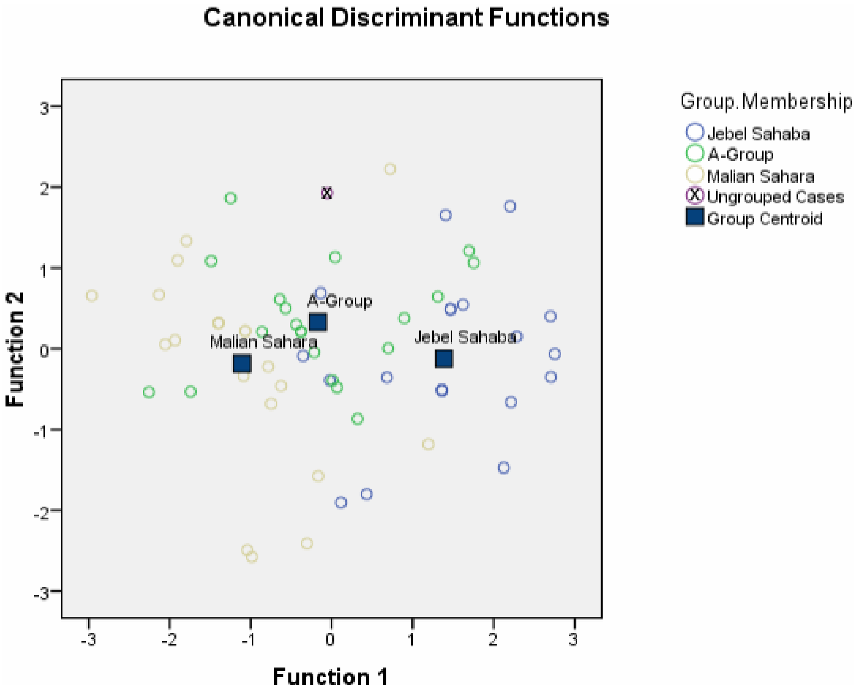
18.B.I.1. Individual:	*Abu Tabari 02/28-20*
18.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
18.B.I.3. Data:	*Scaled dental measurements*
18.B.I.4. Classification:	*A-Group*

18.B.II. Analysis overview

18.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
18.B.II.2.a. Variables in matrix:	*6*
18.B.II.2.b. Variables entered:	*2*
18.B.II.3. Best predictors:	*81(1). Crown width LI2 (.839), 81. Crown length LP2 (-.371), 81, Crown length LP2 (.929 - Function 2)*
18.B.II.4.a. Wilks' Lambda:	*1 through 2: .448 (Sig. .000), 2: .948 (Sig. .078)*
18.B.II.4.b. Eigenvalues:	*1: 1.118 (r: .727), 2: .055 (r: .227)*
18.B.II.5. Prior classification probability:	*33.5% (prior prob. + 25%: 41.8%)*
18.B.II.6. Remarks:	*Box's M (Sig. .135; Log determinants: A-Group - -14.629, Jebel Sahaba/Tushka - -14.210, Malian Sahara - -13.874), removed outliers: A-Group 95/34 (D^2: 10.359; critical value: 5.991 - p 0.95, df 2), Jebel Sahaba/Tushka 117-2 (D^2: 6.233; critical value: 5.991 - p 0.95, df 2), Malian Sahara AZ56/H1 (D^2: 6.008; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

18.B.III. Results

18.B.III.1.a. Within-groups covariance matrix:	*A-Group, 75.8%, A-Group (D^2: 2.570), Malian Sahara (D^2: 5.572)*
18.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*74.2%*
18.B.III.1.c. Separate-groups covariance matrix:	*A-Group, 72.6 %, A-Group (D^2: 5.268), Malian Sahara (D^2: 5.930)*
18.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (6 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 1 Malian Sahara), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
18.B.III.2.b. Misclassifications (separate-groups):	*A-Group (5 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 1 Malian Sahara), Malian Sahara (3 A-Group, 1 Jebel Sahaba/Tushka)*
18.B.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



18.B.IV. Additional results

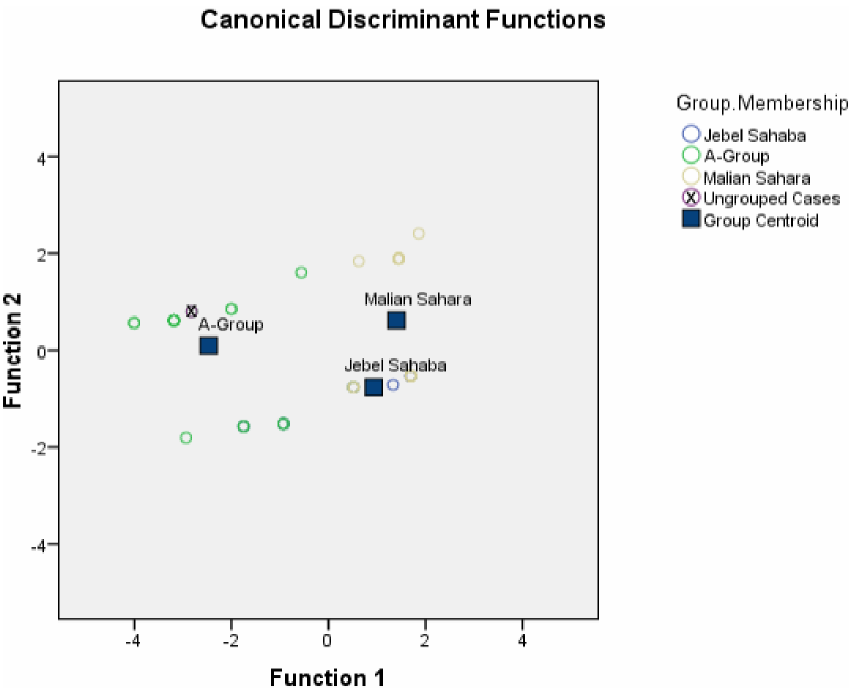
18.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 69.2%, 64.6%), separate-groups covariance matrix (A-Group, 72.3%)*
18.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 70.8%, 69.2%), separate-groups covariance matrix (A-Group, 72.3%), variables entered (3)*
18.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 78.3%, 74.7%; separate-groups covariance matrix - A-Group, 83.1%), variables entered (3)*

18.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 75.9%, 71.1%; separate-groups covariance matrix - A-Group, 80.7%), variables entered (5)*

18.C.I. Summary
18.C.I.1. Individual: *Abu Tabari 02/28-20*
18.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
18.C.I.3. Data: *Non-metric cranial and dental traits*
18.C.I.4. Classification: *A-Group*

18.C.II. Analysis overview
18.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
18.C.II.2.a. Variables in matrix: *7*
18.C.II.2.b. Variables entered: *5*
18.C.II.3. Best predictors: *Shovel UI1 (.790), Groove pattern LM2 (.338), Premolar lingual cusps LP2 (-.300), Premolar lingual cusps LP2 (.887 - Function 2)*
18.C.II.4.a. Wilks' Lambda: *1 through 2: .182 (Sig. .000), 2: .744 (Sig. .001)*
18.C.II.4.b. Eigenvalues: *1: 3.089 (r: .869), 2: .343 (r: .506)*
18.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
18.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

18.C.III. Results
18.C.III.1.a. Within-groups covariance matrix: *A-Group, 72.3%, A-Group (D^2: .618), Jebel Sahaba/Tushka (D^2: 16.533)*
18.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *66.2%*
18.C.III.1.c. Separate-groups covariance matrix: *A-Group, 73.8%, A-Group (D^2: .451), Malian Sahara (D^2: 99.679)*
18.C.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 1 Malian Sahara), Malian Sahara (13 Jebel Sahaba/Tushka)*
18.C.III.2.b. Misclassifications (separate-groups): *A-Group (5 Jebel Sahaba/Tushka), Malian Sahara (12 Jebel Sahaba/Tushka)*
18.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



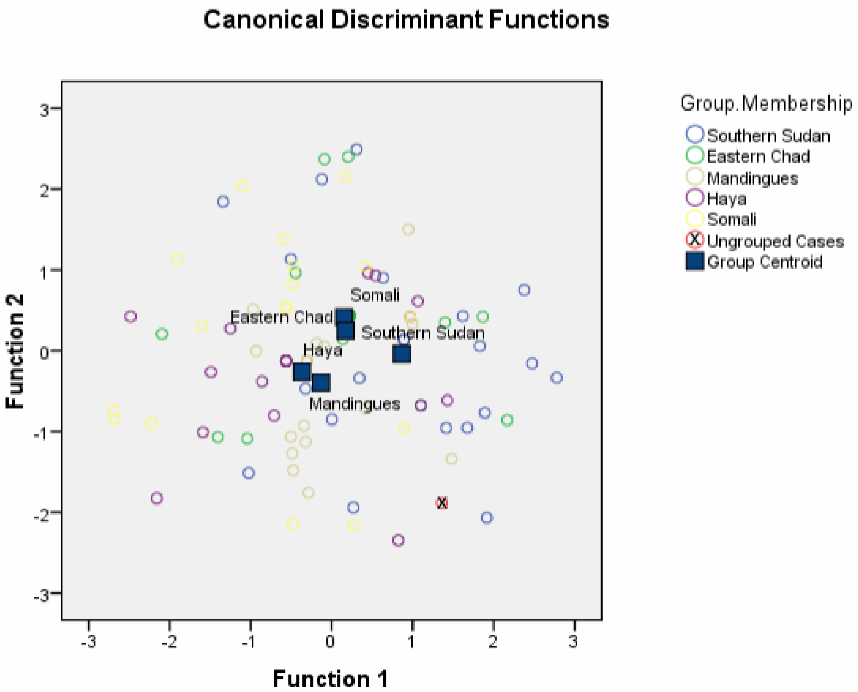
18.C.IV. Additional results
18.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 70.8%, 61.5%), separate-groups covariance matrix (A-Group, 72.3%)*
18.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 70.8%, 70.8%), separate-groups covariance matrix (A-Group, 70.8%), variables entered (3)*
18.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 74.7%, 72.3%; separate-groups covariance matrix - A-Group, 74.7%), variables entered (4)*

18.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 68.7%, 62.7%; separate-groups covariance matrix - A-Group, 78.3%), variables entered (5)*

18.D.I. Summary	
18.D.I.1. Individual:	*Abu Tabari 02/28-20*
18.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
18.D.I.3. Data:	*Dental measurements*
18.D.I.4. Classification:	*Southern Sudan*

18.D.II. Analysis overview	
18.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
18.D.II.2.a. Variables in matrix:	*2*
18.D.II.2.b. Variables entered:	*2*
18.D.II.3. Best predictors:	*81. Crown length UM3 (.651), 81(1). Crown width UM3 (.315), 81(1). Crown width UM3 (.949 - Function 2)*
18.D.II.4.a. Wilks' Lambda:	*1 through 4: .695 (Sig. .000), 2: .913 (Sig. .029)*
18.D.II.4.b. Eigenvalues:	*1: .314 (r: .489), 2: .096 (r: .296)*
18.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
18.D.II.6. Remarks:	*Box's M (Sig. .135; Log determinants: Southern Sudan - -3.985, Chad - -5.049, Mandinka - -5.921, Somalis - -3.927, Haya - -4.564), removed outliers: Southern Sudan 9.992 (D^2: 6.400; critical value: 5.991 - p 0.95, df 2), Mandinka 0.141-14 (D^2: 7.415; critical value: 5.991 - p 0.95, df 2), Mandinka 9.539 (D^2: 9.691; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.31 (D^2: 7.375; critical value: 5.991 - p 0.95, df 2), Haya Af.23.0.127/205 (D^2: 13.728; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

18.D.III. Results	
18.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 51.5%, Southern Sudan (D^2: 3.640), Mandinka (D^2: 4.424)*
18.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*56.3%*
18.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 44.7%, Southern Sudan (D^2: 2.388), Somalis (D^2: 4.674)*
18.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Chad, 4 Mandinka, 1 Somali), Chad (3 Southern Sudan, 1 Somali, 2 Haya), Mandinka (3 Southern Sudan, 3 Chad, 2 Somalis), Somalis (2 Southern Sudan, 5 Chad, 2 Mandinka, 1 Haya), Haya (4 Southern Sudan, 2 Chad, 3 Mandinka, 3 Somalis)*
18.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (5 Chad, 5 Mandinka, 3 Somalis), Chad (3 Southern Sudan, 1 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan, 3 Chad, 1 Haya), Somalis (1 Southern Sudan, 9 Chad, 2 Mandinka, 4 Haya), Haya (3 Southern Sudan, 4 Chad, 7 Mandinkai)*
18.D.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



18.D.IV. Additional results

18.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 51.5%, 56.3%), separate-groups covariance matrix (Southern Sudan, 44.7%)*

18.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 51.5%, 56.3%), separate-groups covariance matrix (Southern Sudan, 44.7%), variables entered (2)*

18.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 83.3%, 80.6%; separate-groups covariance matrix - Southern Sudan, 92.6%), variables entered (5)*

18.E.I. Summary

18.E.I.1. Individual: *Abu Tabari 02/28-20*

18.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

18.E.I.3. Data: *Scaled dental measurements*

18.E.I.4. Classification: *Chad*

18.E.II. Analysis overview

18.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

18.E.II.2.a. Variables in matrix: *1*

18.E.II.2.b. Variables entered: *1*

18.E.II.3. Best predictors: *81(1). Crown width UM3 (1.000)*

18.E.II.4.a. Wilks' Lambda: *1: .842 (Sig. .002)*

18.E.II.4.b. Eigenvalues: *1: .188 (r: .398)*

18.E.II.5. Prior classification probability: *20.2% (prior prob. + 25%: 25.2%)*

18.E.II.6. Remarks: *Box's M (Sig. .040; Log determinants: Southern Sudan - -5.448, Chad - -6.855, Mandinka - -6.109, Somalis - -5.803, Haya - -5.854), removed outliers: Southern Sudan 9.992 (D^2: 6.895; critical value: 3.841 - p 0.95, df 1), Mandinka 0.141-14 (D^2: 3.935; critical value: 3.841 - p 0.95, df 1), Somalis Af.15.0.41 (D^2: 5.007; critical value: 3.841 - p 0.95, df 1), Haya Af.23.0.19 (D^2: 5.733; critical value: 3.841 - p 0.95, df 1), Haya Af.23.0.42 (D^2: 3.962; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

18.E.III. Results

18.E.III.1.a. Within-groups covariance matrix: *Chad, 31.1%, Chad (D^2: .001), Southern Sudan (D^2: .607)*

18.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *29.1%*

18.E.III.1.c. Separate-groups covariance matrix: *Chad, 35.9%, Chad (D^2: .002), Southern Sudan (D^2: .380)*

18.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (7 Chad, 9 Mandinka), Chad (4 Southern Sudan, 1 Mandinka), Mandinka (12 Southern Sudan, 2 Chad, 1 Somali), Somalis (7 Southern Sudan, 5 Chad, 7 Mandinka), Haya (10 Southern Sudan, 3 Chad, 5 Mandinka)*

18.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (11 Chad, 9 Mandinka), Chad (1 Southern Sudan, 2 Mandinka), Mandinka (3 Southern Sudan, 3 Chad), Somalis (2 Southern Sudan, 4 Chad, 13 Mandinka), Haya (2 Southern Sudan, 6 Chad, 10 Mandinka)*

18.E.III.3. All groups scatter plot: *No histogram available*

18.E.IV. Additional results

18.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 29.6%, 28.7%), separate-groups covariance matrix (Chad, 36.1%)*

18.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 29.6%, 28.7%), separate-groups covariance matrix (Chad, 36.1%), variables entered (1)*

18.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 84.3%, 75.9%; separate-groups covariance matrix - Southern Sudan, 89.8%), variables entered (7)*

18.F.I. Summary

18.F.I.1. Individual: *Abu Tabari 02/28-20*

18.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

18.F.I.3. Data: *Non-metric cranial and dental traits*

18.F.I.4. Classification: *Chad*

18.F.II. Analysis overview

18.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

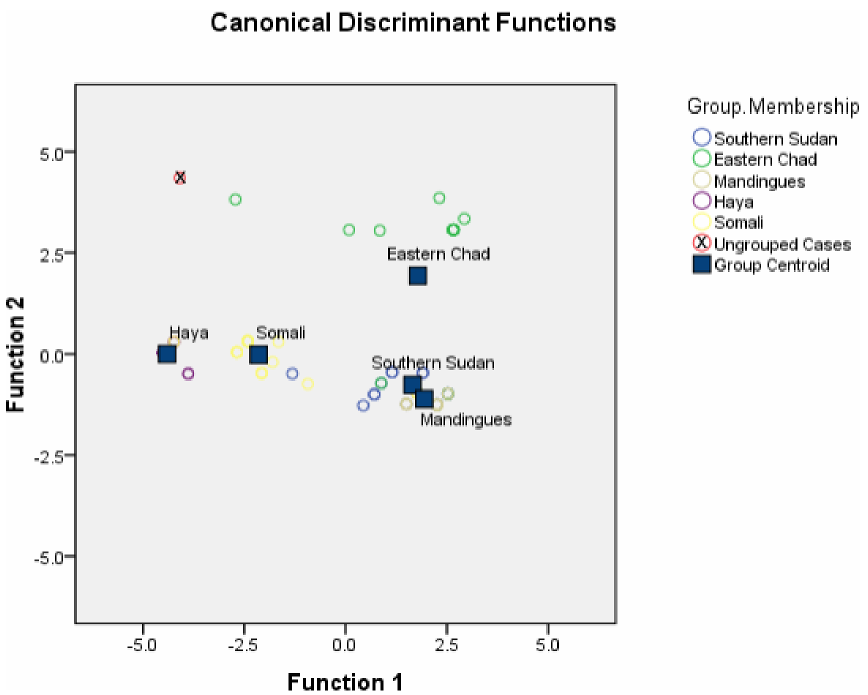
18.F.II.2.a. Variables in matrix: *9*

18.F.II.2.b. Variables entered: *6*

18.F.II.3. Best predictors:	*Shovel UI1 (789), Double shovel UI1 (.423), Cusp number LM2 (-.331), Parastyle UM3 (.953 - Function 2), Double shovel UI1 (.843 - Function 3), Groove pattern LM2 (.590 - Function 4)*
18.F.II.4.a. Wilks' Lambda:	*1 through 4: .030 (Sig. .000), 2 through 4: .224 (Sig. .000), 3 through 4: .503 (Sig. .000), 4: .927 (Sig. .061)*
18.F.II.4.b. Eigenvalues:	*1: 6.580 (r: .932), 2: 1.243 (r: .744), 3: .843 (r: .676), 4: .079 (r: .270)*
18.F.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.3%)*
18.F.II.6. Remarks:	*Box's M (test result not accepted; Sig. .212; Log determinants: Southern Sudan - -13.395, Chad - -12.571, Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), removed outliers: Southern Sudan E.1026-4 (D^2: 14.638; critical value: 14.067 - p 0.95, df 7), Somalis Af.15.0.50 (D^2: 17.390; critical value: 14.067 - p 0.95, df 7), Haya Af.23.0.117 (D^2: 18.050; critical value: 14.067 - p 0.95, df 7), Haya Af.23.0.126/199 (D^2: 18.050; critical value: 14.067 - p 0.95, df 7), outliers - not removed: ungrouped case (D^2: 16.203; critical value: 12.592 - p 0.95, df 6), variables failing tolerance test - removed: Congenital absence UM3*

18.F.III. Results

18.F.III.1.a. Within-groups covariance matrix:	*Haya, 75.0%, Haya (D^2: 19.410), Somalis (D^2: 29.541)*
18.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*75.0%*
18.F.III.1.c. Separate-groups covariance matrix:	*Chad, 76.0%, Chad (D^2: 16.203), Southern Sudan (D^2: 79.258)*
18.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 9 Mandinka, 1 Somali), Chad (3 Southern Sudan, 3 Mandinka, 1 Somali, 1 Haya), Mandinka (4 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka, 1 Haya)*
18.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 12 Mandinka), Chad (2 Southern Sudan, 4 Mandinka, 1 Somali), Mandinka (2 Southern Sudan), Somalis (1 Mandinka, 1 Haya)*
18.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



18.F.IV. Additional results

18.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 73.1%, 67.6%), separate-groups covariance matrix (Haya, 75.9%)*
18.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 70.4%, 69.4%), separate-groups covariance matrix (Haya, 65.7%), variables entered (4)*
18.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 78.7%, 71.3%; separate-groups covariance matrix - Chad, 69.4%), variables entered (6)*

18.G.I. Summary

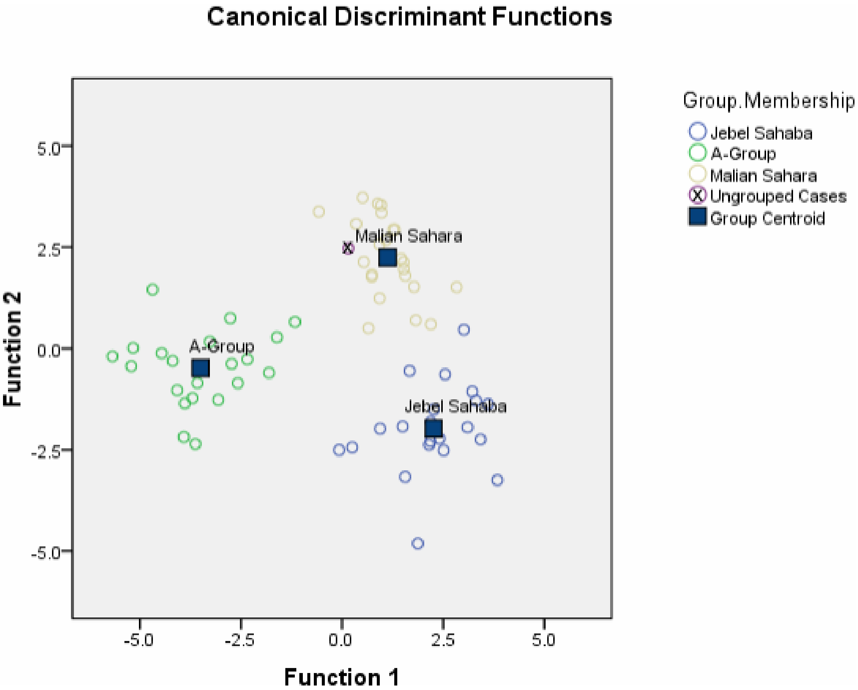
18.G.I.1. Individual:	*Abu Tabari 02/28-20*
18.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
18.G.I.3. Data:	*Dental measurements and cranial and dental non-metric traits*
18.G.I.4. Classification:	*Malian Sahara*

18.G.II. Analysis overview

18.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
18.G.II.2.a. Variables in matrix:	*15*
18.G.II.2.b. Variables entered:	*14*
18.G.II.3. Best predictors:	*81(1) Crown width LI2 (.524), Shovel UI1 (.511), 81. Crown length LI2 (.309), Shovel UI1 (.295 - Function 2)*
18.G.II.4.a. Wilks' Lambda:	*1 through 2: .032 (Sig. .000), 2: .234 (Sig. .000)*
18.G.II.4.b. Eigenvalues:	*1: 6.356 (r: .930), 2: 3.269 (r: .875)*
18.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
18.G.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

18.G.III. Results

18.G.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 1.000), A-Group (D^2: 22.086)*
18.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*92.3%*
18.G.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 2.276), A-Group (D^2: 17.687)*
18.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
18.G.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
18.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



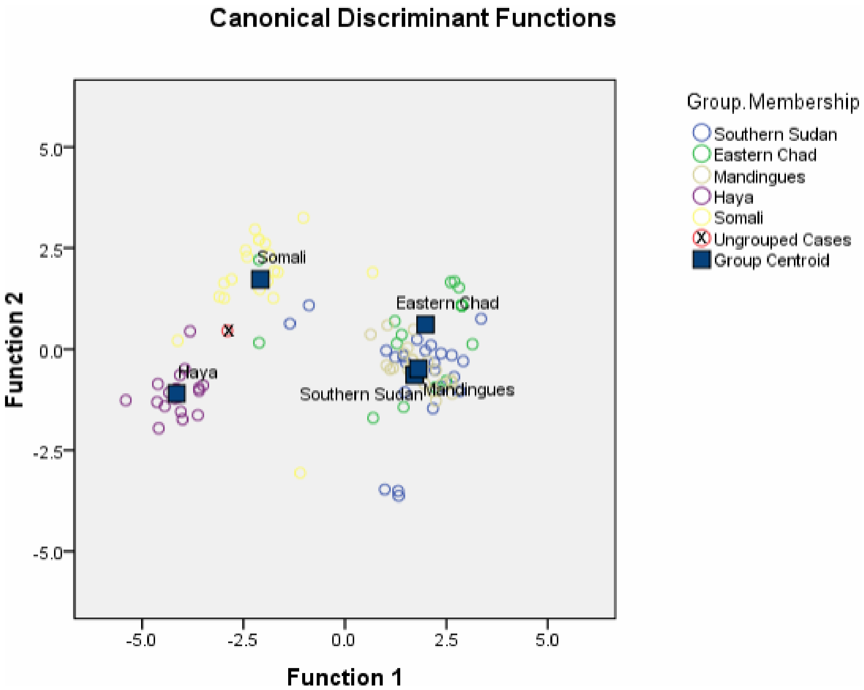
18.G.IV. Additional results

18.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 89.2%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
18.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 95.4%, 92.3%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (8)*
18.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 95.2%, 90.4%; separate-groups covariance matrix - A-Group, 94.0%), variables entered (9)*
18.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 94.0%, 89.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (9)*

18.H.I. Summary
18.H.I.1. Individual: *Abu Tabari 02/28-20*
18.H.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
18.H.I.3. Data: *Dental measurements and cranial and dental non-metric traits*
18.H.I.4. Classification: *Chad*

18.H.II. Analysis overview
18.H.II.1. Method: *Mahalanobis distance, simultaneous entry*
18.H.II.2.a. Variables in matrix: *11*
18.H.II.2.b. Variables entered: *10*
18.H.II.3. Best predictors: *Shovel UI1 (.744), Double shovel UI1 (.411), Cusp number LM2 (-.333), Double shovel UI1 (.657 - Function 2), Parastyle UM3 (.883 - Function 3), 81(1). Crown width UM3 (.333 - Function 4)*
18.H.II.4.a. Wilks' Lambda: *1 through 4: .027 (Sig. .000), 2 through 4: .200 (Sig. .000), 3 through 4: .408 (Sig. .000), 4: .739 (Sig. .000)*
18.H.II.4.b. Eigenvalues: *1: 6.419 (r: .930), 2: 1.037 (r: .713), 3: .810 (r: .669), 4: .353 (r: .511)*
18.H.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
18.H.II.6. Remarks: *Box's M (Sig. .005; Log determinants: Southern Sudan - 'singular', Chad - -25.488, Mandinka - 'singular', Somalis - -26.138, Haya - 'singular'), no outliers detected, no variables failed tolerance test*

18.H.III. Results
18.H.III.1.a. Within-groups covariance matrix: *Haya, 83.3%, Haya (D^2: 14.004), Somalis (D^2: 21.386)*
18.H.III.1.b. Within-groups covariance matrix (Leave-one-out): *76.9%*
18.H.III.1.c. Separate-groups covariance matrix: *Chad, 82.4%, Chad (D^2: 14.110), Haya (D^2: 26.425)*
18.H.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 5 Mandinka, 1 Somali, 1 Haya), Chad (2 Southern Sudan, 4 Mandinka, 1 Somali, 1 Haya), Mandinka (6 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka, 1 Haya)*
18.H.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 8 Mandinka, 1 Somali), Chad (2 Southern Sudan, 3 Mandinka, 1 Somali), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad)*
18.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



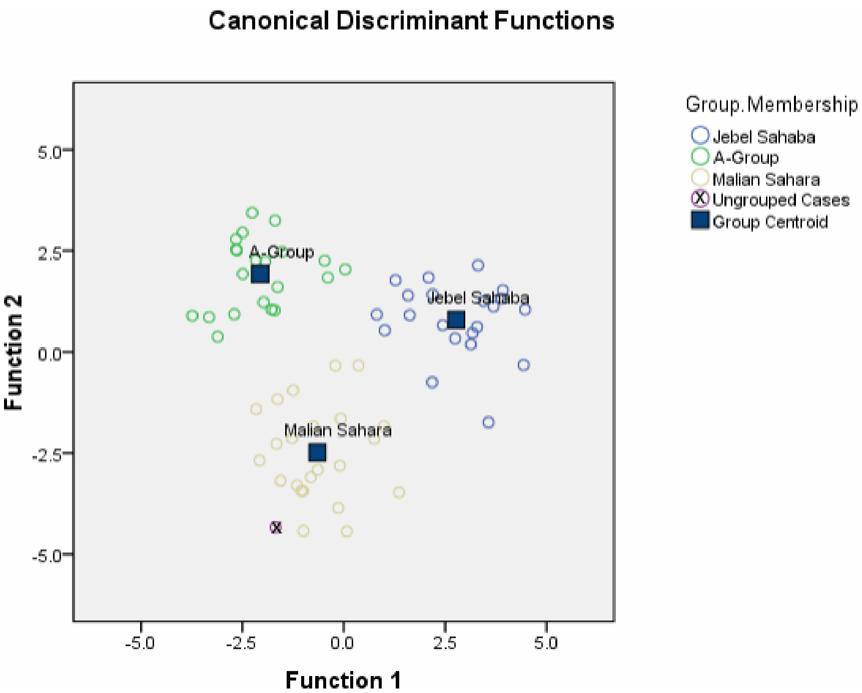
18.H.IV. Additional results
18.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 83.3%, 75.9%), separate-groups covariance matrix (Chad, 82.4%)*
18.H.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 77.8%, 75.9%), separate-groups covariance matrix (Chad, 75.0%), variables entered (7)*
18.H.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 88.9%, 82.4%; separate-groups covariance matrix - Southern Sudan, 92.6%), variables entered (10)*

19. Abu Tabari 02/28-21

19.A.I. Summary
19.A.I.1. Individual: *Abu Tabari 02/28-21*
19.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
19.A.I.3. Data: *Cranial and dental measurements*
19.A.I.4. Classification: *Malian Sahara*

19.A.II. Analysis overview
19.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
19.A.II.2.a. Variables in matrix: *56*
19.A.II.2.b. Variables entered: *14*
19.A.II.3. Best predictors: *81(1). Crown width LI1 (.562), 71a. Minimum ramus width (.430), 69. Height of the mandibular symphysis (.356), 80a. Dental arch length of the mandible (-.441 - Function 2)*
19.A.II.4.a. Wilks' Lambda: *1 through 2: .040 (Sig. .000), 2: .210 (Sig. .000)*
19.A.II.4.b. Eigenvalues: *1: 4.207 (r: .899), 2: 3.762 (r: .889)*
19.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
19.A.II.6. Remarks: *Box's M (Sig. .092; Log determinants: A-Group - -4.600, Jebel Sahaba/Tushka - -4.609, Malian Sahara - -.171), no outliers detected, no variables failed tolerance test*

19.A.III. Results
19.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 4.490), A-Group (D^2: 39.364)*
19.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*
19.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 3.754), Jebel Sahaba/Tushka (D^2: 57.064)*
19.A.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
19.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*
19.A.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



19.A.IV. Additional results
19.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 67.7%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
19.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 100.0%, 96.9%), separate-groups covariance matrix (A-Group, 98.5%), variables entered (13)*
19.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (18)*
19.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (22)*

19.B.I. Summary

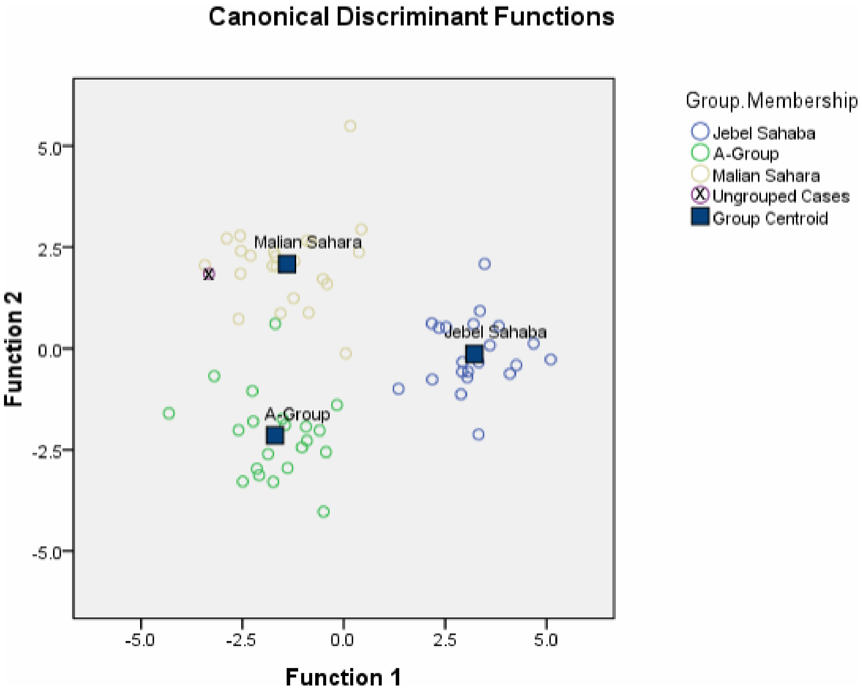
19.B.I.1. Individual:	*Abu Tabari 02/28-21*
19.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
19.B.I.3. Data:	*Scaled cranial and dental measurements*
19.B.I.4. Classification:	*Malian Sahara*

19.B.II. Analysis overview

19.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
19.B.II.2.a. Variables in matrix:	*47*
19.B.II.2.b. Variables entered:	*14*
19.B.II.3. Best predictors:	*81(1). Crown width LI2 (.317), 71a. Minimum ramus width (.295), 81(1). Crown width LI1 (.238), 81(1), Crown width LI1 (-.394 - Function 2)*
19.B.II.4.a. Wilks' Lambda:	*1 through 2: .039 (Sig. .000), 2: .239 (Sig. .000)*
19.B.II.4.b. Eigenvalues:	*1: 5.213 (r: .916), 2: 3.179 (r: .872)*
19.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
19.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -80.763, Jebel Sahaba/Tushka - -76.351, Malian Sahara - -75.437), no outliers detected, no variables failed tolerance test*

19.B.III. Results

19.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.759), A-Group (D^2: 18.553)*
19.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.4%*
19.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.051), A-Group (D^2: 15.669)*
19.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Malian Sahara), Malian Sahara (2 A-Group)*
19.B.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara)*
19.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



19.B.IV. Additional results

19.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 76.9%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
19.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 93.8%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (10)*
19.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 92.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (16)*
19.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 100.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (19)*

19.C.I. Summary

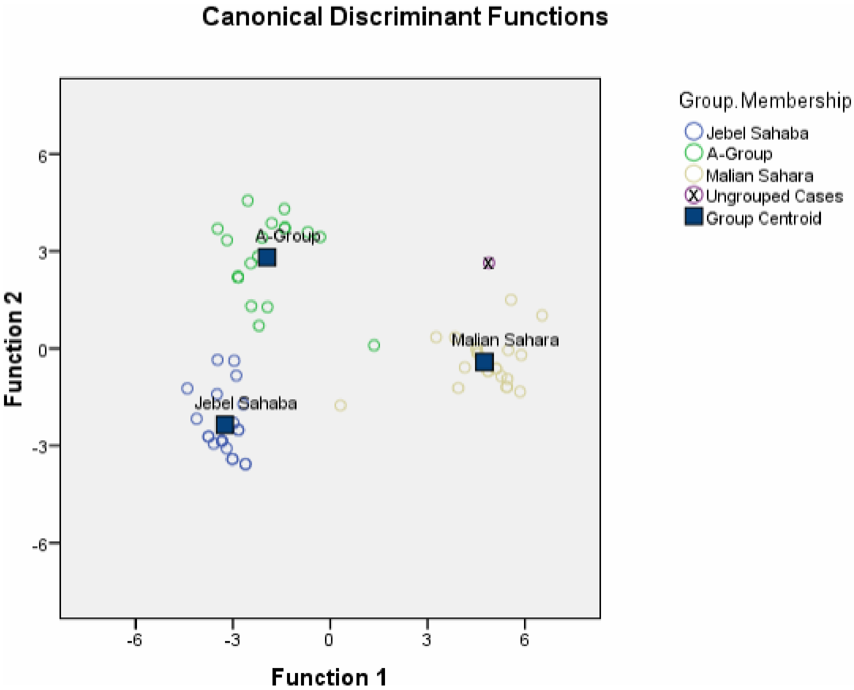
19.C.I.1. Individual:	*Abu Tabari 02/28-21*
19.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
19.C.I.3. Data:	*Non-metric cranial and dental traits*
19.C.I.4. Classification:	*Malian Sahara*

19.C.II. Analysis overview

19.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
19.C.II.2.a. Variables in matrix:	*25*
19.C.II.2.b. Variables entered:	*14*
19.C.II.3. Best predictors:	*Tuberculum dentale UI2 (.712), Shovel UI1 (.214), Interruption groove UI2 (.190), Shovel UI1 (-.538 - Function 2)*
19.C.II.4.a. Wilks' Lambda:	*1 through 2: .012 (Sig. .000), 2: .178 (Sig. .000)*
19.C.II.4.b. Eigenvalues:	*1: 13.247 (r: .964), 2: 4.619 (r: .907)*
19.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
19.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

19.C.III. Results

19.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 96.9%, Malian Sahara (D^2: 9.361), A-Group (D^2: 46.848)*
19.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.4%*
19.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 17.449), A-Group (D^2: 39.088)*
19.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
19.C.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara)*
19.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



19.C.IV. Additional results

19.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 86.2%), separate-groups covariance matrix (A-Group, 100.0%)*
19.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (A-Group, 96.9%), variables entered (6)*
19.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 96.4%, 91.6%; separate-groups covariance matrix - A-Group, 97.6%), variables entered (14)*
19.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 90.4%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (13)*

19.D.I. Summary

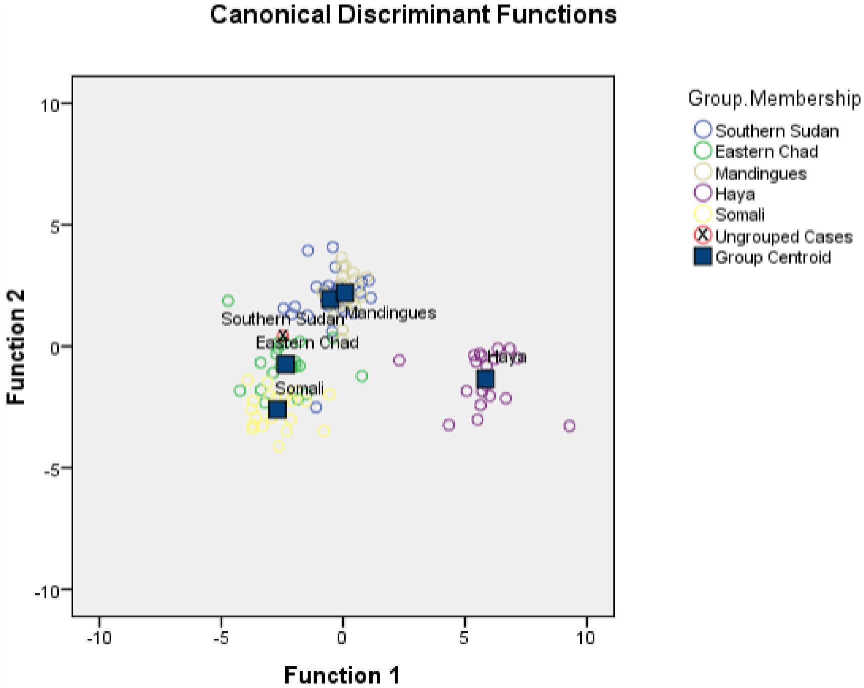
19.D.I.1. Individual:	*Abu Tabari 02/28-21*
19.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
19.D.I.3. Data:	*Cranial and dental measurements*
19.D.I.4. Classification:	*Chad*

19.D.II. Analysis overview

19.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
19.D.II.2.a. Variables in matrix:	*40*
19.D.II.2.b. Variables entered:	*15*
19.D.II.3. Best predictors:	*80(4)b. 1st premolar dental arch length (mx) (.569), 80a. Dental arch length of the mandible (.436), 81(1). Crown width UI2 (.316), 81. Crown length UI2 (.490 - Function 2), 81. Crown length UI2 (.428 - Function 3), 81. Crown length LM1 (-.350 - Function 4)*
19.D.II.4.a. Wilks' Lambda:	*1 through 4: .004 (Sig. .000), 2 through 4: .040 (Sig. .000), 3 through 4: .188 (Sig. .000), 4: .643 (Sig. .000)*
19.D.II.4.b. Eigenvalues:	*1: 9.286 (r: .950), 2: 3.697 (r: .887), 3: 2.419 (r: .841), 4: .556 (r: .598)*
19.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
19.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -29.653, Chad - -33.305, Mandinka - 'singular', Somalis - -32.383, Haya - -59.915), no outliers detected, no variables failed tolerance test*

19.D.III. Results

19.D.III.1.a. Within-groups covariance matrix:	*Chad, 98.1%, Chad (D^2: 4.496), Southern Sudan (D^2: 19.515)*
19.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
19.D.III.1.c. Separate-groups covariance matrix:	*Chad, 99.1%, Chad (D^2: 3.186), Somalis (D^2: 38.769)*
19.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 2 Somalis), Mandinka (1 Chad), Somalis (3 Chad), Haya (1 Southern Sudan)*
19.D.III.2.b. Misclassifications (separate-groups):	*Somalis (1 Chad)*
19.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



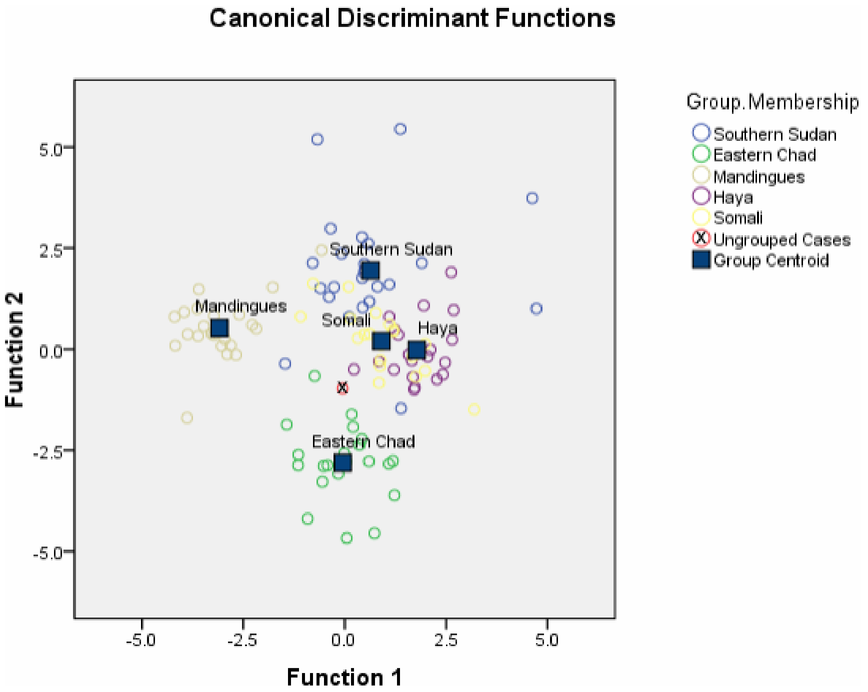
19.D.IV. Additional results

19.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 100.0%, 88.0%), separate-groups covariance matrix (Chad, 100.0%)*
19.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 96.3%, 88.0%), separate-groups covariance matrix (Chad, 98.1%), variables entered (16)*
19.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 96.3%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (35)*

19.E.I. Summary
19.E.I.1. Individual: *Abu Tabari 02/28-21*
19.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
19.E.I.3. Data: *Scaled cranial and dental measurements*
19.E.I.4. Classification: *Chad*

19.E.II. Analysis overview
19.E.II.1. Method: *Mahalanobis distance, simultaneous entry*
19.E.II.2.a. Variables in matrix: *33*
19.E.II.2.b. Variables entered: *15*
19.E.II.3. Best predictors: *81. Crown length UI2 (.544), 81(1) Crown width UC (.294), 80a. Dental arch length of the mandible (.201), 80a. Dental arch length of the mandible (.816 - Function 2), 69c. Thickness of the mandibular symphysis (-.572 - Function 3), 63(2)b. 2nd internal dental arch breadth (mx) (.372 - Function 4)*
19.E.II.4.a. Wilks' Lambda: *1 through 4: .023 (Sig. .000), 2 through 4: .092 (Sig. .000), 3 through 4: .334 (Sig. .000), 4: .642 (Sig. .000)*
19.E.II.4.b. Eigenvalues: *1: 2.909 (r: .863), 2: 2.636 (r: .851), 3: .922 (r: .693), 4: .559 (r: .599)*
19.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
19.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -77.063, Chad - -85.050, Mandinka - -106.075, Somalis - -84.246, Haya - -79.845), no outliers detected, no variables failed tolerance test*

19.E.III. Results
19.E.III.1.a. Within-groups covariance matrix: *Chad, 91.7%, Chad (D^2: 5.012), Somalis (D^2: 5.443)*
19.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *82.4%*
19.E.III.1.c. Separate-groups covariance matrix: *Chad, 96.3%, Chad (D^2: 6.212), Southern Sudan (D^2: 6.089)*
19.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 1 Mandinka, 1 Somali, 4 Haya), Chad (1 Mandinka, 1 Somali), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad, 3 Haya), Haya (1 Southern Sudan, 3 Somalis)*
19.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Somali), Chad (1 Southern Sudan), Mandinka (1 Southern Sudan), Haya (1 Southern Sudan)*
19.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



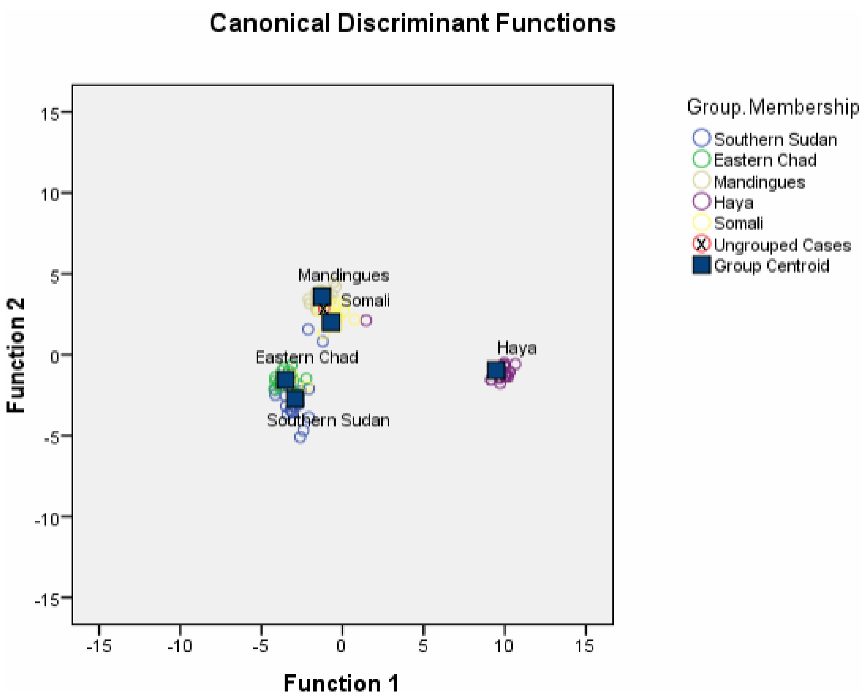
19.E.IV. Additional results
19.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 94.4%, 75.0%), separate-groups covariance matrix (Somalis, 97.2%)*
19.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 90.7%, 81.5%), separate-groups covariance matrix (Chad, 92.6%), variables entered (12)*

19.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 98.1%, 93.5%; separate-groups covariance matrix - Southern Sudan, 98.1%), variables entered (20)*

19.F.I. Summary
19.F.I.1. Individual: *Abu Tabari 02/28-21*
19.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
19.F.I.3. Data: *Non-metric cranial and dental traits*
19.F.I.4. Classification: *Mandinka*

19.F.II. Analysis overview
19.F.II.1. Method: *Mahalanobis distance, simultaneous entry*
19.F.II.2.a. Variables in matrix: *26*
19.F.II.2.b. Variables entered: *16*
19.F.II.3. Best predictors: *Midline diastema (.810), Tuberculum dentale UI2 (.329), Double shovel UI1 (-.262), Tuberculum dentale UI2 (.782 - Function 2), Interruption groove UI2 (-.646 - Function 3), Alveolar prognathism (.527 - Function 4)*
19.F.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .026 (Sig. .000), 3 through 4: .179 (Sig. .000), 4: .684 (Sig. .000)*
19.F.II.4.b. Eigenvalues: *1: 22.453 (r: .978), 2: 5.966 (r: .925), 3: 2.818 (r: .859), 4: .462 (r: .562)*
19.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
19.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

19.F.III. Results
19.F.III.1.a. Within-groups covariance matrix: *Mandinka, 93.5%, Mandinka (D^2: 1.351), Somalis (D^2: 10.195)*
19.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *87.0%*
19.F.III.1.c. Separate-groups covariance matrix: *Mandinka, 94.4%, Mandinka (D^2: 7.064), Somalis (D^2: 7.790)*
19.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (4 Chad, 1 Mandinka, 1 Somali), Chad (2 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad, 3 Mandinka), Haya (1 Somali)*
19.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Somali), Somalis (1 Southern Sudan, 1 Chad, 1 Mandinka), Haya (1 Somali)*
19.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



19.F.IV. Additional results
19.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 97.2%, 87.0%), separate-groups covariance matrix (Somalis, 99.1%)*
19.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 89.8%, 85.2%), separate-groups covariance matrix (Somalis, 93.5%), variables entered (8)*

19.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 94.4%, 89.8%; separate-groups covariance matrix - Somalis, 96.3%), variables entered (8)*

20. Abu Tabari 02/28-22

20.A.I. Summary

20.A.I.1. Individual: *Abu Tabari 02/28-22*

20.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

20.A.I.3. Data: *Cranial and dental measurements*

20.A.I.4. Classification: *Malian Sahara*

20.A.II. Analysis overview

20.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

20.A.II.2.a. Variables in matrix: *49*

20.A.II.2.b. Variables entered: *14*

20.A.II.3. Best predictors: *71a. Minimum ramus width (.349), 61a(3). 2nd premolar alveolar breadth (md) (.291), 61a(1). Canine alveolar breadth (md) (.272), 80a. Dental arch length of the mandible (-.596 - Function 2)*

20.A.II.4.a. Wilks' Lambda: *1 through 2: .043 (Sig. .000), 2: .274 (Sig. .000)*

20.A.II.4.b. Eigenvalues: *1: 5.312 (r: .917), 2: 2.646 (r: .852)*

20.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

20.A.II.6. Remarks: *Box's M (Sig. .032; Log determinants: A-Group - -23.361, Jebel Sahaba/Tushka - -24.724, Malian Sahara - -18.332), no outliers detected, no variables failed tolerance test*

20.A.III. Results

20.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 2.553), A-Group (D^2: 5.350)*

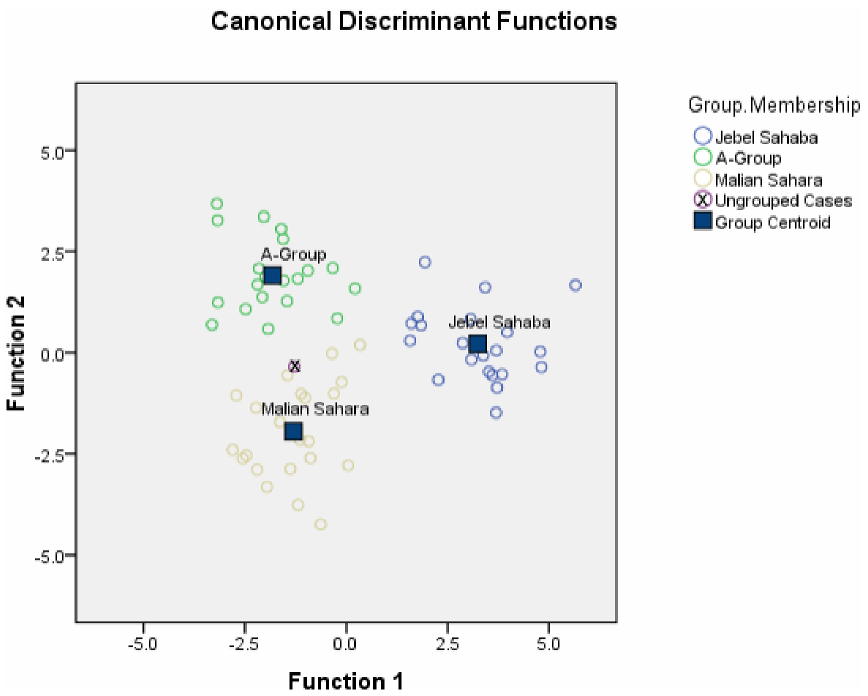
20.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*

20.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 2.050), A-Group (D^2: 6.494)*

20.A.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

20.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

20.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



20.A.IV. Additional results

20.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 64.6%), separate-groups covariance matrix (Malian Sahara, 100.0%)*

20.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 92.3%, 87.7%), separate-groups covariance matrix (A-Group, 93.8%), variables entered (7)*

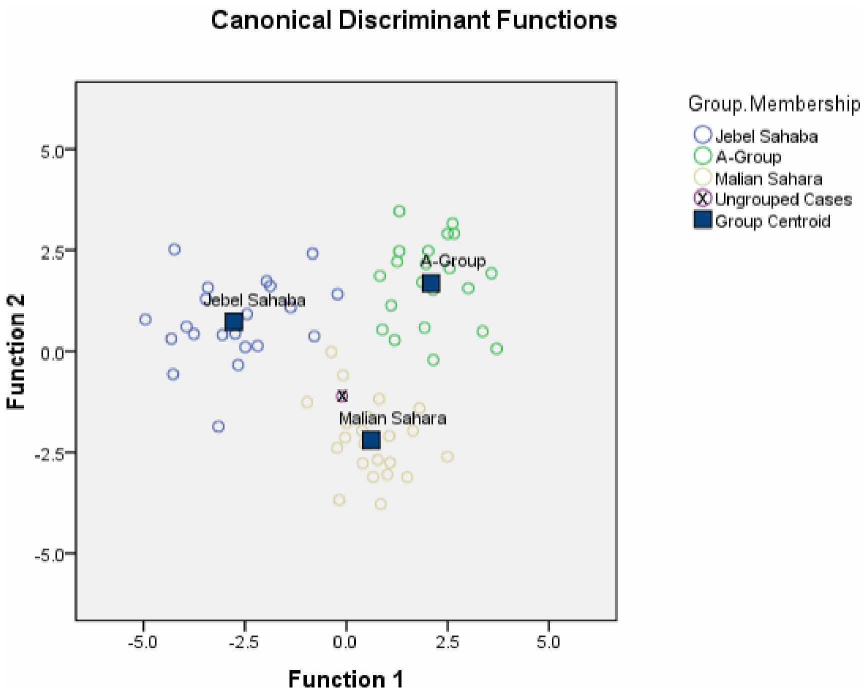
20.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 94.0%; separate-groups* *covariance matrix - Malian Sahara, 98.8%), variables entered (17)*

20.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 92.8%; separate-groups covariance matrix - A-Group, 98.8%), variables entered (20)*

20.B.I. Summary
20.B.I.1. Individual: *Abu Tabari 02/28-22*
20.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
20.B.I.3. Data: *Scaled cranial and dental measurements*
20.B.I.4. Classification: *Malian Sahara*

20.B.II. Analysis overview
20.B.II.1. Method: *Mahalanobis distance, simultaneous entry*
20.B.II.2.a. Variables in matrix: *41*
20.B.II.2.b. Variables entered: *14*
20.B.II.3. Best predictors: *71a. Minimum ramus width (-.343), 69. Height of the mandibular symphysis (-.235), 30. Bregma-Lambda chord (.220), 81(1), Crown width UM1 (.431 - Function 2)*
20.B.II.4.a. Wilks' Lambda: *1 through 2: .049 (Sig. .000), 2: .254 (Sig. .000)*
20.B.II.4.b. Eigenvalues: *1: 4.224 (r: .899), 2: 2.930 (r: .863)*
20.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
20.B.II.6. Remarks: *Box's M (Sig. .021; Log determinants: A-Group - -76.248, Jebel Sahaba/Tushka - -73.015, Malian Sahara - -71.655), no outliers detected, no variables failed tolerance test*

20.B.III. Results
20.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 1.706), Jebel Sahaba/Tushka (D^2: 10.481)*
20.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *90.8%*
20.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 1.729), Jebel Sahaba/Tushka (D^2: 9.994)*
20.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (2 Jebel Sahaba/Tushka)*
20.B.III.2.b. Misclassifications (separate-groups): *No misclassifications*
20.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



20.B.IV. Additional results
20.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 81.5%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
20.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 95.4%, 90.8%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (11)*
20.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 92.8%; separate-groups*

	covariance matrix - Malian Sahara, 98.8%), variables entered (15)
20.B.IV.3. Raw matrix:	Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 92.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (20)

20.C.I. Summary

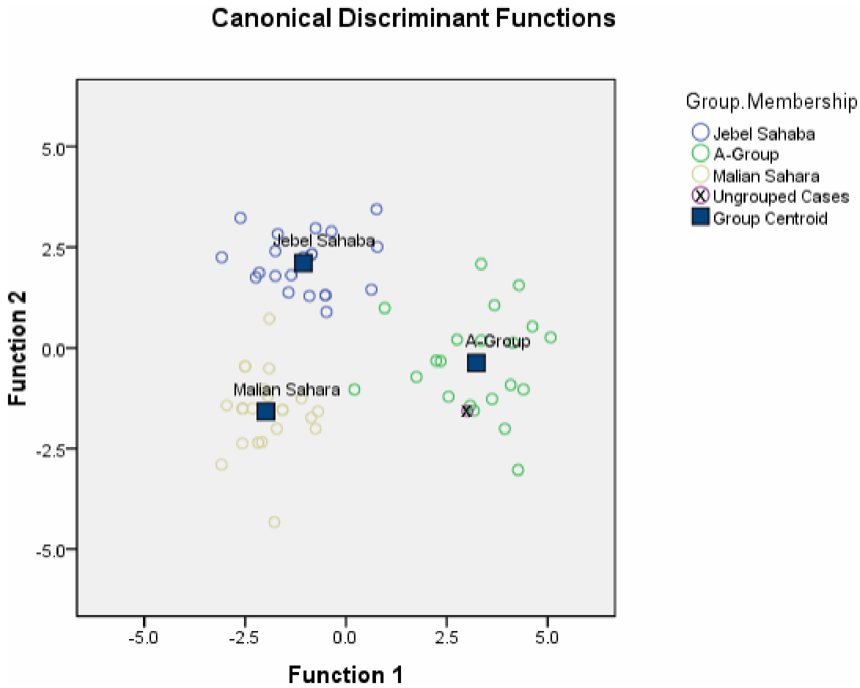
20.C.I.1. Individual:	*Abu Tabari 02/28-22*
20.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
20.C.I.3. Data:	*Non-metric cranial and dental traits*
20.C.I.4. Classification:	*A-Group*

20.C.II. Analysis overview

20.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
20.C.II.2.a. Variables in matrix:	*36*
20.C.II.2.b. Variables entered:	*12*
20.C.II.3. Best predictors:	*Shovel UI1 (-.601), Sella nasi (main) (.309), Alveolar prognathism (-.252), Premolar root number UP1 (.410 - Function 2)*
20.C.II.4.a. Wilks' Lambda:	*1 through 2: .045 (Sig. .000), 2: .288 (Sig. .000)*
20.C.II.4.b. Eigenvalues:	*1: 5.381 (r: .918), 2: 2.478 (r: .844)*
20.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
20.C.II.6. Remarks:	*Box's M (test not possible: A-Group - -27.207, Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

20.C.III. Results

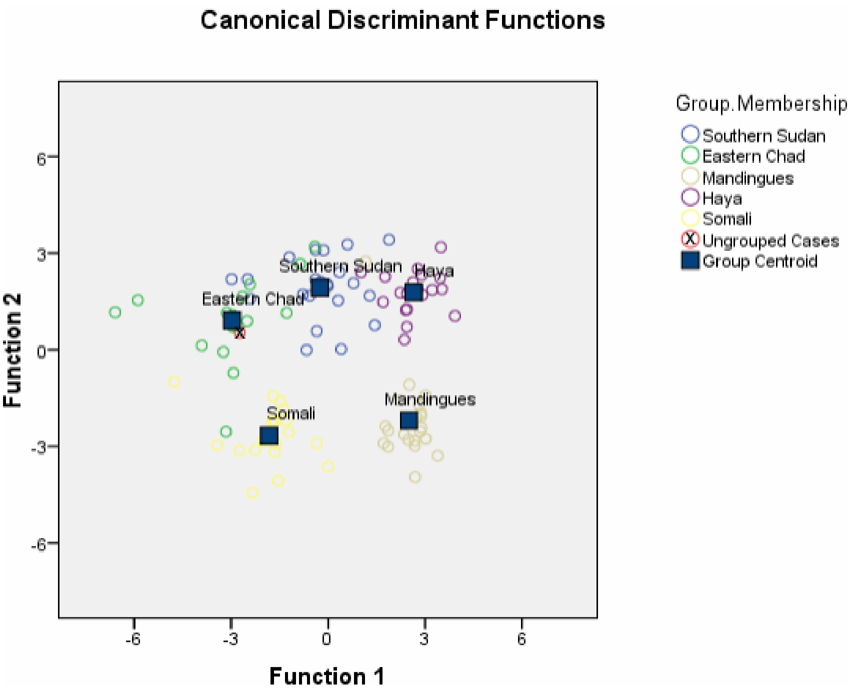
20.C.III.1.a. Within-groups covariance matrix:	*A-Group, 95.4%, A-Group (D^2: 1.476), Malian Sahara (D^2: 24.931)*
20.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.4%*
20.C.III.1.c. Separate-groups covariance matrix:	*A-Group, 98.5%, A-Group (D^2: .955), Jebel Sahaba/Tushka (D^2: 41.468)*
20.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Malian Sahara (1 A-Group, 0 Jebel Sahaba/Tushka)*
20.C.III.2.b. Misclassifications (separate-groups):	*Malian Sahara (1 Jebel Sahaba/Tushka)*
20.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



20.C.IV. Additional results

20.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 72.3%), separate-groups covariance matrix (A-Group, 100.0%)*
20.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 93.8%, 90.8%), separate-groups covariance matrix (A-Group, 95.4%), variables entered (9)*
20.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 96.4%, 94.0%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (16)*

20.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 92.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (20)*
20.D.I. Summary	
20.D.I.1. Individual:	*Abu Tabari 02/28-22*
20.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
20.D.I.3. Data:	*Cranial and dental measurements*
20.D.I.4. Classification:	*Chad*
20.D.II. Analysis overview	
20.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
20.D.II.2.a. Variables in matrix:	*40*
20.D.II.2.b. Variables entered:	*14*
20.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.864), 80a. Dental arch length of the mandible (.436), 81. Crown length LC (.226), 81. Crown length LC (.573 - Function 2), 19a. Mastoid height (-.348 - Function 3), 63(2)d. 4th internal dental arch breadth (md) (.484 - Function 4)*
20.D.II.4.a. Wilks' Lambda:	*1 through 4: .008 (Sig. .000), 2 through 4: .051 (Sig. .000), 3 through 4: .260 (Sig. .000), 4: .527 (Sig. .000)*
20.D.II.4.b. Eigenvalues:	*1: 5.242 (r: .916), 2: 4.076 (r: .896), 3: 1.025 (r: .712), 4: .897 (r: .688)*
20.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
20.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -7.192, Chad - -11.752, Mandinka - 'singular', Somalis - -9.022, Haya - -4.839), no outliers detected, no variables failed tolerance test*
20.D.III. Results	
20.D.III.1.a. Within-groups covariance matrix:	*Chad, 95.4%, Chad (D^2: 14.893), Southern Sudan (D^2: 41.861)*
20.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*89.8%*
20.D.III.1.c. Separate-groups covariance matrix:	*Chad, 96.3%, Chad (D^2: 12.848), Somalis (D^2: 41.012)*
20.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Haya), Chad (1 Southern Sudan, 2 Somalis, 2 Haya), Mandinka (1 Southern Sudan), Somalis (1 Chad), Haya (1 Southern Sudan)*
20.D.III.2.b. Misclassifications (separate-groups):	*Chad (1 Southern Sudan), Mandinka (1 Southern Sudan), Somalis (1 Chad), Haya (1 Southern Sudan)*
20.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



20.D.IV. Additional results	
20.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 99.1%, 84.3%), separate-groups covariance matrix (Chad, 100.0%)*
20.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 92.6%, 90.7%), separate-groups covariance matrix (Chad, 94.4%), variables entered (11)*

20.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 99.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (24)*

20.E.I. Summary

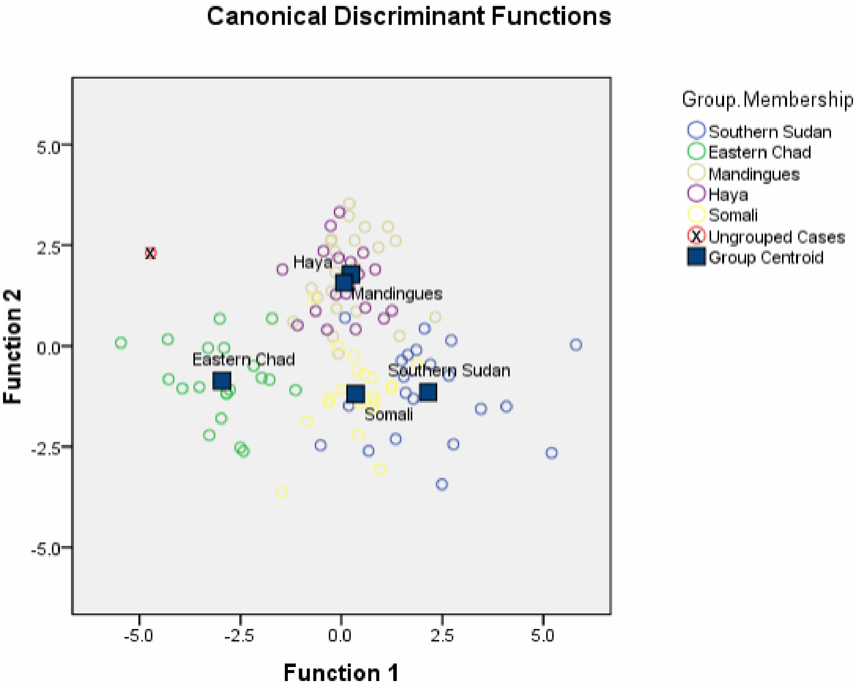
20.E.I.1. Individual:	*Abu Tabari 02/28-22*
20.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
20.E.I.3. Data:	*Scaled cranial and dental measurements*
20.E.I.4. Classification:	*Chad*

20.E.II. Analysis overview

20.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
20.E.II.2.a. Variables in matrix:	*36*
20.E.II.2.b. Variables entered:	*16*
20.E.II.3. Best predictors:	*80a. Dental arch length of the mandible (.781), 80(1)c. 2nd premolar dental arch breadth (md) (.287), 63(2)d. 4th internal dental arch breadth (md) (.247), 69c. Thickness of the mandibular symphysis (-.399 - Function 2), 81(1). Crown width UC (.367 - Function 3), 30. Bregma-Lambda chord (.442 - Function 4)*
20.E.II.4.a. Wilks' Lambda:	*1 through 4: .023 (Sig. .000), 2 through 4: .091 (Sig. .000), 3 through 4: .264 (Sig. .000), 4: .596 (Sig. .000)*
20.E.II.4.b. Eigenvalues:	*1: 2.988 (r: .866), 2: 1.897 (r: .809), 3: 1.257 (r: .746), 4: .679 (r: .636)*
20.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
20.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -73.138, Chad - -82.895, Mandinka - -74.599, Somalis - -80.419, Haya - -77.141), no outliers detected, no variables failed tolerance test*

20.E.III. Results

20.E.III.1.a. Within-groups covariance matrix:	*Chad, 91.7%, Chad (D^2: 20.158), Mandinka (D^2: 27.080)*
20.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*80.6%*
20.E.III.1.c. Separate-groups covariance matrix:	*Chad, 94.4%, Chad (D^2: 17.361), Southern Sudan (D^2: 34.858)*
20.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali, 1 Haya), Chad (2 Mandinka, 1 Haya), Mandinka (3 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 1 Chad, 3 Haya), Haya (1 Southern Sudan, 1Mandinka, 2 Somalis)*
20.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Mandinka), Mandinka (1 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 1 Haya), Haya (1 Mandinka)*
20.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



20.E.IV. Additional results

20.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 97.2%, 71.3%), separate-groups covariance matrix (Chad, 97.2%)*

20.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 91.7%, 80.6%), separate-groups covariance matrix (Chad, 91.7%), variables entered (17)*

20.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 100.0%, 96.3%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (27)*

20.F.I. Summary

20.F.I.1. Individual: *Abu Tabari 02/28-22*

20.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

20.F.I.3. Data: *Non-metric cranial and dental traits*

20.F.I.4. Classification: *Haya*

20.F.II. Analysis overview

20.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

20.F.II.2.a. Variables in matrix: *38*

20.F.II.2.b. Variables entered: *15*

20.F.II.3. Best predictors: *Shovel UI1 (-.778), Cusp number LM2 (.342), Parastyle UM3 (-.162), Parastyle UM3 (.654 - Function 2), Sella nasi (main) (.530 - Function 3), Parastyle UM3 (-.536 - Function 4)*

20.F.II.4.a. Wilks' Lambda: *1 through 4: .027 (Sig. .000), 2 through 4: .192 (Sig. .000), 3 through 4: .455 (Sig. .000), 4: .810 (Sig. .060)*

20.F.II.4.b. Eigenvalues: *1: 6.031 (r: .926), 2: 1.370 (r: .760), 3: .779 (r: .662), 4: .234 (r: .435)*

20.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

20.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - -37.406, Haya - 'singular'), no outliers detected, no variables failed tolerance test*

20.F.III. Results

20.F.III.1.a. Within-groups covariance matrix: *Haya, 81.5%, Haya (D^2: 2.138), Somalis (D^2: 6.965)*

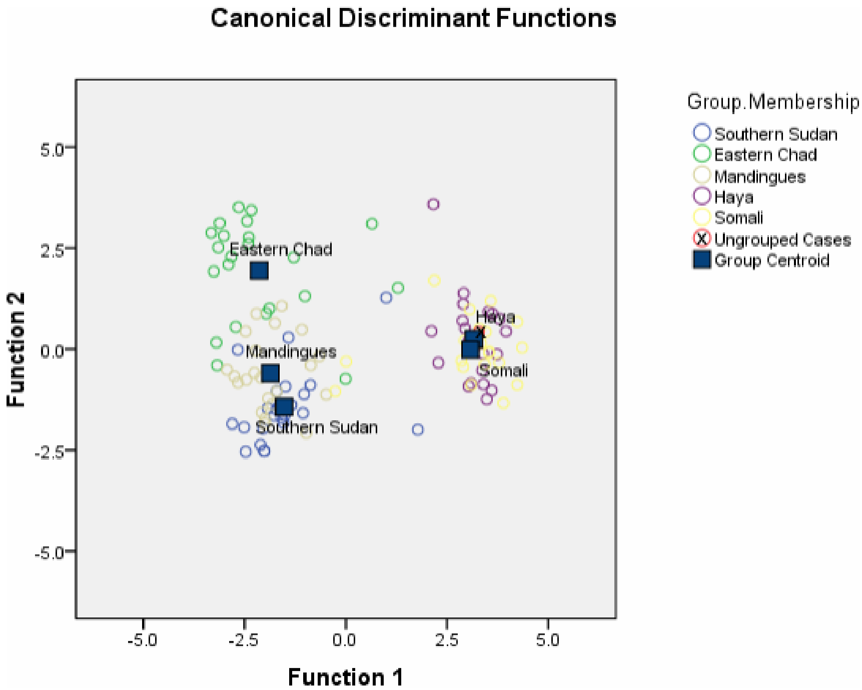
20.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *63.9%*

20.F.III.1.c. Separate-groups covariance matrix: *Haya, 91.7%, Haya (D^2: 3.409), Somalis (D^2: 11.305)*

20.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 3 Mandinka, 2 Somalis), Chad (1 Southern Sudan, 6 Mandinka, 2 Haya), Mandinka (11 Southern Sudan, 1 Chad), Somalis (2 Southern Sudan, 4 Haya), Haya (1 Chad, 5 Somalis)*

20.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Mandinka), Chad (1 Southern Sudan, 1 Mandinka), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Haya), Haya (1 Somali)*

20.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



20.F.IV. Additional results

20.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 92.6%, 63.0%), separate-groups covariance matrix (Somalis, 94.4%)*

20.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 78.7%, 73.1%), separate-groups covariance matrix (Somalis, 75.9%), variables entered (9)*

20.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 85.2%, 81.5%; separate-groups covariance matrix - Chad, 89.8%), variables entered (10)*

21. Abu Tabari 02/28-23

21.A.I. Summary

21.A.I.1. Individual: *Abu Tabari 02/28-23*

21.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

21.A.I.3. Data: *Cranial and dental measurements*

21.A.I.4. Classification: *Jebel Sahaba/Tushka*

21.A.II. Analysis overview

21.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

21.A.II.2.a. Variables in matrix: *59*

21.A.II.2.b. Variables entered: *14*

21.A.II.3. Best predictors: *81(1). Crown width LI1 (.449), 81. Crown length LI1 (.373), 80a. Dental arch length of the mandible (.297), 80a. Dental arch length of the mandible (.380 - Function 2)*

21.A.II.4.a. Wilks' Lambda: *1 through 2: .026 (Sig. .000), 2: .211 (Sig. .000)*

21.A.II.4.b. Eigenvalues: *1: 7.084 (r: .936), 2: 3.742 (r: .888)*

21.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

21.A.II.6. Remarks: *Box's M (Sig. .013; Log determinants: A-Group - -16.622, Jebel Sahaba/Tushka - -13.598, Malian Sahara - -12.588), no outliers detected, no variables failed tolerance test*

21.A.III. Results

21.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 3.221), Malian Sahara (D^2: 14.528)*

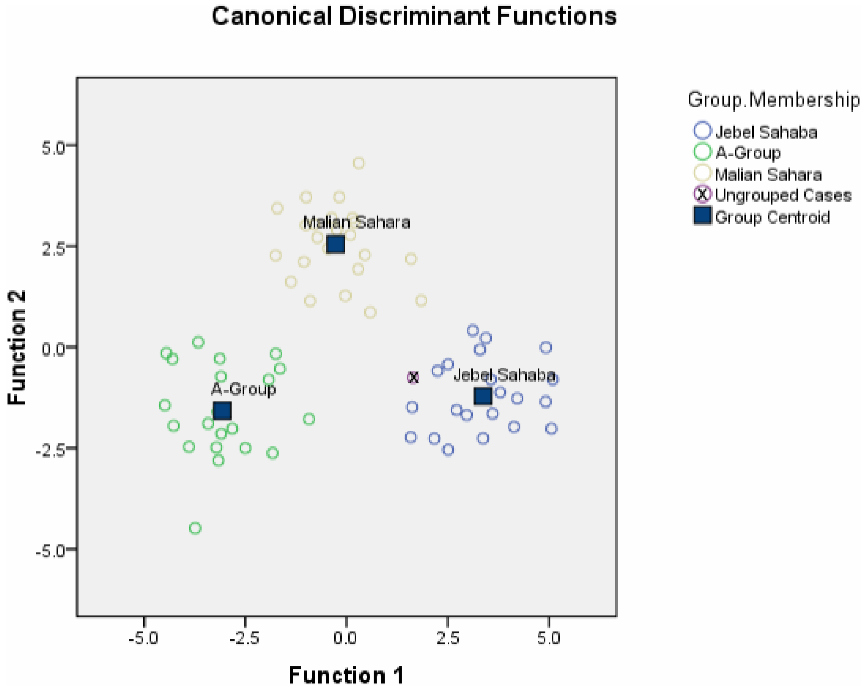
21.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*

21.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 3.300), Malian Sahara (D^2: 14.097)*

21.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*

21.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

21.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



21.A.IV. Additional results

21.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 63.1%), separate-groups covariance matrix (A-Group, 100.0%)*

21.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%, 96.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%), variables entered (12)*

21.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 98.8%, 94.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%), variables entered (18)*

21.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 98.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (23)*

21.B.I. Summary

21.B.I.1. Individual: *Abu Tabari 02/28-23*

21.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

21.B.I.3. Data: *Scaled cranial and dental measurements*

21.B.I.4. Classification: *Jebel Sahaba/Tushka*

21.B.II. Analysis overview

21.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

21.B.II.2.a. Variables in matrix: *47*

21.B.II.2.b. Variables entered: *14*

21.B.II.3. Best predictors: *81(1). Crown width LI1 (.253), 48(1). Nasospinale-Prosthion height (.218), 69. Height of the mandibular symphysis (.206), 81(1). Crown width LI1 (-.390 - Function 2)*

21.B.II.4.a. Wilks' Lambda: *1 through 2: .039 (Sig. .000), 2: .272 (Sig. .000)*

21.B.II.4.b. Eigenvalues: *1: 5.989 (r: .926), 2: 2.671 (r: .853)*

21.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

21.B.II.6. Remarks: *Box's M (Sig. .004; Log determinants: A-Group - -79.684, Jebel Sahaba/Tushka - -79.123, Malian Sahara - -74.663), no outliers detected, no variables failed tolerance test*

21.B.III. Results

21.B.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 98.5%, Jebel Sahaba/Tushka (D^2: 3.042), A-Group (D^2: 35.187)*

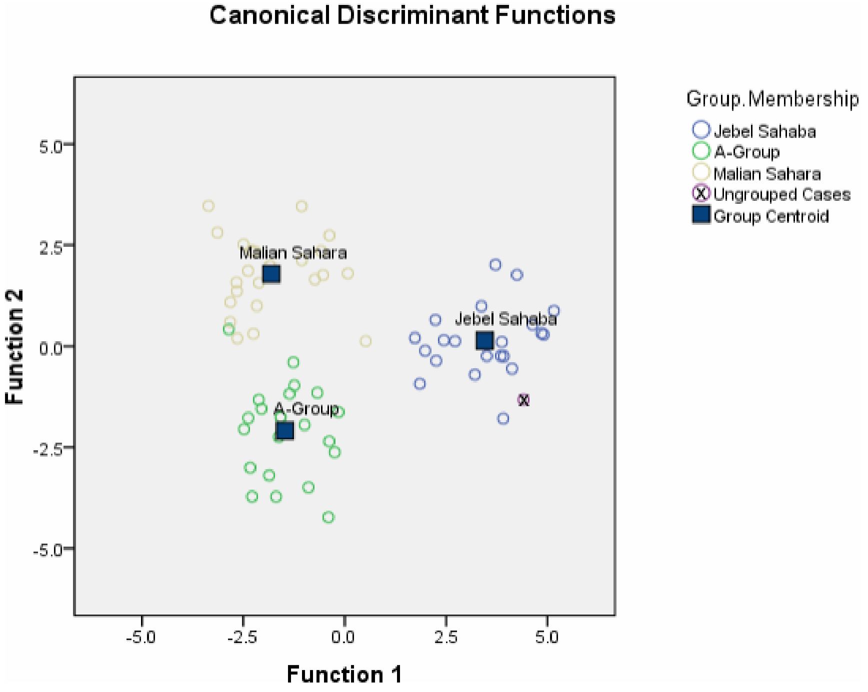
21.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *89.2%*

21.B.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 98.5%, Jebel Sahaba/Tushka (D^2: 4.706), Malian Sahara (D^2: 41.973)*

21.B.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Malian Sahara), Malian Sahara (1 A-Group, 3 Jebel Sahaba/Tushka)*

21.B.III.2.b. Misclassifications (separate-groups): *A-Group (1 Jebel Sahaba/Tushka)*

21.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



21.B.IV. Additional results

21.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 78.5%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%)*

21.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 95.4%, 93.8%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 95.4%), variables entered (8)*

21.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 98.8%, 91.6%; separate-groups covariance matrix - A-Group, 98.8%), variables entered (19)*

21.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 92.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (19)*

21.C.I. Summary

21.C.I.1. Individual: *Abu Tabari 02/28-23*

21.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

21.C.I.3. Data: *Non-metric cranial and dental traits*

21.C.I.4. Classification: *Jebel Sahaba/Tushka*

21.C.II. Analysis overview

21.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

21.C.II.2.a. Variables in matrix: *44*

21.C.II.2.b. Variables entered: *14*

21.C.II.3. Best predictors: *Shovel UI1 (-.557), Margo infranasalis (.241), Groove pattern LM2 (-.233), Premolar lingual cusps LP2 (-.298 - Function 2)*

21.C.II.4.a. Wilks' Lambda: *1 through 2: .027 (Sig. .000), 2: .192 (Sig. .000)*

21.C.II.4.b. Eigenvalues: *1: 6.200 (r: .928), 2: 4.196 (r: .899)*

21.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

21.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

21.C.III. Results

21.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 19.180), A-Group (D^2: 23.846)*

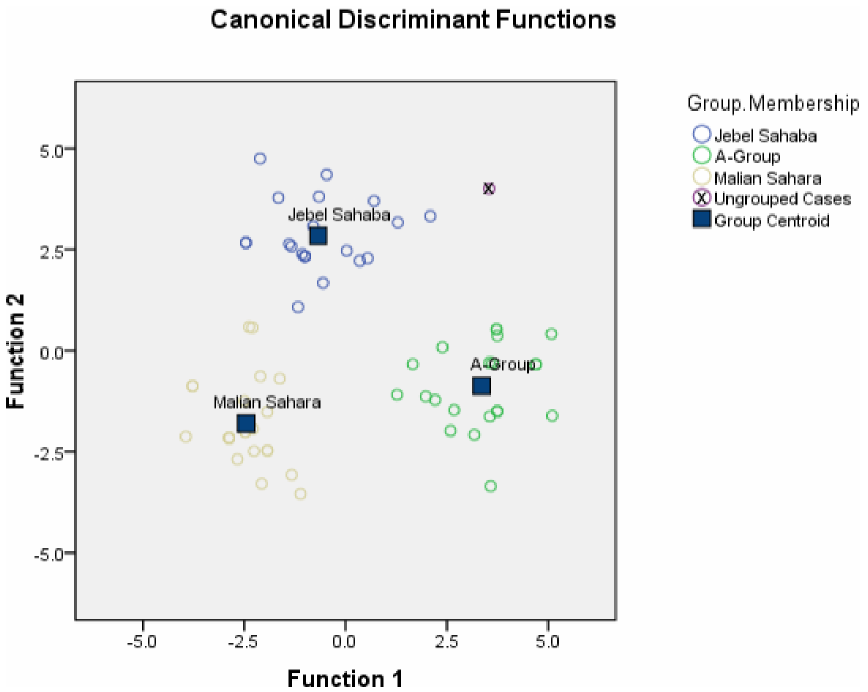
21.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

21.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 14.428), A-Group (D^2: 23.226)*

21.C.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (2 Jebel Sahaba/Tushka)*

21.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*

21.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



21.C.IV. Additional results

21.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 80.0%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%)*
21.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%, 95.4%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%), variables entered (11)*
21.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 98.8%, 94.0%; separate-groups covariance matrix - A-Group, 98.8%), variables entered (20)*
21.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 94.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), variables entered (24)*

21.D.I. Summary

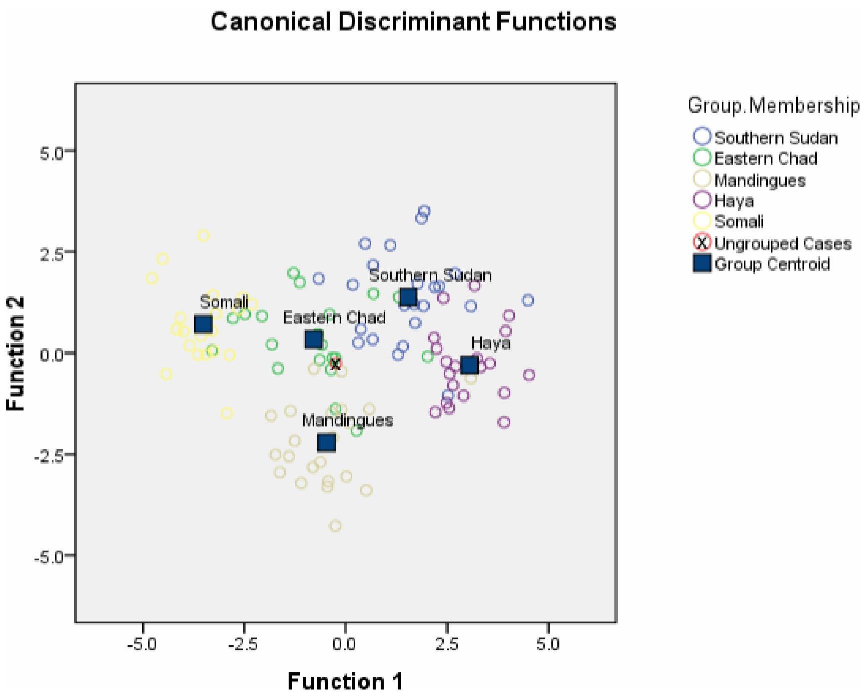
21.D.I.1. Individual:	*Abu Tabari 02/28-23*
21.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
21.D.I.3. Data:	*Cranial and dental measurements*
21.D.I.4. Classification:	*Chad*

21.D.II. Analysis overview

21.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
21.D.II.2.a. Variables in matrix:	*42*
21.D.II.2.b. Variables entered:	*16*
21.D.II.3. Best predictors:	*80a. Dental arch length of the mandible (.644), 81. Crown length LC (.559), 63(2)d. 4th internal dental arch breadth (md) (.231), 69c. Thickness of the mandibular symphysis (.300 - Function 2), 63(2)d. 4th internal dental arch breadth (.431 - Function 3), 63(2)b. 2nd internal dental arch breadth (mx) (.394 - Function 4)*
21.D.II.4.a. Wilks' Lambda:	*1 through 4: .016 (Sig. .000), 2 through 4: .095 (Sig. .000), 3 through 4: .249 (Sig. .000), 4: .513 (Sig. .000)*
21.D.II.4.b. Eigenvalues:	*1: 4.936 (r: .912), 2: 1.633 (r: .788), 3: 1.056 (r: .717), 4: .950 (r: .698)*
21.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
21.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -10.877, Chad - -22.394, Mandinka - -9.180, Somalis - -18.769, Haya - -12.120), no outliers detected, no variables failed tolerance test*

21.D.III. Results

21.D.III.1.a. Within-groups covariance matrix:	*Chad, 93.5%, Chad (D^2: 1.432), Mandinka (D^2: 7.640)*
21.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*85.2%*
21.D.III.1.c. Separate-groups covariance matrix:	*Chad, 94.4%, Chad (D^2: 1.070), Southern Sudan (D^2: 8.641)*
21.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 2 Haya), Chad (1 Southern Sudan, 1 Mandinka, 1 Somali, 2 Haya), Mandinka (1 Southern Sudan, 2 Chad, 1 Haya), Somalis (1 Chad), Haya (2 Southern Sudan)*
21.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Haya), Chad (1 Southern Sudan, 1 Mandinka), Mandinka (1 Haya), Somalis (1 Chad), Haya (1 Southern Sudan)*
21.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



21.D.IV. Additional results

21.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 99.1%, 73.1%), separate-groups covariance matrix (Chad, 98.1%)*
21.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 93.5%, 81.5%), separate-groups covariance matrix (Chad, 93.5%), variables entered (16)*
21.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 93.5%; separate-groups covariance matrix - Chad, 100.0%), variables entered (32)*

21.E.I. Summary

21.E.I.1. Individual:	*Abu Tabari 02/28-23*
21.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
21.E.I.3. Data:	*Scaled cranial and dental measurements*
21.E.I.4. Classification:	*Chad*

21.E.II. Analysis overview

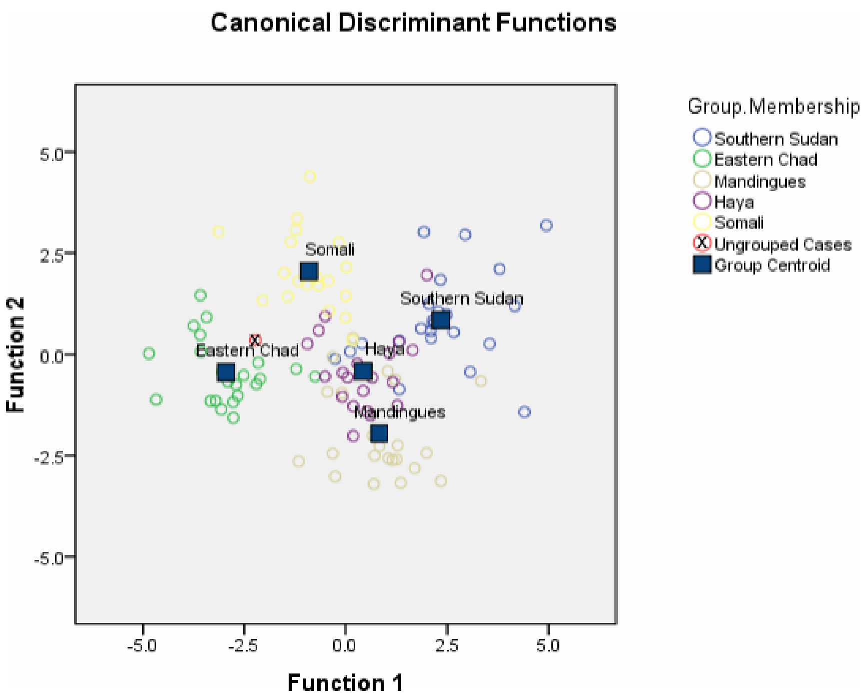
21.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
21.E.II.2.a. Variables in matrix:	*36*
21.E.II.2.b. Variables entered:	*16*
21.E.II.3. Best predictors:	*80a. Dental arch length of the mandible (.682), 63(2)d. 4th internal dental arch breadth (md) (.237), 80(1)c. 2nd premolar dental arch breadth (md) (.208), 80a. Dental arch length of the mandible (.360 - Function 2), 69c. Thickness of the mandibular symphysis (-.333 - Function 3), 48(1). Nasospinale-Prosthion height (-.318 - Function 4)*
21.E.II.4.a. Wilks' Lambda:	*1 through 4: .024 (Sig. .000), 2 through 4: .109 (Sig. .000), 3 through 4: .314 (Sig. .000), 4: .661 (Sig. .000)*
21.E.II.4.b. Eigenvalues:	*1: 3.482 (r: .881), 2: 1.876 (r: .808), 3: 1.104 (r: .724), 4: .513 (r: .582)*
21.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
21.E.II.6. Remarks:	*20.1% (prior prob. + 25%: 25.1%)*
2.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -72.235, Chad - -81.690, Mandinka - -69.069, Somalis - -73.148, Haya - -69.173), no outliers detected, no variables failed tolerance test*

21.E.III. Results

21.E.III.1.a. Within-groups covariance matrix:	*Chad, 90.7%, Chad (D^2: 4.811), Haya (D^2: 11.846)*
21.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*81.5%*
21.E.III.1.c. Separate-groups covariance matrix:	*Chad, 92.6%, Chad (D^2: 5.414), Mandinka (D^2: 15.965)*
21.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 3 Mandinka, 2 Haya), Chad (1 Somali), Mandinka (2 Southern Sudan, 1 Chad, 1 Somali, 1 Haya), Somalis (1 Mandinka, 2 Haya), Haya (2 Southern Sudan, 1 Mandinka, 2 Somalis)*

21.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka, 1 Haya), Chad (1 Mandinka), Mandinka (1 Haya), Haya (1 Southern Sudan, 2 Mandinka, 1 Somali)*

21.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



21.E.IV. Additional results

21.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 95.4%, 68.5%), separate-groups covariance matrix (Chad, 97.2%)*

21.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 89.8%, 77.8%), separate-groups covariance matrix (Haya, 87.0%), variables entered (14)*

21.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 97.2%, 86.1%; separate-groups covariance matrix - Chad, 99.1%), variables entered (19)*

21.F.I. Summary

21.F.I.1. Individual: *Abu Tabari 02/28-23*

21.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

21.F.I.3. Data: *Non-metric cranial and dental traits*

21.F.I.4. Classification: *Somalis*

21.F.II. Analysis overview

21.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

21.F.II.2.a. Variables in matrix: *48*

21.F.II.2.b. Variables entered: *18*

21.F.II.3. Best predictors: *Midline diastema (.704), Premolar mesial and distal accessory cusps UP1 (.399), Shovel UI1 (-.316), Premolar mesial and distal accessory cusps UP1 (.502 - Function 2), Parastyle UM3 (.539 - Function 3), Cusp 5 UM1 (.690 - Function 4)*

21.F.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .019 (Sig. .000), 3 through 4: .143 (Sig. .000), 4: .411 (Sig. .000)*

21.F.II.4.b. Eigenvalues: *1: 28.144 (r: .983), 2: 6.681 (r: .933), 3: 1.871 (r: .807), 4: 1.433 (r: .767)*

21.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

21.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

21.F.III. Results

21.F.III.1.a. Within-groups covariance matrix: *Somalis, 92.6%, Somalis (D^2: 2.708), Mandinka (D^2: 74.644)*

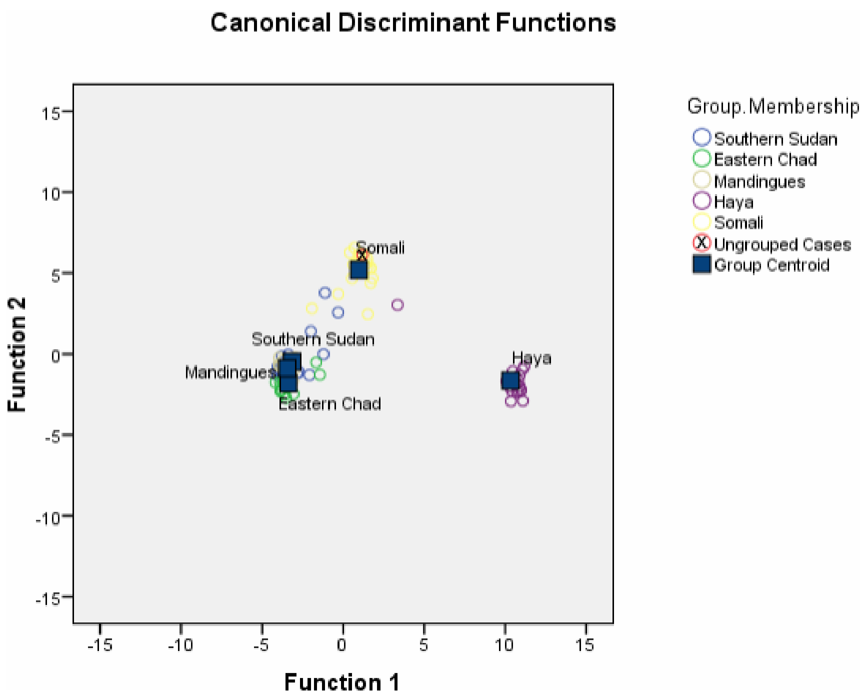
21.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *87.0%*

21.F.III.1.c. Separate-groups covariance matrix: *Somalis, 96.3%, Somalis (D^2: 1.804), Haya (D^2: 49.763)*

21.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 1 Mandinka, 2 Somalis), Chad (2 Southern Sudan, 2 Mandinka), Mandinka (2 Southern Sudan), Somalis (2 Southern Sudan), Haya (1 Somali)*

21.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka), Chad (1 Southern Sudan, 1 Mandinka), Mandinka (1 Southern Sudan)*

21.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



21.F.IV. Additional results

21.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 99.1%, 81.5%), separate-groups covariance matrix (Somalis, 100.0%)*

21.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 89.8%, 88.0%), separate-groups covariance matrix (Somalis, 92.6%), variables entered (13)*

21.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 88.0%, 86.1%; separate-groups covariance matrix - Somalis, 93.5%), variables entered (11)*

22. Abu Tabari 03/31

no data

23. Abu Tabari 03/34-1

23.A.I. Summary

23.A.I.1. Individual: *Abu Tabari 03/34-1*

23.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

23.A.I.3. Data: *Dental measurements*

23.A.I.4. Classification: *Malian Sahara*

23.A.II. Analysis overview

23.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

23.A.II.2.a. Variables in matrix: *28*

23.A.II.2.b. Variables entered: *13*

23.A.II.3. Best predictors: *81(1). Crown width LI2 (.618), 81. Crown length LI1 (.552), 81(1). Crown width LI1 (.531), 81(1). Crown width LI1 (.391 - Function 2)*

23.A.II.4.a. Wilks' Lambda: *1 through 2: .065 (Sig. .000), 2: .327 (Sig. .000)*

23.A.II.4.b. Eigenvalues: *1: 4.016 (r: .895), 2: 2.060 (r: .820)*

23.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

23.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -55.762, Jebel Sahaba/Tushka - -54.573, Malian Sahara - -51.693), no outliers detected, no variables failed tolerance test*

23.A.III. Results

23.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 3.657), A-Group (D^2: 10.143)*

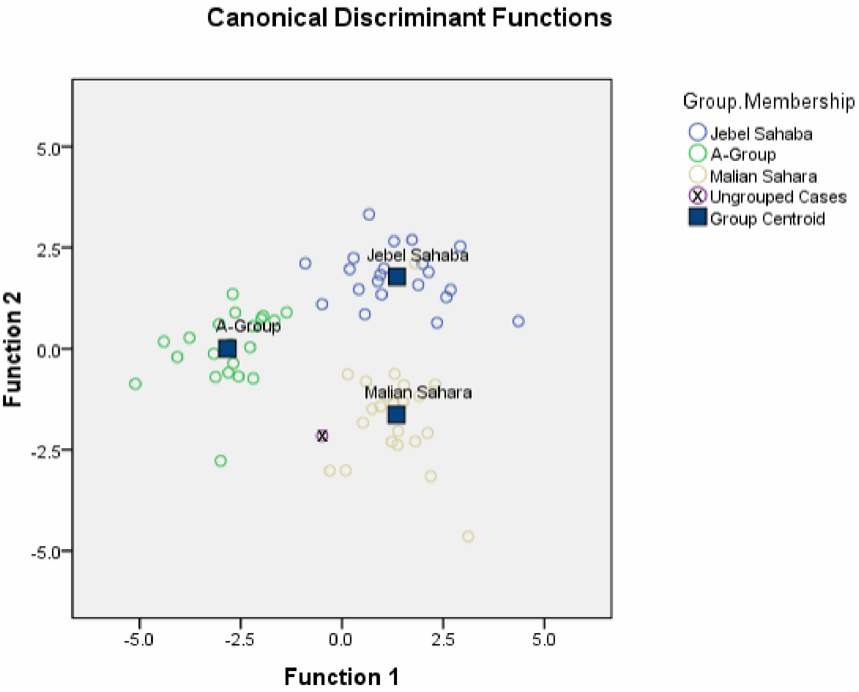
23.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.8%*

23.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 5.450), A-Group (D^2: 18.870)*

23.A.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 A-Group, 2 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*

23.A.III.2.b. Misclassifications (separate-groups): *Malian Sahara (1 Jebel Sahaba/Tushka)*

23.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



23.A.IV. Additional results

23.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 98.5%, 83.1%), separate-groups covariance matrix (A-Group, 98.5%)*

23.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 90.8%, 87.7%), separate-groups covariance matrix (A-Group, 95.4%), variables entered (8)*

23.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 94.0%; separate-groups covariance matrix - Malian Sahara, 96.4%), variables entered (13)*

23.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 97.6%; separate-groups covariance matrix – "Sudanese Hotchpotch", 100.0%), variables entered (23)*

23.B.I. Summary

23.B.I.1. Individual: *Abu Tabari 03/34-1*

23.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

23.B.I.3. Data: *Scaled dental measurements*

23.B.I.4. Classification: *Malian Sahara*

23.B.II. Analysis overview

23.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

23.B.II.2.a. Variables in matrix: *20*

23.B.II.2.b. Variables entered: *12*

23.B.II.3. Best predictors: *81(1). Crown width LI1 (.397), 81(1). Crown width UM1 (.347), 81(1). Crown width LI2 (.287), 81(1), Crown width LI2 (.492 - Function 2)*

23.B.II.4.a. Wilks' Lambda: *1 through 2: .084 (Sig. .000), 2: .486 (Sig. .000)*

23.B.II.4.b. Eigenvalues: *1: 4.771 (r: .909), 2: 1.058 (r: .717)*

23.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

23.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -91.806, Jebel Sahaba/Tushka - -87.675, Malian Sahara - -86.394), no outliers detected, no variables failed tolerance test*

23.B.III. Results

23.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 95.4%, Malian Sahara (D^2: 13.066), A-Group (D^2: 51.519)*

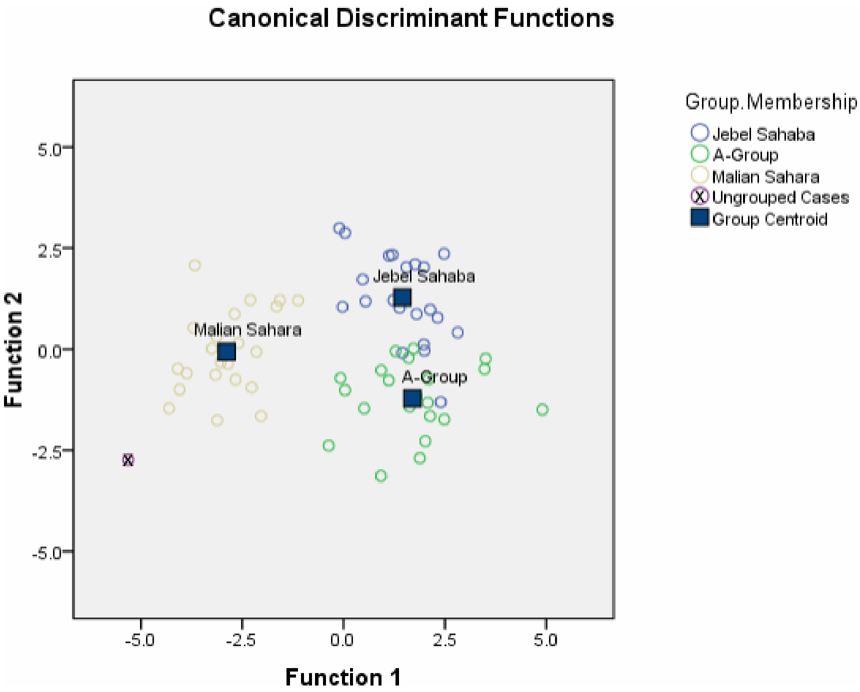
23.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *83.1%*

23.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 95.4%, Malian Sahara (D^2: 11.236), A-Group (D^2: 32.506)*

23.B.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group), Malian Sahara (2 Jebel Sahaba/Tushka)*

23.B.III.2.b. Misclassifications (separate-groups): *A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group)*

23.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



23.B.IV. Additional results

23.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 95.4%, 76.9%), separate-groups covariance matrix (Malian Sahara, 96.9%)*

23.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 90.8%, 83.1%), separate-groups covariance matrix (A-Group, 87.7%), variables entered (8)*

23.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 92.8%, 83.1%; separate-groups covariance matrix - Malian Sahara, 92.8%), variables entered (11)*

23.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 91.6%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (17)*

23.C.I. Summary

23.C.I.1. Individual: *Abu Tabari 03/34-1*

23.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

23.C.I.3. Data: *Non-metric dental traits*

23.C.I.4. Classification: *Malian Sahara*

23.C.II. Analysis overview

23.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

23.C.II.2.a. Variables in matrix: *18*

23.C.II.2.b. Variables entered: *14*

23.C.II.3. Best predictors: *Distal accessory ridge UC (.532), Shovel UI1 (.275), Interruption groove UI2 (.264), Tuberculum dentale UI2 (-.733 - Function 2)*

23.C.II.4.a. Wilks' Lambda: *1 through 2: .004 (Sig. .000), 2: .096 (Sig. .000)*

23.C.II.4.b. Eigenvalues: *1: 24.893 (r: .980), 2: 9.444 (r: .951)*

23.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

23.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

23.C.III. Results

23.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: .445), Jebel Sahaba/Tushka (D^2: 58.323)*

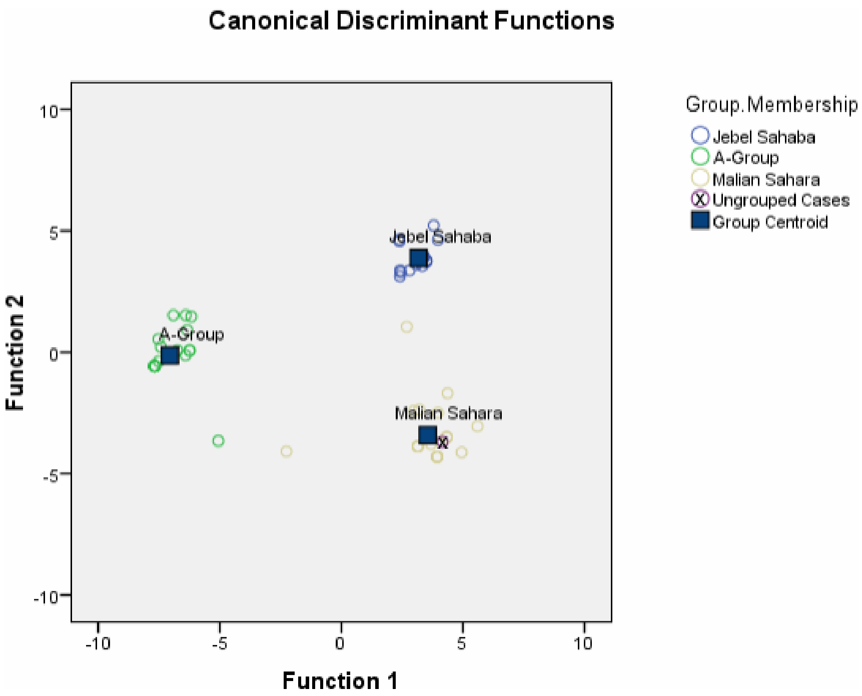
23.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

23.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .226), A-Group (D^2: 220.968)*

23.C.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

23.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*

23.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



23.C.IV. Additional results

23.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 100.0%)*

23.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), variables entered (8)*

23.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 95.2%; separate-groups covariance matrix - Malian Sahara, 96.4%), variables entered (11)*

23.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 96.4%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (11)*

23.D.I. Summary

23.D.I.1. Individual: *Abu Tabari 03/34-1*

23.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

23.D.I.3. Data: *Dental measurements*

23.D.I.4. Classification: *Southern Sudan*

23.D.II. Analysis overview

23.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

23.D.II.2.a. Variables in matrix: *16*

23.D.II.2.b. Variables entered: *14*

23.D.II.3. Best predictors: *81. Crown length LC (.669), 81(1). Crown width UC (-.359), 81. Crown length LP1 (-.324), 81(1). Crown width UI2 (.777 - Function 2), 81. Crown length LM1 (.537 - Function 3), 81. Crown length LM1 (-.327 - Function 4)*

23.D.II.4.a. Wilks' Lambda: *1 through 4: .030 (Sig. .000), 2 through 4: .124 (Sig. .000), 3 through 4: .448 (Sig. .000), 4: .746 (Sig. .003)*

23.D.II.4.b. Eigenvalues: *1: 3.117 (r: .870), 2: 2.609 (r: .850), 3: .664 (r: .632), 4: .314 (r: .504)*

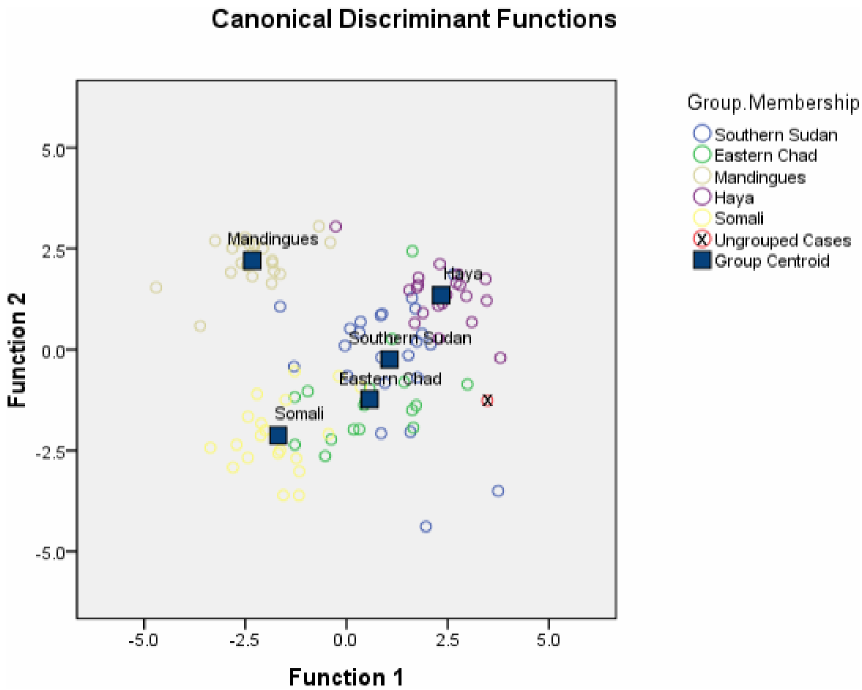
23.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

23.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -47.006, Chad - -57.588, Mandinka - -89.410, Somalis - -52.373, Haya - -56.816), no outliers detected, no variables failed tolerance test*

23.D.III. Results

23.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 89.8%, Southern Sudan (D^2: 9.162), Haya (D^2: 9.302)*

23.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *75.0%*
23.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 93.5%, Southern Sudan (D^2: 5.114), Chad (D^2: 12.987)*
23.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 1 Mandinka, 1 Somali, 2 Haya), Chad (3 Southern Sudan, 5 Somalis, 1 Haya), Mandinka (1 Southern Sudan, 1 Somali), Somalis (3 Chad, 1 Mandinka), Haya (3 Southern Sudan, 1 Chad, 1 Mandinka)*
23.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad), Chad (3 Southern Sudan, 1 Haya), Haya (1 Chad)*
23.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*

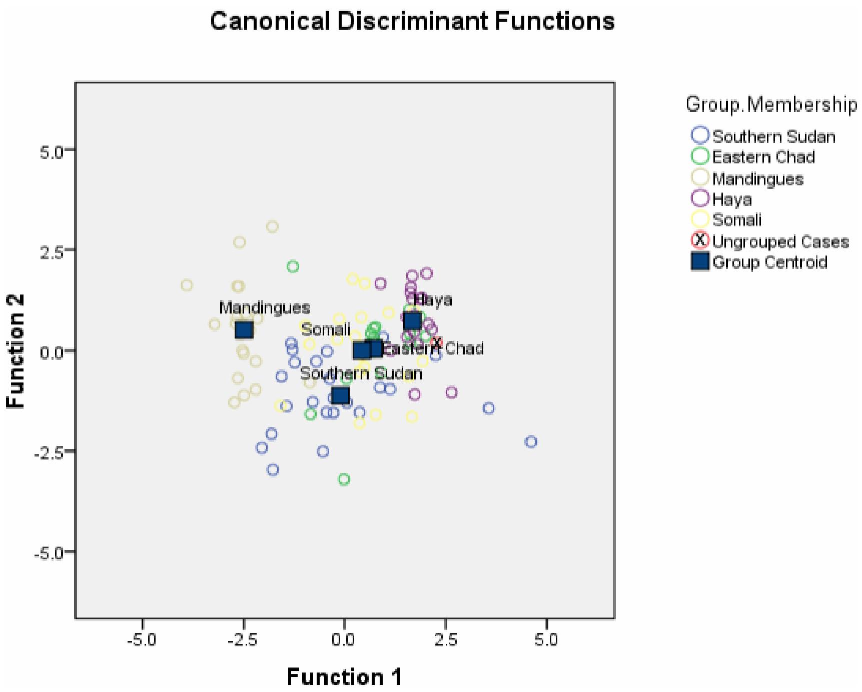


23.D.IV. Additional results
23.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 88.0%, 76.9%), separate-groups covariance matrix (Southern Sudan, 91.7%)*
23.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 82.4%, 78.7%), separate-groups covariance matrix (Southern Sudan, 88.0%), variables entered (8)*
23.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 93.5%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (28)*

23.E.I. Summary
23.E.I.1. Individual: *Abu Tabari 03/34-1*
23.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
23.E.I.3. Data: *Scaled dental measurements*
23.E.I.4. Classification: *Haya*

23.E.II. Analysis overview
23.E.II.1. Method: *Mahalanobis distance, simultaneous entry*
23.E.II.2.a. Variables in matrix: *8*
23.E.II.2.b. Variables entered: *6*
23.E.II.3. Best predictors: *81. Crown length UI2 (.740), 81(1). Crown width UC (.314), 81(1). Crown width UM1 (.129), 81. Crown length LM1 (-.777 - Function 2), 81(1). Crown width UM3 (.625 - Function 3), 81(1). Crown width UM1 (-.744 - Function 4)*
23.E.II.4.a. Wilks' Lambda: *1 through 4: .164 (Sig. .000), 2 through 4: .494 (Sig. .000), 3 through 4: .718 (Sig. .000), 4: .900 (Sig. .014)*
23.E.II.4.b. Eigenvalues: *1: 2.021 (r: .818), 2: .453 (r: .558), 3: .254 (r: .450), 4: .111 (r: .316)*
23.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
23.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -37.074, Chad - -42.258, Mandinka - -70.901, Somalis - -38.967, Haya - -42.049), no outliers detected, no variables failed tolerance test*

23.E.III. Results
23.E.III.1.a. Within-groups covariance matrix: *Haya, 72.2%, Haya (D^2: 2.339), Somalis (D^2: 3.546)*
23.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *65.7%*
23.E.III.1.c. Separate-groups covariance matrix: *Haya, 77.8%, Haya (D^2: 6.437), Somalis (D^2: 4.650)*
23.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 3 Mandinka, 2 Somalis, 2 Haya), Chad (3 Southern Sudan, 1 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan), Somalis (4 Southern Sudan, 3 Chad, 1 Mandinka, 4 Haya), Haya (1 Southern Sudan, 3 Chad, 2 Somalis)*
23.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka, 3 Somalis, 1 Haya), Chad (1 Southern Sudan, 3 Somalis, 3 Haya), Mandinka (1 Southern Sudan), Somalis (4 Southern Sudan, 3 Chad, 1 Haya), Haya (1 Chad, 1 Somali)*
23.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



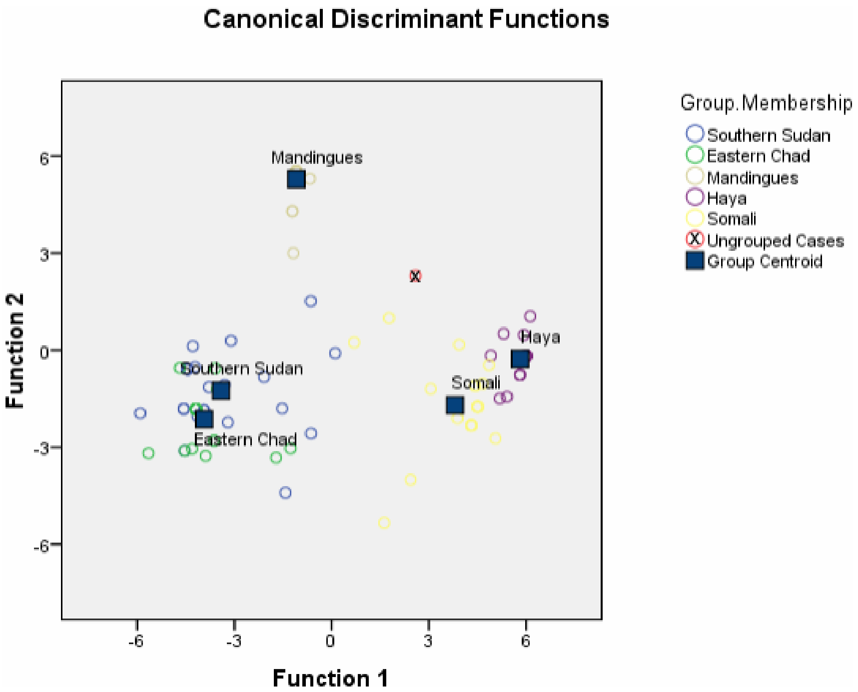
23.E.IV. Additional results
23.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 71.3%, 63.0%), separate-groups covariance matrix (Haya, 75.9%)*
23.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 69.4%, 67.6%), separate-groups covariance matrix (Chad, 78.7%), variables entered (5)*
23.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 88.9%; separate-groups covariance matrix - Somalis, 100.0%), variables entered (30)*

23.F.I. Summary
23.F.I.1. Individual: *Abu Tabari 03/34-1*
23.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
23.F.I.3. Data: *Non-metric dental traits*
23.F.I.4. Classification: *Southern Sudan*

23.F.II. Analysis overview
23.F.II.1. Method: *Mahalanobis distance, simultaneous entry*
23.F.II.2.a. Variables in matrix: *21*
23.F.II.2.b. Variables entered: *12*
23.F.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.594), Tuberculum dentale UI2 (.509), Shovel UI1 (-.459), Tuberculum dentale UI2 (.511 - Function 2), Canine mesial ridge (.681 - Function 3), Interruption groove UI2 (-.709 - Function 4)*
23.F.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .010 (Sig. .000), 3 through 4: .088 (Sig. .000), 4: .316 (Sig. .000)*
23.F.II.4.b. Eigenvalues: *1: 15.648 (r: .970), 2: 7.885 (r: .942), 3: 2.578 (r: .849), 4: 2.169 (r: .827)*
23.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
23.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - -30.012, Chad - 'singular', Mandinka - 'singular', Somalis -*

'singular', Haya - 'singular'), no outliers detected (except ungrouped case - D^2: 22.062; critical value: 21.026 - p 0.95, df 12), no variables failed tolerance test

23.F.III. Results
23.F.III.1.a. Within-groups covariance matrix: *Haya, 96.3%, Haya (D^2: 23.518), Mandinka (D^2: 26.623)*
23.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *92.6%*
23.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 97.2%, Southern Sudan (D^2: 22.062), Somalis (D^2: 26.423)*
23.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 1 Mandinka, 1 Somali), Chad (1 Southern Sudan), Somalis (1 Haya), Haya (2 Somalis)*
23.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Chad (2 Southern Sudan)*
23.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



23.F.IV. Additional results
23.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 97.2%, 88.9%), separate-groups covariance matrix (Southern Sudan, 97.2%)*
23.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 96.3%, 92.6%), separate-groups covariance matrix (Southern Sudan, 97.2%), variables entered (11)*
23.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 99.1%, 93.5%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (16)*

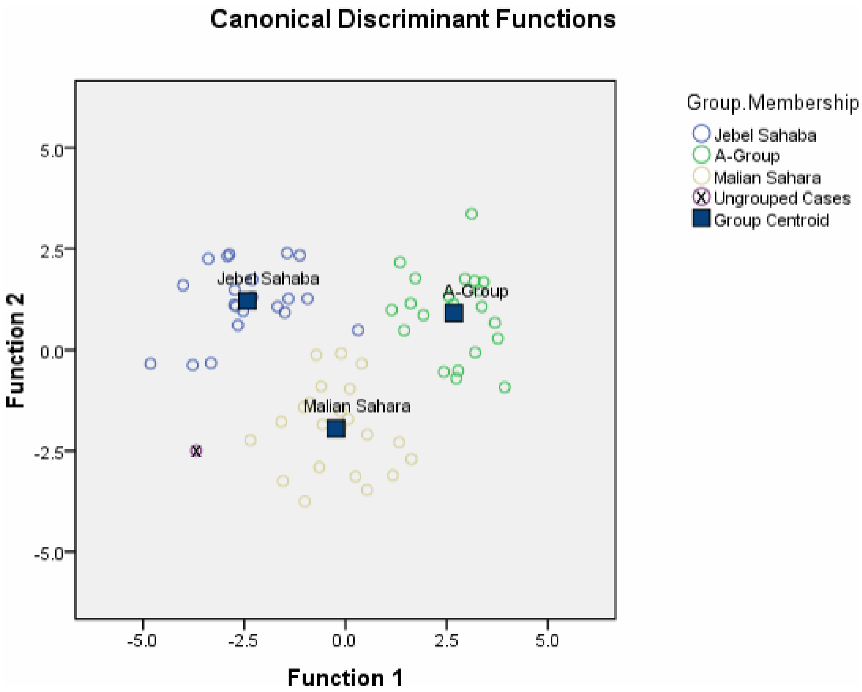
24. Conical Hill 95/4

24.A.I. Summary
24.A.I.1. Individual: *Conical Hill 95/4*
24.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
24.A.I.3. Data: *Cranial and dental measurements*
24.A.I.4. Classification: *Malian Sahara*

24.A.II. Analysis overview
24.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
24.A.II.2.a. Variables in matrix: *35*
24.A.II.2.b. Variables entered: *14*
24.A.II.3. Best predictors: *81(1). Crown width UI2 (-.481), 80(1)a. Canine dental arch breadth (mx) (-.359), 69. Height of the mandibular symphysis (-.347), 81. Crown length LP1 (-.372 - Function 2)*
24.A.II.4.a. Wilks' Lambda: *1 through 2: .058 (Sig. .000), 2: .314 (Sig. .000)*
24.A.II.4.b. Eigenvalues: *1: 4.438 (r: .903), 2: 2.187 (r: .828)*
24.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
24.A.II.6. Remarks: *Box's M (Sig. .051; Log determinants: A-Group - -23.960, Jebel Sahaba/Tushka - -21.907, Malian Sahara - -18.668), no outliers detected, no variables failed tolerance test*

24.A.III. Results

24.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 12.199), Jebel Sahaba/Tushka (D^2: 15.377)*
24.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
24.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 13.634), Jebel Sahaba/Tushka (D^2: 18.060)*
24.A.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 Jebel Sahaba/Tushka)*
24.A.III.2.b. Misclassifications (separate-groups):	*Jebel Sahaba/Tushka (1 Malian Sahara)*
24.A.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



24.A.IV. Additional results

24.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 80.0%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
24.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 98.5%, 89.2%), separate-groups covariance matrix (Malian Sahara, 98.5%), variables entered (12)*
24.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%, 90.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 98.8%), variables entered (16)*
24.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 94.0%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (16)*

24.B.I. Summary

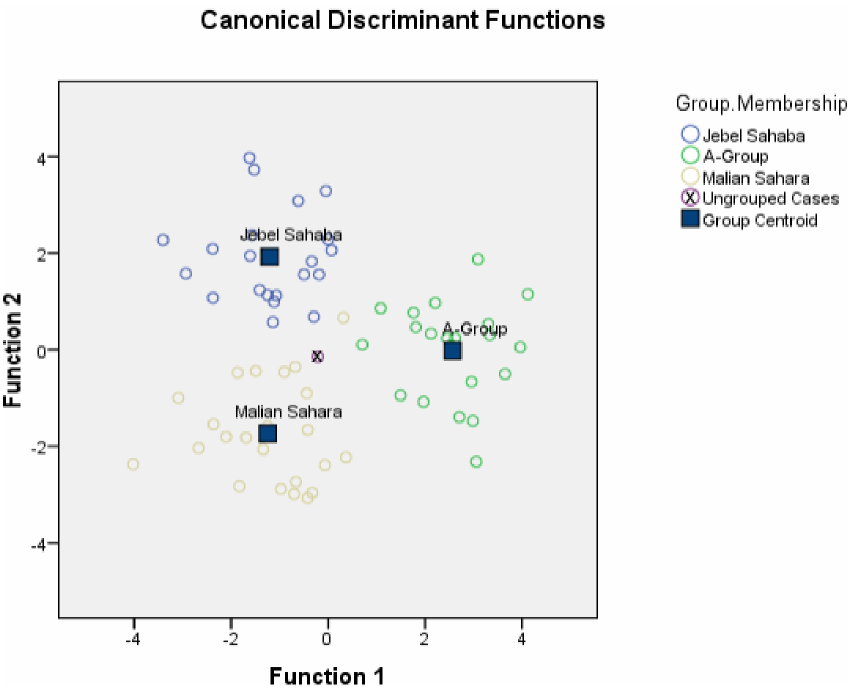
24.B.I.1. Individual:	*Conical Hill 95/4*
24.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
24.B.I.3. Data:	*Scaled cranial and dental measurements*
24.B.I.4. Classification:	*Malian Sahara*

24.B.II. Analysis overview

24.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
24.B.II.2.a. Variables in matrix:	*25*
24.B.II.2.b. Variables entered:	*14*
24.B.II.3. Best predictors:	*30. Bregma-Lambda chord (.323), 81(1). Crown width UI2 (-.179), 1. Maximum cranial length (.176), 48(1). Nasospinale-Prosthion height (.430 - Function 2)*
24.B.II.4.a. Wilks' Lambda:	*1 through 2: .069 (Sig. .000), 2: .296 (Sig. .000)*
24.B.II.4.b. Eigenvalues:	*1: 3.303 (r: .876), 2: 2.375 (r: .839)*
24.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
24.B.II.6. Remarks:	*Box's M (Sig. .002; Log determinants: A-Group - -86.775, Jebel Sahaba/Tushka - -80.141, Malian Sahara - -77.180), no outliers detected, no variables failed tolerance test*

24.B.III. Results

24.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.609), Jebel Sahaba/Tushka (D^2: 5.272)*
24.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.8%*
24.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.193), Jebel Sahaba/Tushka (D^2: 5.703)*
24.B.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (3 Jebel Sahaba/Tushka)*
24.B.III.2.b. Misclassifications (separate-groups):	*Malian Sahara (1 Jebel Sahaba/Tushka)*
24.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



24.B.IV. Additional results

24.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 84.6%), separate-groups covariance matrix (A-Group, 100.0%)*
24.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 95.4%, 89.2%), separate-groups covariance matrix (Malian Sahara, 95.4%), variables entered (10)*
24.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 92.8%, 85.5%; separate-groups covariance matrix - A-Group, 96.4%), variables entered (13)*
24.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 98.8%, 91.6%; separate-groups covariance matrix - "Sudanese Hotchpotch", 98.8%), variables entered (18)*

24.C.I. Summary

24.C.I.1. Individual:	*Conical Hill 95/4*
24.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
24.C.I.3. Data:	*Non-metric cranial and dental traits*
24.C.I.4. Classification:	*Malian Sahara*

24.C.II. Analysis overview

24.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
24.C.II.2.a. Variables in matrix:	*41*
24.C.II.2.b. Variables entered:	*14*
24.C.II.3. Best predictors:	*Distal accessory ridge UC (.558), Tuberculum dentale UI2 (.304), Margo infranasalis (main) (-.142), Tuberculum dentale UI2 (-.657 - Function 2)*
24.C.II.4.a. Wilks' Lambda:	*1 through 2: .004 (Sig. .000), 2: .084 (Sig. .000)*
24.C.II.4.b. Eigenvalues:	*1: 22.264 (r: .978), 2: 10.941 (r: .957)*
24.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
24.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - -37.282), no outliers detected, no variables failed tolerance test*

24.C.III. Results

24.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: 4.562), Jebel Sahaba/Tushka (D^2: 61.517)*

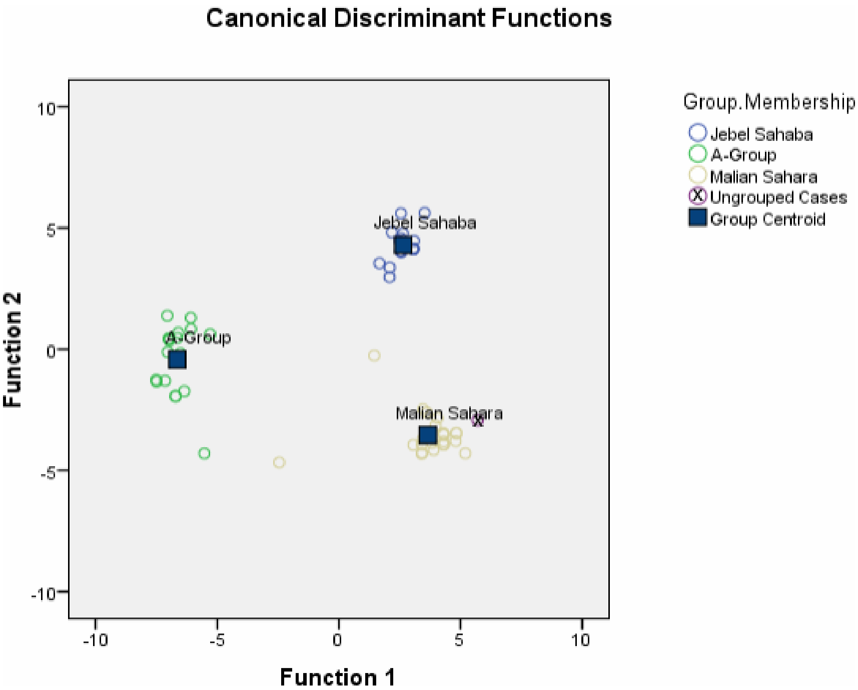
24.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*

24.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 2.325), Jebel Sahaba/Tushka (D^2: 340.307)*

24.C.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

24.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*

24.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



24.C.IV. Additional results

24.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 90.8%), separate-groups covariance matrix (Malian Sahara, 100.0%)*

24.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 98.5%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), variables entered (9)*

24.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 94.0%; separate-groups covariance matrix - Malian Sahara, 98.8%), variables entered (17)*

24.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (19)*

24.D.I. Summary

24.D.I.1. Individual: *Conical Hill 95/4*

24.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

24.D.I.3. Data: *Cranial and dental measurements*

24.D.I.4. Classification: *Southern Sudan*

24.D.II. Analysis overview

24.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

24.D.II.2.a. Variables in matrix: *27*

24.D.II.2.b. Variables entered: *15*

24.D.II.3. Best predictors: *81. Crown length LC (-.604), 81(1). Crown width UC (.322), 81. Crown length UI2 (.254), 81(1). Crown width UI2 (.689 - Function 2), 80(4)a. Canine dental arch length (mx) (.525 - Function 3), 81. Crown length LM1 (-.470 - Function 4)*

24.D.II.4.a. Wilks' Lambda: *1 through 4: .015 (Sig. .000), 2 through 4: .068 (Sig. .000), 3 through 4: .277 (Sig. .000), 4: .658 (Sig. .000)*

24.D.II.4.b. Eigenvalues: *1: 3.637 (r: .886), 2: 3.059 (r: .868), 3: 1.375 (r: .761), 4: .520 (r: .585)*

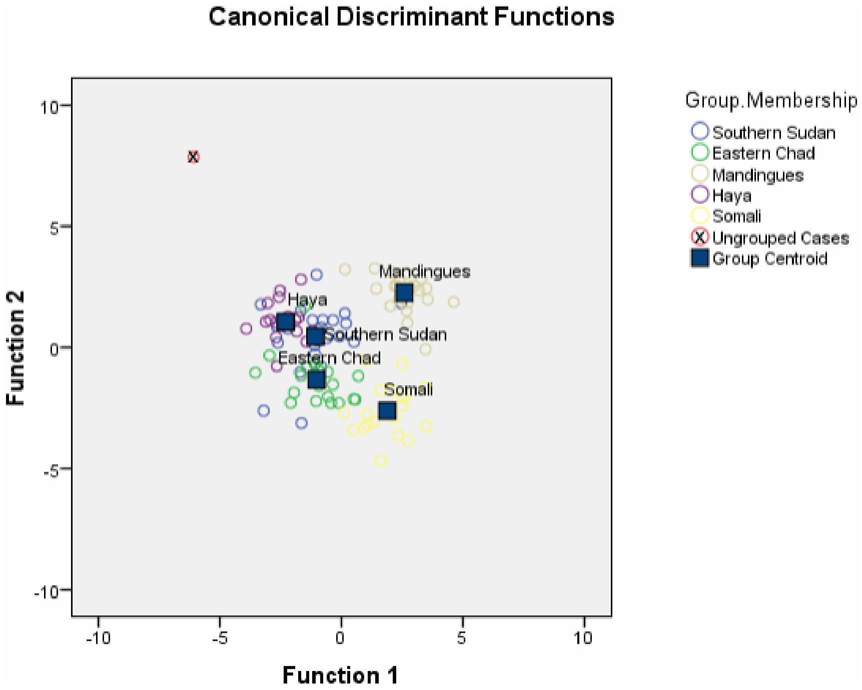
24.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

24.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -37.718, Chad - -45.455, Mandinka - -80.554, Somalis - -*

40.850, Haya - -76.856), no outliers detected (except ungrouped case - D^2: 133.357; critical value: 24.996 - p 0.95, df 15), no variables failed tolerance test

24.D.III. Results

24.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 96.3%, Southern Sudan (D^2: 136.131), Haya (D^2: 157.205)*
24.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*84.3%*
24.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 133.357), Chad (D^2: 207.323)*
24.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 1 Somali, 2 Haya), Chad (2 Southern Sudan, 1 Somali, 2 Haya), Mandinka (1 Somali, 1 Haya), Somalis (2 Chad, 1 Haya), Haya (1 Southern Sudan)*
24.D.III.2.b. Misclassifications (separate-groups):	*Chad (1 Southern Sudan)*
24.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



24.D.IV. Additional results

24.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 97.2%, 76.9%), separate-groups covariance matrix (Haya, 99.1%)*
24.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 93.5%, 85.2%), separate-groups covariance matrix (Southern Sudan, 98.1%), variables entered (13)*
24.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Haya, 100.0%), variables entered (25)*

24.E.I. Summary

24.E.I.1. Individual:	*Conical Hill 95/4*
24.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
24.E.I.3. Data:	*Scaled cranial and dental measurements*
24.E.I.4. Classification:	*Southern Sudan*

24.E.II. Analysis overview

24.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
24.E.II.2.a. Variables in matrix:	*20*
24.E.II.2.b. Variables entered:	*12*
24.E.II.3. Best predictors:	*81. Crown length UI2 (.672), 81(1). Crown width UC (.269), 63(2)a. 1st internal dental arch breadth (mx) (-.252), 1. Maximum cranial length (-.466 - Function 2), 81. Crown length LM1 (.777 - Function 3), 81(1). Crown width UM3 (.464 - Function 4)*
24.E.II.4.a. Wilks' Lambda:	*1 through 4: .073 (Sig. .000), 2 through 4: .257 (Sig. .000), 3 through 4: .470 (Sig. .000), 4: .744 (Sig. .001)*
24.E.II.4.b. Eigenvalues:	*1: 2.498 (r: .845), 2: .830 (r: .673), 3: .584 (r: .607), 4: .344 (r: .506)*

24.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

24.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -53.574, Chad - -59.649, Mandinka - -86.187, Somalis - -59.334, Haya - -58.453), no outliers detected, no variables failed tolerance test*

24.E.III. Results

24.E.III.1.a. Within-groups covariance matrix: *Chad, 83.3%, Chad (D^2: 9.051), Somalis (D^2: 8.888)*

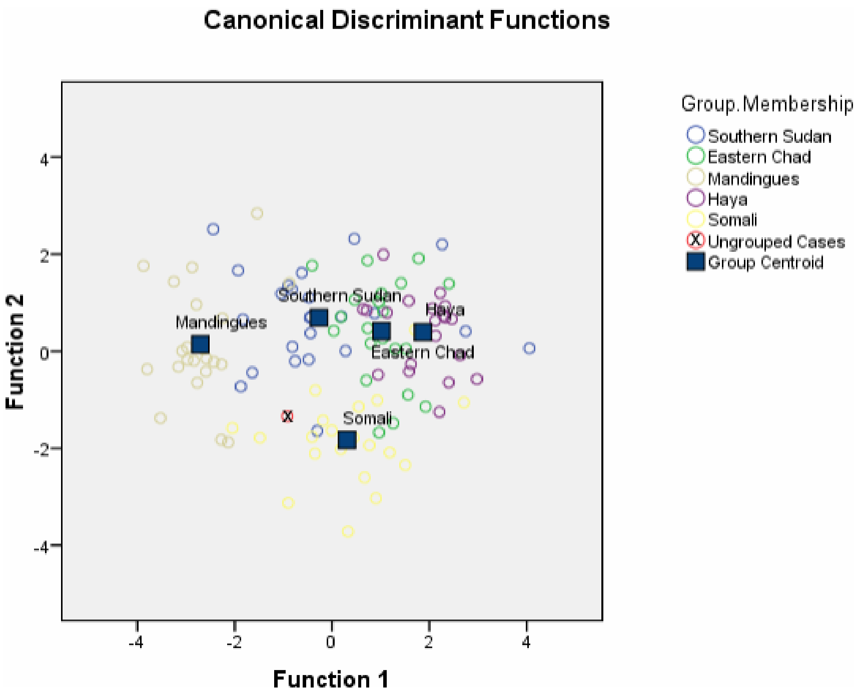
24.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *75.0%*

24.E.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 88.9%, Southern Sudan (D^2: 14.128), Chad (D^2: 16.952)*

24.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 3 Mandinka, 1 Somali, 2 Haya), Chad (2 Southern Sudan, 1 Somali, 3 Haya), Mandinka (1 Southern Sudan, 1 Chad, 1 Somali), Somalis (2 Southern Sudan, 2 Chad), Haya (2 Southern Sudan, 3 Chad)*

24.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Somali, 2 Haya), Chad (1 Southern Sudan, 1 Somali, 2 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan), Haya (1 Southern Sudan, 2 Chad)*

24.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



24.E.IV. Additional results

24.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 81.5%, 65.7%), separate-groups covariance matrix (Mandinka, 87.0%)*

24.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 80.6%, 70.4%), separate-groups covariance matrix (Somalis, 80.6%), variables entered (8)*

24.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 98.1%, 87.0%; separate-groups covariance matrix - Chad, 99.1%), variables entered (25)*

24.F.I. Summary

24.F.I.1. Individual: *Conical Hill 95/4*

24.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

24.F.I.3. Data: *Non-metric cranial and dental traits*

24.F.I.4. Classification: *Mandinka*

24.F.II. Analysis overview

24.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

24.F.II.2.a. Variables in matrix: *44*

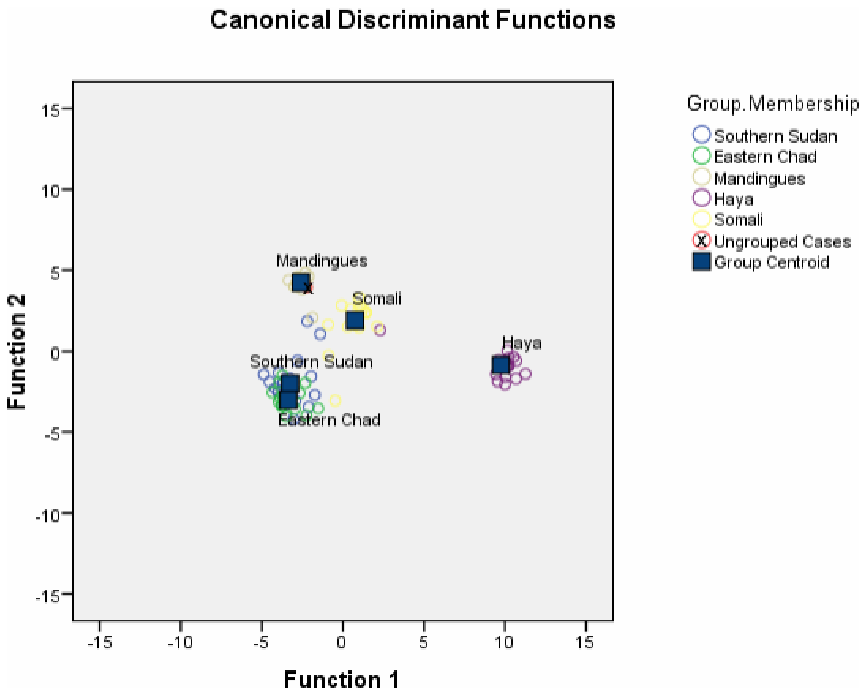
24.F.II.2.b. Variables entered: *14*

24.F.II.3. Best predictors: *Midline diastema (.752), Shovel UI1 (-.331), Tuberculum dentale UI2 (.300), Tuberculum dentale UI2 (.727 - Function 2), Canine mesial ridge UC (.613 - Function 3), Interruption groove UI2 (-.692 - Function 4)*

24.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .006 (Sig. .000), 3 through 4: .052 (Sig. .000), 4: .299 (Sig. .000)*
24.F.II.4.b. Eigenvalues:	*1: 24.871 (r: .980), 2: 7.582 (r: .940), 3: 4.762 (r: .909), 4: 2.345 (r: .837)*
24.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
24.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

24.F.III. Results

24.F.III.1.a. Within-groups covariance matrix:	*Mandinka, 98.1%, Mandinka (D^2: .577), Southern Sudan (D^2: 42.405)*
24.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*89.8%*
24.F.III.1.c. Separate-groups covariance matrix:	*Mandinka, 98.1%, Mandinka (D^2: 2.775), Southern Sudan (D^2: 24.256)*
24.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Somali, 1 Haya), Chad (2 Southern Sudan), Somalis (1 Southern Sudan, 2 Chad, 1 Mandinka), Haya (1 Somali)*
24.F.III.2.b. Misclassifications (separate-groups):	*Chad (1 Southern Sudan), Haya (1 Somali)*
24.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



24.F.IV. Additional results

24.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Mandinka, 99.1%, 89.8%), separate-groups covariance matrix (Mandinka, 100.0%)*
24.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Mandinka, 96.3%, 90.7%), separate-groups covariance matrix (Mandinka, 95.4%), variables entered (12)*
24.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 97.2%, 95.4%; separate-groups covariance matrix - Southern Sudan, 100.0%), variables entered (15)*

25. Conical Hill 95/4-1

25.A.I. Summary

25.A.I.1. Individual:	*Conical Hill 95/4-1*
25.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
25.A.I.3. Data:	*Dental measurements*
25.A.I.4. Classification:	*Jebel Sahaba/Tushka*

25.A.II. Analysis overview

25.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
25.A.II.2.a. Variables in matrix:	*3*
25.A.II.2.b. Variables entered:	*1*
25.A.II.3. Best predictors:	*81. Crown length UP1 (1.000)*
25.A.II.4.a. Wilks' Lambda:	*1: .682 (Sig. .000)*

25.A.II.4.b. Eigenvalues: *1: .467 (r: .564)*
25.A.II.5. Prior classification probability: *33.6% (prior prob. + 25%: 42.0%)*
25.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -2.829, Jebel Sahaba/Tushka - -3.396, Malian Sahara - -1.274), removed outliers: A-Group 95/2:2 (D^2: 4.011; critical value: 3.841 - p 0.95, df 1), A-Group 308/17 (D^2: 4.511; critical value: 3.841 - p 0.95, df 1), Jebel Sahaba/Tushka 117-19 (D^2: 5.460; critical value: 3.841 - p 0.95, df 1), Malian Sahara EIS-AZ56/H8 (D^2: 11.724; critical value: 7.815 - p 0.95, df 3), Malian Sahara MN10/H5 (D^2: 13.735; critical value: 7.815 - p 0.95, df 3), Malian Sahara MN27/H2 (D^2: 7.899; critical value: 7.815 - p 0.95, df 3), Malian Sahara MN27/H3 (D^2: 8.911; critical value: 7.815 - p 0.95, df 3), Malian Sahara KBD89/H1 (D^2: 8.498; critical value: 7.815 - p 0.95, df 3), Malian Sahara KBD89/H3 (D^2: 4.414; critical value: 3.841 - p 0.95, df 1), Malian Sahara KBD89/H37 (D^2: 8.344; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test*

25.A.III. Results
25.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 61.8%, Jebel Sahaba/Tushka (D^2: .219), Malian Sahara (D^2: .300)*
25.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *61.8%*
25.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 70.9%, Jebel Sahaba/Tushka (D^2: .741), Malian Sahara (D^2: .122)*
25.A.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (5 A-Group, 11 Jebel Sahaba/Tushka)*
25.A.III.2.b. Misclassifications (separate-groups): *A-Group (4 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group, 1 Malian Sahara), Malian Sahara (5 A-Group, 5 Jebel Sahaba/Tushka)*
25.A.III.3. All groups scatter plot: *No histogram available*

25.A.IV. Additional results
25.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 56.9%, 55.4%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 56.9%)*
25.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 56.9%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 55.4%), variables entered (2)*
25.A.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 49.4%, 45.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 51.8%), variables entered (3)*
25.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 43.4%, 44.6%; separate-groups covariance matrix - Malian Sahara, 53.0%), variables entered (2)*

25.B.I. Summary
25.B.I.1. Individual: *Conical Hill 95/4-1*
25.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
25.B.I.3. Data: *Scaled dental measurements*
25.B.I.4. Classification: *A-Group*

25.B.II. Analysis overview
25.B.II.1. Method: *Mahalanobis distance, simultaneous entry*
25.B.II.2.a. Variables in matrix: *3*
25.B.II.2.b. Variables entered: *1*
25.B.II.3. Best predictors: *81. Crown length UM3 (1.000)*
25.B.II.4.a. Wilks' Lambda: *1: .913 (Sig. .067)*
25.B.II.4.b. Eigenvalues: *1: .096 (r: .296)*
25.B.II.5. Prior classification probability: *33.5% (prior prob. + 25%: 41.8%)*
25.B.II.6. Remarks: *Box's M (Sig. .656; Log determinants: A-Group - -5.642, Jebel Sahaba/Tushka - -5.813, Malian Sahara - -5.401), removed outliers: A-Group 277/63 (D^2: 4.014; critical value: 3.841 - p 0.95, df 1), Jebel Sahaba/Tushka 8905-2 (D^2: 6.959; critical value: 3.841 - p 0.95, df 1), Malian Sahara KBD89/H1 (D^2: 6.383; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

25.B.III. Results
25.B.III.1.a. Within-groups covariance matrix: *A-Group, 50.0%, A-Group (D^2: 2.846), Malian Sahara (D^2: 4.157)*
25.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *48.4%*

25.B.III.1.c. Separate-groups covariance matrix: *A-Group, 40.3%, A-Group (D^2: 2.977), Malian Sahara (D^2: 3.419)*
25.B.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 7 Malian Sahara), Malian Sahara (6 A-Group, 5 Jebel Sahaba/Tushka)*
25.B.III.2.b. Misclassifications (separate-groups): *A-Group (7 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (6 A-Group, 2 Malian Sahara), Malian Sahara (7 A-Group, 15 Jebel Sahaba/Tushka)*
25.B.III.3. All groups scatter plot: *No histogram available*

25.B.IV. Additional results
25.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 43.1%, 35.4%), separate-groups covariance matrix (A-Group, 46.2%)*
25.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 44.6%, 44.6%), separate-groups covariance matrix (A-Group, 41.5%), variables entered (1)*
25.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 49.4%, 45.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 51.8%), variables entered (3)*
25.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 43.4%, 44.6%; separate-groups covariance matrix - Malian Sahara, 53.0%), variables entered (2)*

25.C.I. Summary
25.C.I.1. Individual: *Conical Hill 95/4-1*
25.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
25.C.I.3. Data: *Non-metric dental traits*
25.C.I.4. Classification: *Jebel Sahaba/Tushka*

25.C.II. Analysis overview
25.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
25.C.II.2.a. Variables in matrix: *2*
25.C.II.2.b. Variables entered: *1*
25.C.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (1.000)*
25.C.II.4.a. Wilks' Lambda: *1: .770 (Sig. .000)*
25.C.II.4.b. Eigenvalues: *1: .299 (r: .480)*
25.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
25.C.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -2.403, Jebel Sahaba/Tushka - -1.340, Malian Sahara - -3.135), no outliers detected, no variables failed tolerance test*

25.C.III. Results
25.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 49.2%, Jebel Sahaba/Tushka (D^2: 2.125), A-Group (D^2: 6.341)*
25.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *49.2%*
25.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 49.2%, Jebel Sahaba/Tushka (D^2: 1.048), A-Group (D^2: 9.048)*
25.C.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Jebel Sahaba/Tushka, 19 Malian Sahara), Jebel Sahaba/Tushka (11 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
25.C.III.2.b. Misclassifications (separate-groups): *A-Group (2 Jebel Sahaba/Tushka, 19 Malian Sahara), Jebel Sahaba/Tushka (11 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
25.C.III.3. All groups scatter plot: *No histogram available*

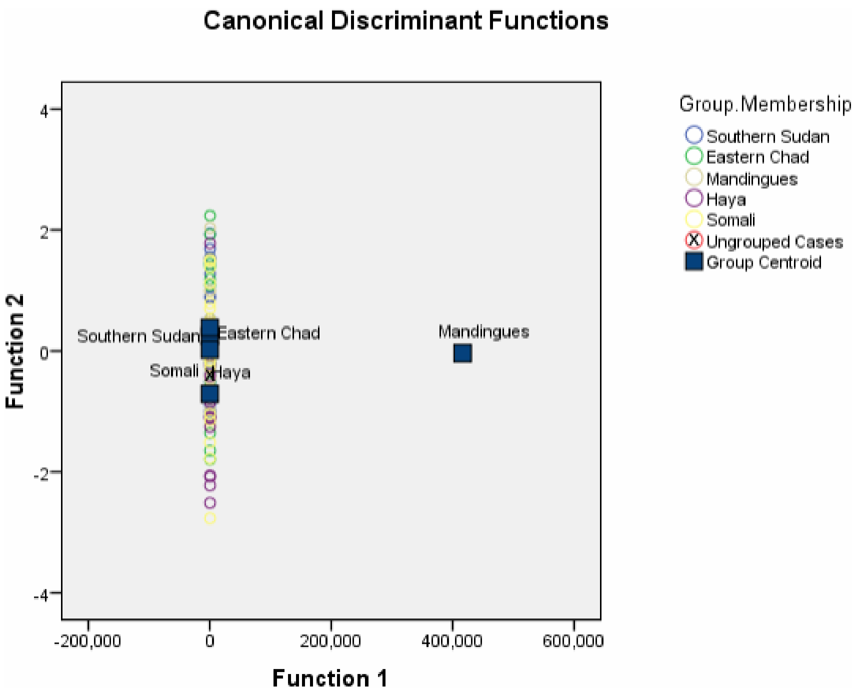
25.C.IV. Additional results
25.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 49.2%, 47.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 44.6%)*
25.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 49.2%, 49.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 49.2%), variables entered (1)*
25.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 38.6%, 38.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 38.6%), variables entered (1)*
25.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 38.6%, 38.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 38.6%), variables entered (1)*

25.D.I. Summary
25.D.I.1. Individual: *Conical Hill 95/4-1*
25.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

25.D.I.3. Data: *Dental measurements*
25.D.I.4. Classification: *Southern Sudan*

25.D.II. Analysis overview
25.D.II.1. Method: *Mahalanobis distance, simultaneous entry*
25.D.II.2.a. Variables in matrix: *3*
25.D.II.2.b. Variables entered: *3*
25.D.II.3. Best predictors: *81(1). Crown width UP1 (.720), 81. Crown length UM3 (.461), 81(1). Crown width UM3 (.027), 81(1). Crown width UM3 (.673 - Function 2), 81. Crown length UM3 (-.884 - Function 3)*
25.D.II.4.a. Wilks' Lambda: *1 through 3: .509 (Sig. .000), 2 through 3: .841 (Sig. .009), 3: .961 (Sig. .136)*
25.D.II.4.b. Eigenvalues: *1: .652 (r: .628), 2: .143 (r: .353), 3: .041 (r: .199)*
25.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
25.D.II.6. Remarks: *Box's M (Sig. .455; Log determinants: Southern Sudan --5.735, Chad - -7.312, Mandinka - -7.828, Somalis - -5.724, Haya - -6.175), removed outliers: Southern Sudan 9.992 (D^2: 7.937; critical value: 7.815 - p 0.95, df 3), Southern Sudan E.1026-11 (D^2: 7.997; critical value: 7.815 - p 0.95, df 3), Mandinka 9.539 (D^2: 8.490; critical value: 7.815 - p 0.95, df 3), Haya Af.23.0.127/205 (D^2: 12.689; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test*

25.D.III. Results
25.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 49.0%, Southern Sudan (D^2: 3.080), Haya (D^2: 6.941)*
25.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *54.8%*
25.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 45.2%, Southern Sudan (D^2: 2.014), Haya (D^2: 6.149)*
25.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (5 Chad, 2 Mandinka, 1 Somali, 3 Haya), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali, 2 Haya), Mandinka (1 Southern Sudan, 2 Chad, 4 Somalis, 2 Haya), Somalis (4 Chad, 3 Mandinka, 2 Haya), Haya (6 Southern Sudan, 1 Chad, 1 Mandinka, 2 Somalis)*
25.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Chad, 3 Somalis, 2 Haya), Chad (3 Southern Sudan, 3 Somalis, 2 Haya), Mandinka (1 Southern Sudan, 11 Chad, 6 Somalis, 3 Haya), Somalis (1 Southern Sudan, 6 Chad, 1 Haya), Haya (6 Southern Sudan, 4 Chad, 2 Somalis)*
25.D.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



25.D.IV. Additional results
25.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 49.0%, 54.8%), separate-groups covariance matrix (Southern Sudan, 45.2%)*

25.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 49.0%, 54.8%), separate-groups covariance matrix (Southern Sudan, 45.2%), variables entered (3)*
25.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 49.1%, 52.8%; separate-groups covariance matrix - Haya, 47.2%), variables entered (3)*

25.E.I. Summary
25.E.I.1. Individual: *Conical Hill 95/4-1*
25.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
25.E.I.3. Data: *Scaled dental measurements*
25.E.I.4. Classification: *Southern Sudan*

25.E.II. Analysis overview
25.E.II.1. Method: *Mahalanobis distance, simultaneous entry*
25.E.II.2.a. Variables in matrix: *2*
25.E.II.2.b. Variables entered: *1*
25.E.II.3. Best predictors: *81. Crown length UP1 (1.000)*
25.E.II.4.a. Wilks' Lambda: *1: .895 (Sig. .030)*
25.E.II.4.b. Eigenvalues: *1: .117 (r: .323)*
25.E.II.5. Prior classification probability: *20.2% (prior prob. + 25%: 25.2%)*
25.E.II.6. Remarks: *Box's M (Sig. .684; Log determinants: Southern Sudan - -6.848, Chad - -7.051, Mandinka - -6.984, Somalis - -6.672, Haya - -6.435), removed outliers: Southern Sudan 9.956 (D^2: 3.896; critical value: 3.841 - p 0.95, df 1), Southern Sudan E.1026-3 (D^2: 4.489; critical value: 3.841 - p 0.95, df 1), Southern Sudan E.1028-10 (D^2: 4.945; critical value: 3.841 - p 0.95, df 1), Somalis Af.15.0.5 (D^2: 4.984; critical value: 3.841 - p 0.95, df 1), Haya Af.23.0.25/129 (D^2: 5.115; critical value: 3.841 - p 0.95, df 1), Haya Af.23.0.28 (D^2: 4.055; critical value: 3.841 - p 0.95, df 1), Haya Af.23.0.42 (D^2: 4.065; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

25.E.III. Results
25.E.III.1.a. Within-groups covariance matrix: *Southern Sudan, 44.6%, Southern Sudan (D^2: .003), Mandinka (D^2: .477)*
25.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *44.6%*
25.E.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 43.6%, Southern Sudan (D^2: .003), Mandinka (D^2: .576)*
25.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 5 Mandinka), Chad (4 Southern Sudan, 1 Mandinka), Mandinka (3 Southern Sudan, 4 Chad), Somalis (7 Southern Sudan, 5 Chad, 7 Mandinka), Haya (7 Southern Sudan, 5 Chad, 5 Mandinka)*
25.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (3 Chad, 5 Mandinka), Chad (4 Southern Sudan, 1 Mandinka), Mandinka (3 Southern Sudan, 5 Chad), Somalis (7 Southern Sudan, 6 Chad, 6 Mandinka), Haya (7 Southern Sudan, 5 Chad, 5 Mandinka)*
25.E.III.3. All groups scatter plot: *No histogram available*

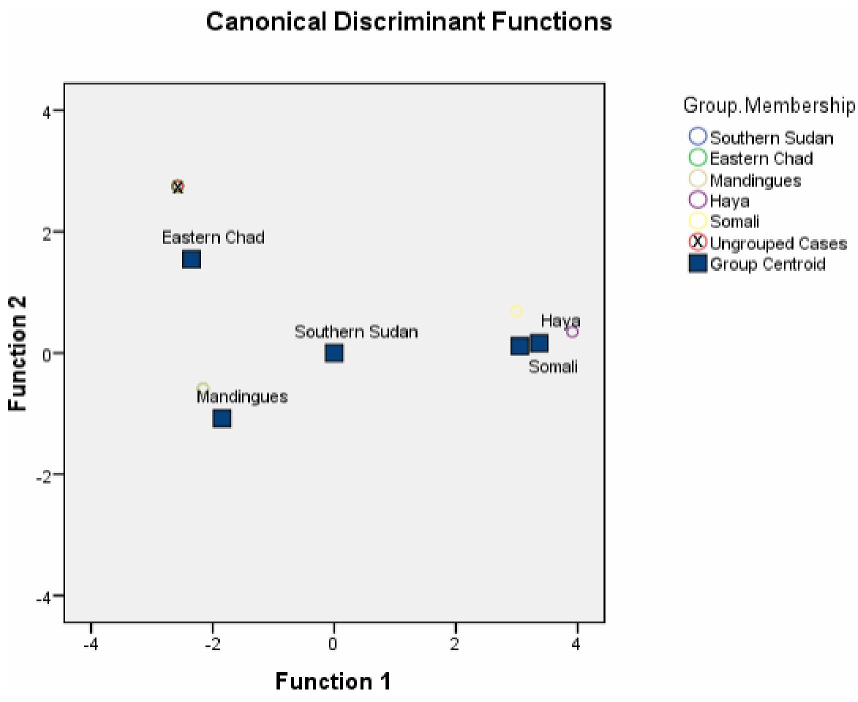
25.E.IV. Additional results
25.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 42.6%, 39.8%), separate-groups covariance matrix (Mandinka, 48.1%)*
25.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 42.6%, 39.8%), separate-groups covariance matrix (Mandinka, 48.1%), variables entered (2)*
25.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 50.9%, 47.2%; separate-groups covariance matrix - Southern Sudan, 47.2%), variables entered (3)*

25.F.I. Summary
25.F.I.1. Individual: *Conical Hill 95/4-1*
25.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
25.F.I.3. Data: *Non-metric dental traits*
25.F.I.4. Classification: *Chad*

25.F.II. Analysis overview
25.F.II.1. Method: *Simultaneous entry*
25.F.II.2.a. Variables in matrix: *4*
25.F.II.2.b. Variables entered: *4*
25.F.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.979), Parastyle UM3 (-.236), Congenital absence UM3 (.056),*

	Parastyle UM3 (.965 - Function 2), Peg-shaped molar UM3 (.764 - Function 3), Congenital absence UM3 (.765 - Function 4)
25.F.II.4.a. Wilks' Lambda:	*1 through 4: .070 (Sig. .000), 2 through 4: .504 (Sig. .000), 3 through 4: .946 (Sig. .233), 4: .983 (Sig. .194)*
25.F.II.4.b. Eigenvalues:	*1: 6.199 (r: .928), 2: .876 (r: .683), 3: .039 (r: .195), 4: .017 (r: .129)*
25.F.II.5. Prior classification probability:	*20.2% (prior prob. + 25%: 25.2%)*
25.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), removed outliers: Somalis Af.15.0.50 (D^2: 18.050; critical value: 9.488 - p 0.95, df 4), Haya Af.23.0.117 (D^2: 18.050; critical value: 9.488 - p 0.95, df 4), no variables failed tolerance test*

25.F.III. Results	
25.F.III.1.a. Within-groups covariance matrix:	*Chad, 52.8%, Chad (D^2: 1.556), Southern Sudan (D^2: 14.219)*
25.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*51.9%*
25.F.III.1.c. Separate-groups covariance matrix:	*Chad, 50.0%, Chad (D^2: .445), Southern Sudan (D^2: 9.334)*
25.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 19 Mandinka, 3 Somalis), Chad (7 Mandinka), Somalis (1 Mandinka), Haya (1 Southern Sudan)*
25.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 19 Mandinka, 3 Haya), Chad (1 Southern Sudan, 6 Mandinka), Mandinka (2 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka), Haya (1 Somali)*
25.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



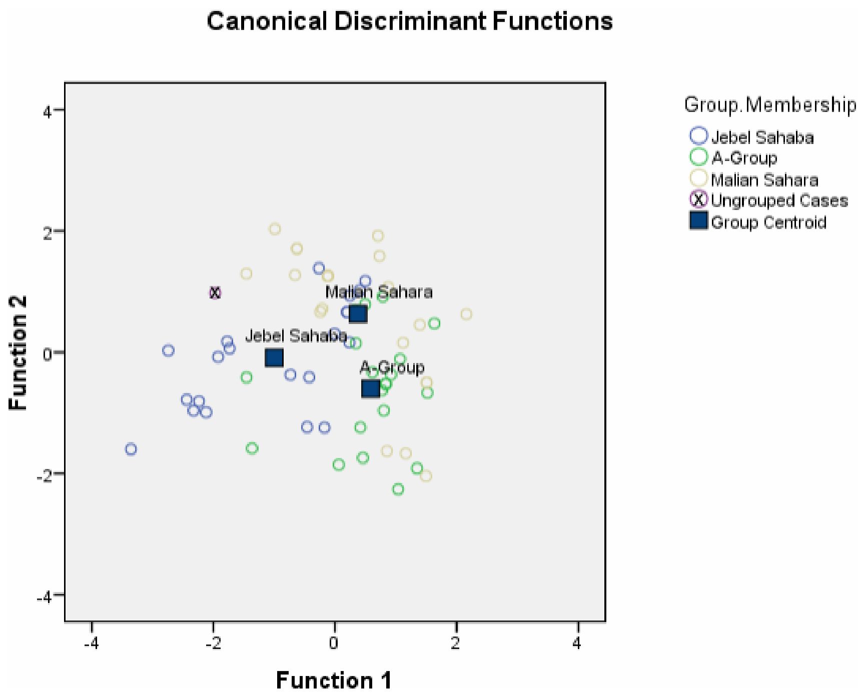
25.F.IV. Additional results	
25.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 52.8%, 50.9%), separate-groups covariance matrix (Chad, 50.0%)*
25.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 52.8%, 51.9%), separate-groups covariance matrix (Chad, 38.9%), variables entered (2)*
25.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 51.9%, 50.9%; separate-groups covariance matrix - Chad, 38.9%), variables entered (2)*

25.G.I. Summary	
25.G.I.1. Individual:	*Conical Hill 95/4-1*
25.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
25.G.I.3. Data:	*Dental measurements and non-metric traits*
25.G.I.4. Classification:	*Jebel Sahaba/Tushka*

25.G.II. Analysis overview	
25.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*

25.G.II.2.a. Variables in matrix:	*5*
25.G.II.2.b. Variables entered:	*3*
25.G.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.749), 81. Crown length UP1 (-.428), 81. Crown length UM3 (.079), 81. Crown lengthUP1 (.769 - Function 2)*
25.G.II.4.a. Wilks' Lambda:	*1 through 2: .522 (Sig. .000), 2: .785 (Sig. .001)*
25.G.II.4.b. Eigenvalues:	*1: .505 (r: .579), 2: .274 (r: .464)*
25.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
25.G.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -6.105, Jebel Sahaba/Tushka - -4.716, Malian Sahara - -5.287), no outliers detected, no variables failed tolerance test*

25.G.III. Results	
25.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 64.6%, Jebel Sahaba/Tushka (D^2: 2.094), Malian Sahara (D^2: 5.637)*
25.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*64.6%*
25.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 64.6%, Jebel Sahaba/Tushka (D^2: 5.596), Malian Sahara (D^2: 8.662)*
25.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 8 Malian Sahara), Malian Sahara (5 A-Group, 1 Jebel Sahaba/Tushka)*
25.G.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 8 Malian Sahara), Malian Sahara (6 A-Group)*
25.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



25.G.IV. Additional results	
25.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 63.1%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 64.6%)*
25.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 64.6%, 64.6%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 64.6%), variables entered (3)*
25.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 55.4%, 49.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 55.4%), variables entered (4)*
25.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 56.6%, 51.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 61.4%), variables entered (3)*

25.H.I. Summary	
25.H.I.1. Individual:	*Conical Hill 95/4-1*
25.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
25.H.I.3. Data:	*Dental measurements and non-metric traits*
25.H.I.4. Classification:	*Chad*

25.H.II. Analysis overview

25.H.II.1. Method: *Mahalanobis distance, simultaneous entry*

25.H.II.2.a. Variables in matrix: *7*

25.H.II.2.b. Variables entered: *5*

25.H.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.945), Parastyle UM3 (-.255), 81. Crown length UM3 (-.083), Parastyle UM3 (.940 - Function 2), 81(1). Crown width UP1 (.874 - Function 3), 81(1). Crown width UM3 (.820 - Function 4)*

25.H.II.4.a. Wilks' Lambda: *1 through 4: .040 (Sig. .000), 2 through 4: .298 (Sig. .000), 3 through 4: .610 (Sig. .000), 4: .917 (Sig. .016)*

25.H.II.4.b. Eigenvalues: *1: 6.438 (r: .930), 2: 1.047 (r: .715), 3: .502 (r: .578), 4: .090 (r: .288)*

25.H.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.2%)*

25.H.II.6. Remarks: *Box's M (test not possible: Southern Sudan - -11.095, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), removed outliers: Southern Sudan E.1026-4 (D^2: 12.878; critical value: 12.592 - p 0.95, df 6), Southern Sudan E.1026-11 (D^2: 12.353; critical value: 11.070 - p 0.95, df 5), Mandinka 9.539 (D^2: 12.735; critical value: 12.592 - p 0.95, df 6), Somalis Af.15.0.50 (D^2: 20.089; critical value: 12.592 - p 0.95, df 6), Haya Af.23.0.126/199 (D^2: 16.476; critical value: 12.592 - p 0.95, df 6), Haya Af.23.0.117 (D^2: 18.009; critical value: 12.592 - p 0.95, df 6), (not removed: ungrouped case - D^2: 14.335; critical value: 12.592 - p 0.95, df 6), variables failing tolerance test - removed: Congenital absence UM3*

25.H.III. Results

25.H.III.1.a. Within-groups covariance matrix: *Chad, 73.5%, Chad (D^2: 6.488), Southern Sudan (D^2: 15.977)*

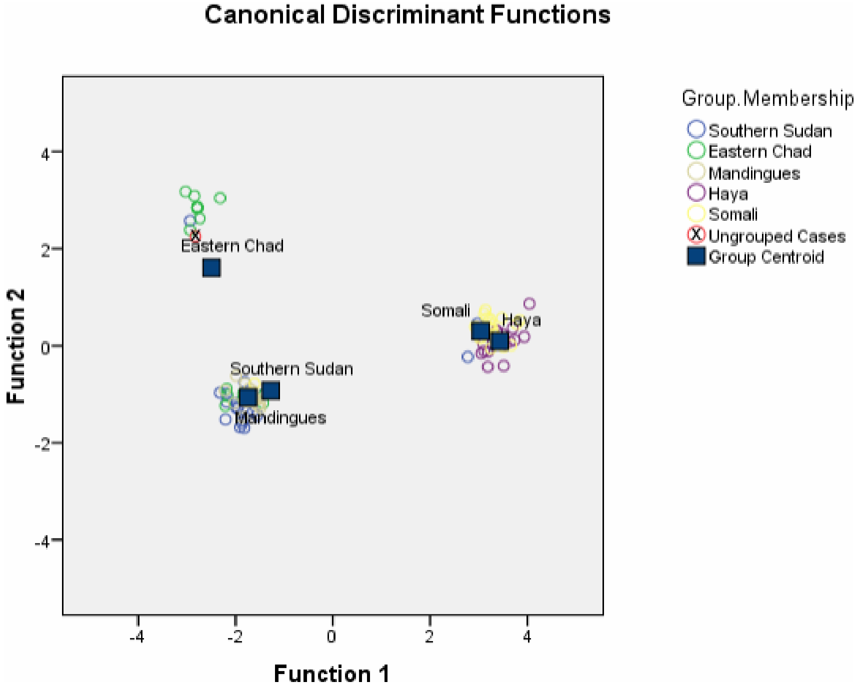
25.H.III.1.b. Within-groups covariance matrix (Leave-one-out): *72.5%*

25.H.III.1.c. Separate-groups covariance matrix: *Chad, 68.6%, Chad (D^2: 14.335), Southern Sudan (D^2: 26.215)*

25.H.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 6 Mandinka, 1 Somali, 2 Haya), Chad (2 Southern Sudan, 5 Mandinka), Mandinka (3 Southern Sudan), Somalis (1 Mandinka, 3 Haya), Haya (4 Somalis)*

25.H.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 9 Mandinka, 1 Somali, 2 Haya), Chad (5 Mandinka), Mandinka (1 Southern Sudan, 1 Chad), Somalis (1 Mandinka, 8 Haya), Haya (2 Somalis)*

25.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



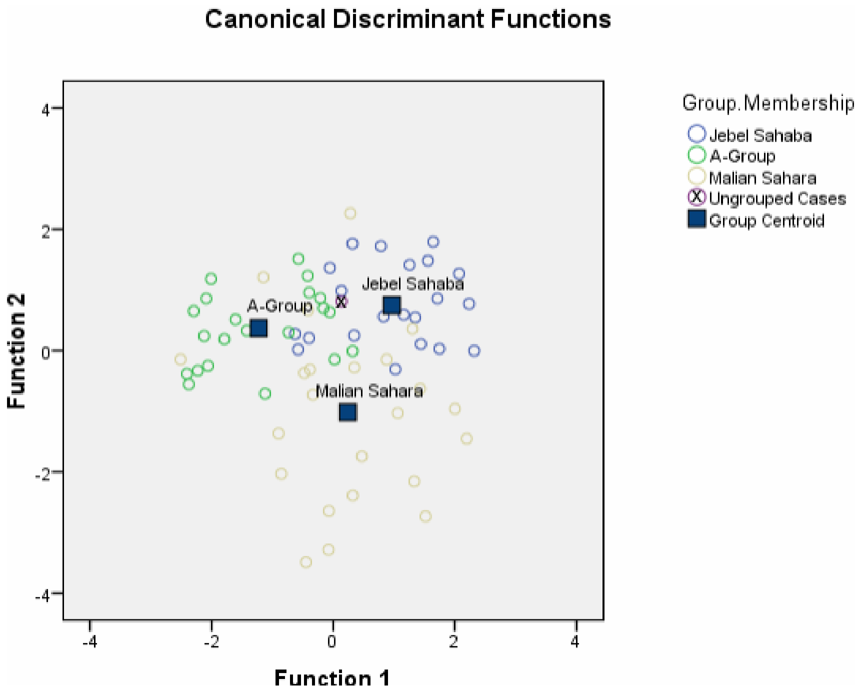
25.H.IV. Additional results

25.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 75.9%, 69.4%), separate-groups covariance matrix (Chad, 60.2%)*

25.H.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 73.1%, 70.4%), separate-groups covariance matrix (Chad, 59.3%), variables entered (5)*
25.H.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 73.1%, 71.3%; separate-groups covariance matrix - Southern Sudan, 63.9%), variables entered (5)*

26. Conical Hill 02/3-4

26.A.I. Summary	
26.A.I.1. Individual:	*Conical Hill 02/3-4*
26.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
26.A.I.3. Data:	*Cranial and dental measurements*
26.A.I.4. Classification:	*Jebel Sahaba/Tushka*
26.A.II. Analysis overview	
26.A.II.1. Method:	*Simultaneous entry*
26.A.II.2.a. Variables in matrix:	*8*
26.A.II.2.b. Variables entered:	*8*
26.A.II.3. Best predictors:	*50(1). Interorbital breadth (.613), 69(1). Mental foramen height (.604), 81(1). Crown width LM2 (-.555), 81(1). Crown width LM2 (.420 - Function 2)*
26.A.II.4.a. Wilks' Lambda:	*1 through 2: .335 (Sig. .000), 2: .618 (Sig. .000)*
26.A.II.4.b. Eigenvalues:	*1: .846 (r: .677), 2: .619 (r: .618)*
26.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
26.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -13.862, Jebel Sahaba/Tushka - -13.681, Malian Sahara - -11.930), no outliers detected, no variables failed tolerance test*
26.A.III. Results	
26.A.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 80.0%, Jebel Sahaba/Tushka (D^2: .688), A-Group (D^2: 2.053)*
26.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*67.7%*
26.A.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 80.0%, Jebel Sahaba/Tushka (D^2: .866), A-Group (D^2: 2.167)*
26.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (6 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 1 Malian Sahara), Malian Sahara (5 A-Group, 3 Jebel Sahaba/Tushka)*
26.A.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group), Malian Sahara (3 A-Group, 3 Jebel Sahaba/Tushka)*
26.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



26.A.IV. Additional results

26.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%, 67.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%)*
26.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 70.8%, 63.1%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 70.8%), variables entered (4)*
26.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 65.1%, 57.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 72.3%), variables entered (4)*
26.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 67.5%, 62.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 75.9%), variables entered (5)*

26.B.I. Summary

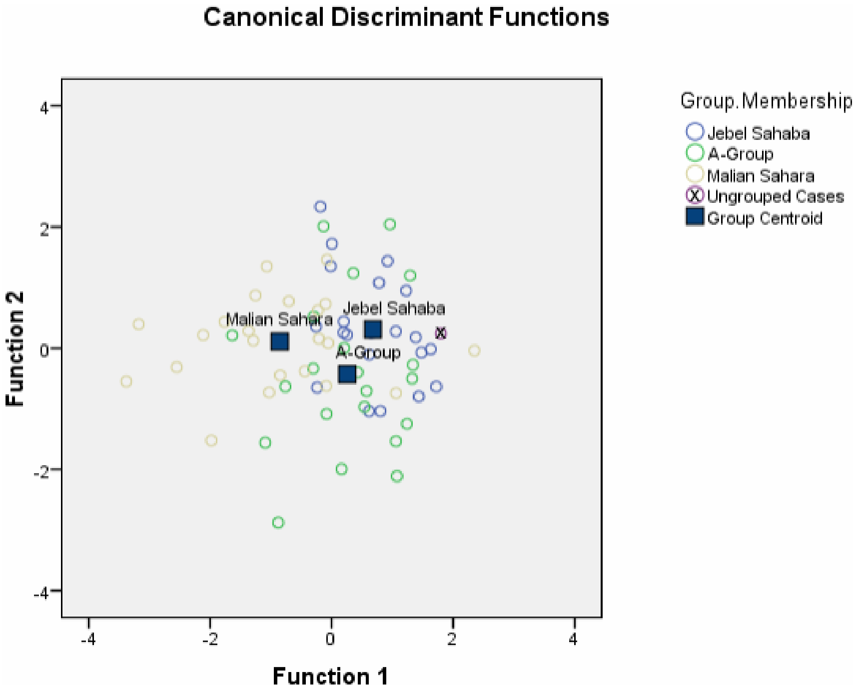
26.B.I.1. Individual:	*Conical Hill 02/3-4*
26.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
26.B.I.3. Data:	*Scaled cranial and dental measurements*
26.B.I.4. Classification:	*Jebel Sahaba/Tushka*

26.B.II. Analysis overview

26.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
26.B.II.2.a. Variables in matrix:	*6*
26.B.II.2.b. Variables entered:	*5*
26.B.II.3. Best predictors:	*81(1). Crown width LM3 (.677), 69(1). Mental foramen height (.607), 81. Crown length (-.274), 69(1). Mental foramen height (.544 - Function 2)*
26.B.II.4.a. Wilks' Lambda:	*1 through 2: .628 (Sig. .002), 2: .910 (Sig. .226)*
26.B.II.4.b. Eigenvalues:	*1: .449 (r: .557), 2: .099 (r: .300)*
26.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
26.B.II.6. Remarks:	*Box's M (Sig. .004; Log determinants: A-Group - -24.083, Jebel Sahaba/Tushka - -26.342, Malian Sahara - -24.820), no outliers detected, no variables failed tolerance test*

26.B.III. Results

26.B.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 66.2%, Jebel Sahaba/Tushka (D^2: 1.248), A-Group (D^2: 2.819)*
26.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*53.8%*
26.B.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 64.6%, Jebel Sahaba/Tushka (D^2: 3.409), A-Group (D^2: 3.260)*
26.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (7 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (6 A-Group, 3 Malian Sahara), Malian Sahara (4 A-Group, 5 Jebel Sahaba/Tushka)*
26.B.III.2.b. Misclassifications (separate-groups):	*A-Group (10 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 1 Malian Sahara), Malian Sahara (1 A-Group, 4 Jebel Sahaba/Tushka)*
26.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



26.B.IV. Additional results

26.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 49.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 64.6%)*

26.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 61.5%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%), variables entered (3)*

26.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 39.8%, 38.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 38.6%), variables entered (1)*

26.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 53.0%, 47.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 47.0%), variables entered (2)*

26.C.I. Summary

26.C.I.1. Individual: *Conical Hill 02/3-4*

26.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

26.C.I.3. Data: *Non-metric cranial and dental traits*

26.C.I.4. Classification: *Jebel Sahaba/Tushka*

26.C.II. Analysis overview

26.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

26.C.II.2.a. Variables in matrix: *18*

26.C.II.2.b. Variables entered: *13*

26.C.II.3. Best predictors: *Margo infranasalis (main) (-.425), Orientation of the Processus frontales maxillae (-.407), Alveolar prognathism (.318), Alveolar prognathism (-.383 - Function 2)*

26.C.II.4.a. Wilks' Lambda: *1 through 2: .159 (Sig. .000), 2: .539 (Sig. .001)*

26.C.II.4.b. Eigenvalues: *1: 2.381 (r: .839), 2: .855 (r: .679)*

26.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

26.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

26.C.III. Results

26.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 87.7%, Jebel Sahaba/Tushka (D^2: 1.868), Malian Sahara (D^2: 2.429)*

26.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *81.5%*

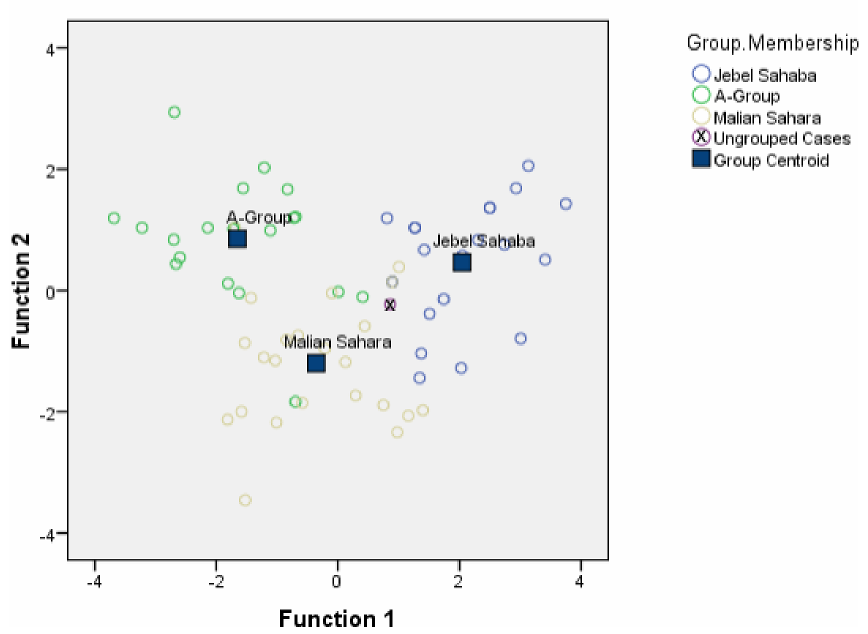
26.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 87.7%, Jebel Sahaba/Tushka (D^2: 1.828), Malian Sahara (D^2: 2.184)*

26.C.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (3 Malian Sahara), Malian Sahara (3 A-Group, 3 Jebel Sahaba/Tushka)*

26.C.III.2.b. Misclassifications (separate-groups): *A-Group (3 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 A-Group, 2 Jebel Sahaba/Tushka)*

26.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*

Canonical Discriminant Functions



26.C.IV. Additional results

26.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 87.7%, 72.3%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 89.2%)*

26.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 80.0%, 78.5%), separate-groups covariance matrix (Malian Sahara, 81.5%), variables entered (5)*

26.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 86.7%, 71.1%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 88.0%), variables entered (12)*

26.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 88.0%, 77.1%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 90.4%), variables entered (12)*

26.D.I. Summary

26.D.I.1. Individual: *Conical Hill 02/3-4*

26.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

26.D.I.3. Data: *Cranial and dental measurements*

26.D.I.4. Classification: *Southern Sudan*

26.D.II. Analysis overview

26.D.II.1. Method: *Simultaneous entry*

26.D.II.2.a. Variables in matrix: *7*

26.D.II.2.b. Variables entered: *7*

26.D.II.3. Best predictors: *69c. Thickness of the mandibular symphysis (.439), 81. Crown length LM1 (.421), 81(1). Crown width LM2 (-.298), 81. Crown length LM1 (.603 - Function 2), 81. Crown length LM2 (.725 - Function 3), 69b. 2nd molar mandibular body thickness (-.725 - Function 4)*

26.D.II.4.a. Wilks' Lambda: *1 through 4: .301 (Sig. .000), 2 through 4: .523 (Sig. .000), 3 through 4: .728 (Sig. .000), 4: .907 (Sig. .044)*

26.D.II.4.b. Eigenvalues: *1: .737 (r: .651), 2: .392 (r: .531), 3: .247 (r: .445), 4: .102 (r: .304)*

26.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

26.D.II.6. Remarks: *Box's M (Sig. .001; Log determinants: Southern Sudan - -7.104, Chad - -7.094, Mandinka - -3.723, Somalis - -6.407, Haya - -5.292), no outliers detected, no variables failed tolerance test*

26.D.III. Results

26.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 65.7%, Southern Sudan (D^2: 2.088), Somalis (D^2: 2.888)*

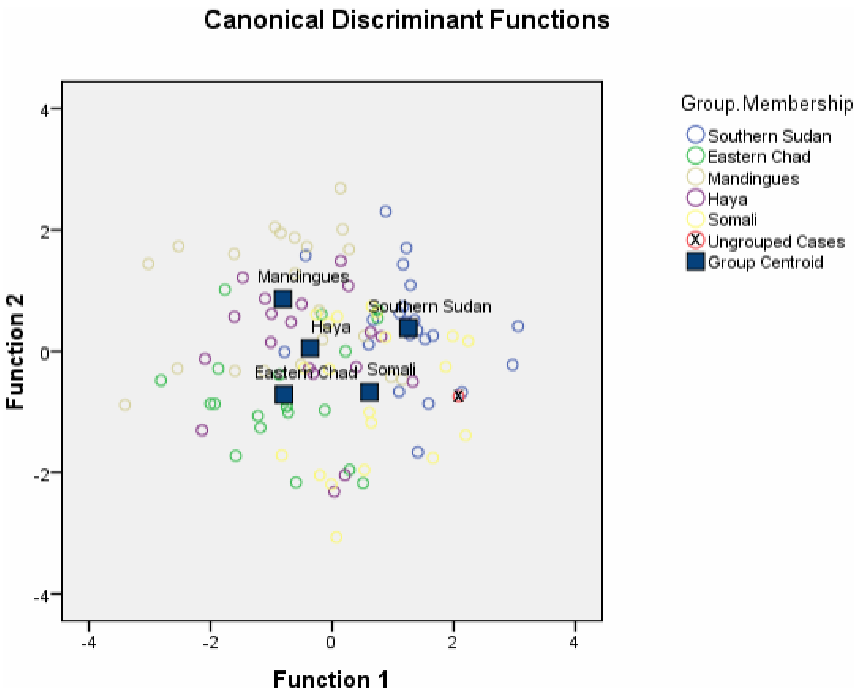
26.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *51.9%*

26.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 66.7%, Southern Sudan (D^2: 2.300), Somalis (D^2: 2.664)*

26.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (Chad, 2 Mandinka, 1 Somali, 2 Haya), Chad (3 Southern Sudan, 1 Mandinka, 4 Somalis, 2 Haya), Mandinka (2 Southern Sudan, 4 Chad, 3 Somalis, 3 Haya), Somalis (6 Southern Sudan, 2 Chad, 2 Mandinka, 2 Haya), Haya (4 Southern Sudan, 3 Chad, 4 Mandinka, 1 Somali)*

26.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka, 1 Somali), Chad (2 Southern Sudan, 1 Mandinka, 4 Somalis, 1 Haya), Mandinka (3 Southern Sudan, 4 Chad, 3 Somalis, 1 Haya), Somalis (4 Southern Sudan, 1 Chad, 2 Mandinka), Haya (3 Southern Sudan, 2 Chad, 2 Mandinka)*

26.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



26.D.IV. Additional results

26.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 65.7%, 51.9%), separate-groups covariance matrix (Southern Sudan, 66.7%)*

26.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 64.8%, 50.9%), separate-groups covariance matrix (Southern Sudan, 66.7%), variables entered (6)*

26.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 53.7%, 46.3%; separate-groups covariance matrix - Southern Sudan, 66.7%), variables entered (5)*

26.E.I. Summary

26.E.I.1. Individual: *Conical Hill 02/3-4*

26.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

26.E.I.3. Data: *Scaled cranial and dental measurements*

26.E.I.4. Classification: *Mandinka*

26.E.II. Analysis overview

26.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

26.E.II.2.a. Variables in matrix: *6*

26.E.II.2.b. Variables entered: *5*

26.E.II.3. Best predictors: *81. Crown length LM1 (.730), 69c. Thickness of the mandibular symphysis (.705), 69(1). Mental foramen height (.501), 69(1). Mental foramen height (-.577 - Function 2), 81. Crown length LM1 (.584 - Function 3), 69b. 2nd molar mandibular body thickness (.910 - Function 4)*

26.E.II.4.a. Wilks' Lambda: *1 through 4: .433 (Sig. .000), 2 through 4: .693 (Sig. .000), 3 through 4: .848 (Sig. .010), 4: .946 (Sig. .059)*

26.E.II.4.b. Eigenvalues: *1: .601 (r: .613), 2: .223 (r: .427), 3: .115 (r: .322), 4: .057 (r: .232)*

26.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

26.E.II.6. Remarks: *Box's M (Sig. .025; Log determinants: Southern Sudan --23.645, Chad - -23.458, Mandinka - -21.635, Somalis - -22.191, Haya - -20.413), no outliers detected, no variables failed tolerance test*

26.E.III. Results

26.E.III.1.a. Within-groups covariance matrix: *Somalis, 56.5%, Somalis (D^2: 6.437), Southern Sudan (D^2: 10.919)*

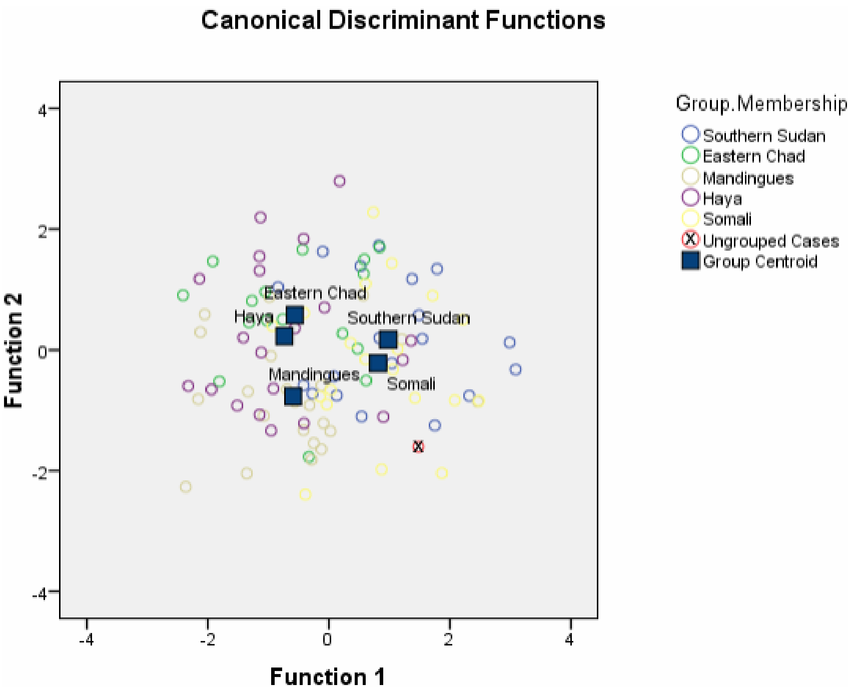
26.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *46.3%*

26.E.III.1.c. Separate-groups covariance matrix: *Mandinka, 60.2%, Mandinka (D^2: 8.956), Haya (D^2: 9.841)*

26.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 4 Mandinka, 2 Somalis), Chad (3 Southern Sudan, 2 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan, 4 Chad, 3 Somalis, 2 Haya), Somalis (7 Southern Sudan, 4 Chad, 3 Mandinka), Haya (2 Southern Sudan, 4 Chad, 8 Mandinka, 2 Somalis)*

26.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 3 Mandinka, 1 Haya), Chad (2 Southern Sudan, 1 Mandinka, 3 Somalis, 3 Haya), Mandinka (3 Chad, 1 Somali, 2 Haya), Somalis (6 Southern Sudan, 2 Chad, 2 Mandinka), Haya (5 Chad, 7 Mandinka, 1 Somali)*

26.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



26.E.IV. Additional results

26.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 55.6%, 43.5%), separate-groups covariance matrix (Mandinka, 57.4%)*

26.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 54.6%, 46.3%), separate-groups covariance matrix (Mandinka, 57.4%), variables entered (4)*

26.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 52.8%, 44.4%; separate-groups covariance matrix - Mandinka, 58.3%), variables entered (4)*

26.F.I. Summary

26.F.I.1. Individual: *Conical Hill 02/3-4*

26.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

26.F.I.3. Data: *Non-metric cranial and dental traits*

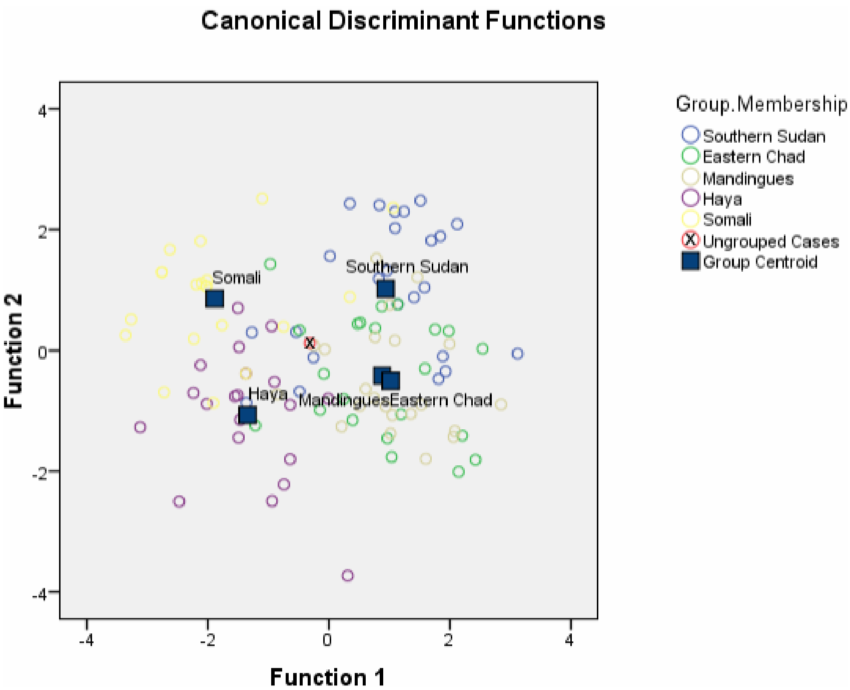
26.F.I.4. Classification: *Southern Sudan*

26.F.II. Analysis overview

26.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

26.F.II.2.a. Variables in matrix:	*20*
26.F.II.2.b. Variables entered:	*14*
26.F.II.3. Best predictors:	*Cusp number LM2 (-.643), Alveolar prognathism (.328), Mandibular torus (-.269), Symphyseal height (.412 - Function 2), Cusp 7 LM1 (.697 - Function 3), Cusp 7 LM1 (-.421 - Function 4)*
26.F.II.4.a. Wilks' Lambda:	*1 through 4: .117 (Sig. .000), 2 through 4: .308 (Sig. .000), 3 through 4: .523 (Sig. .000), 4: .801 (Sig. .028)*
26.F.II.4.b. Eigenvalues:	*1: 1.634 (r: .788), 2: .697 (r: .641), 3: .532 (r: .589), 4: .248 (r: .446)*
26.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
26.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

26.F.III. Results	
26.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 77.8%, Southern Sudan (D^2: 2.895), Haya (D^2: 2.967)*
26.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*63.9%*
26.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 81.5%, Southern Sudan (D^2: 2.795), Haya (D^2: 4.141)*
26.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 3 Mandinka, 4 Haya), Chad (4 Southern Sudan, 3 Mandinka, 2 Somalis, 1 Haya), Mandinka (3 Southern Sudan, 3 Chad, 1 Haya), Somalis (1 Southern Sudan, 1 Chad, 1 Mandinka, 2 Haya), Haya (1 Chad, 3 Mandinka, 5 Somalis)*
26.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 1 Mandinka, 3 Haya), Chad (3 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan, 3 Chad), Somalis (1 Southern Sudan, 1 Chad, 1 Haya), Haya (1 Chad, 1 Mandinka)*
26.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



26.F.IV. Additional results	
26.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 78.7%, 65.7%), separate-groups covariance matrix (Southern Sudan, 82.4%)*
26.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 72.2%, 65.7%), separate-groups covariance matrix (Southern Sudan, 72.2%), variables entered (7)*
26.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Mandinka, 62.0%, 53.7%; separate-groups covariance matrix - Southern Sudan, 60.2%), variables entered (7)*

26.G.I. Summary	
26.G.I.1. Individual:	*Conical Hill 02/3-4*
26.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
26.G.I.3. Data:	*Cranial and dental measurements and non-metric traits*

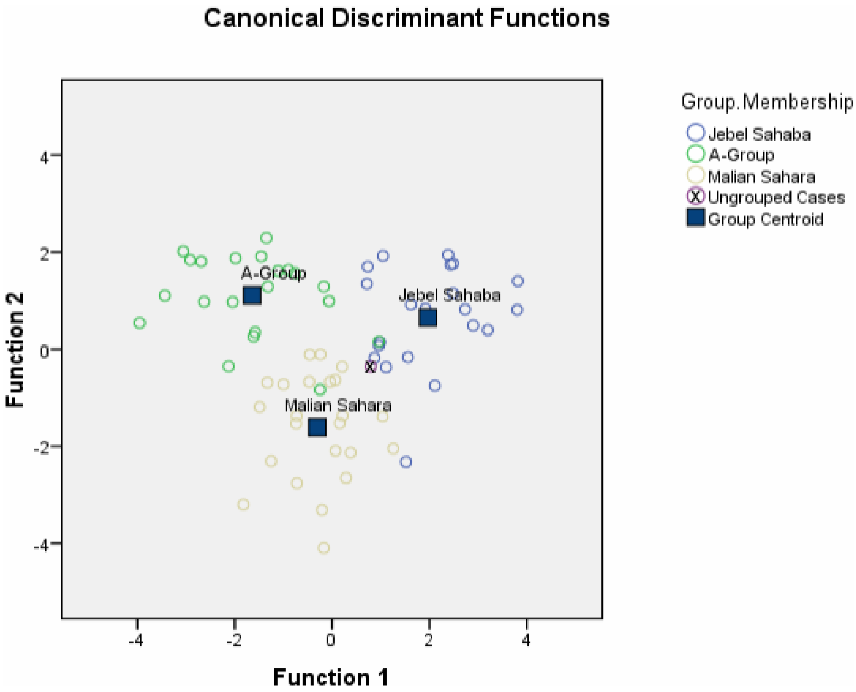
26.G.I.4. Classification:	*Jebel Sahaba/Tushka*

26.G.II. Analysis overview

26.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
26.G.II.2.a. Variables in matrix:	*26*
26.G.II.2.b. Variables entered:	*11*
26.G.II.3. Best predictors:	*Margo infranasalis (main) (-.440), Alveolar prognathism (.331), 81(1). Crown width LM3 (.331), 81. Crown length LM1 (-.370 - Function 2)*
26.G.II.4.a. Wilks' Lambda:	*1 through 2: .122 (Sig. .000), 2: .397 (Sig. .000)*
26.G.II.4.b. Eigenvalues:	*1: 2.262 (r: .833), 2: 1.519 (r: .777)*
26.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
26.G.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

26.G.III. Results

26.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 2.405), Malian Sahara (D^2: 2.769)*
26.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*83.1%*
26.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 95.4%, Jebel Sahaba/Tushka (D^2: 1.990), Malian Sahara (D^2: 3.294)*
26.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 Malian Sahara), Malian Sahara (3 A-Group)*
26.G.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara)*
26.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



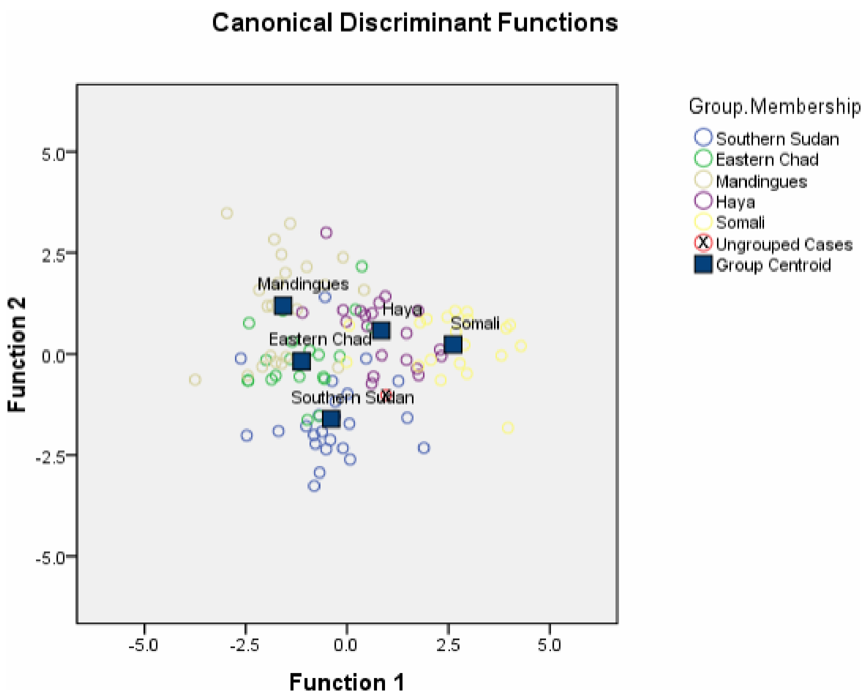
26.G.IV. Additional results

26.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 96.9%, 73.8%), separate-groups covariance matrix A-Group, 96.9%)*
26.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 83.1%, 81.5%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 87.7%), variables entered (7)*
26.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 94.0%, 77.1%; separate-groups covariance matrix - A-Group, 94.0%), variables entered (17)*
26.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 89.2%, 77.1%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 90.4%), variables entered (11)*

26.H.I. Summary

26.H.I.1. Individual:	*Conical Hill 02/3-4*
26.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*

26.H.I.3. Data:	*Cranial and dental measurements and non-metric traits*
2.F.I.4. Classification:	*Southern Sudan*
26.H.II. Analysis overview	
26.H.II.1. Method:	*Mahalanobis distance, simultaneous entry*
26.H.II.2.a. Variables in matrix:	*27*
26.H.II.2.b. Variables entered:	*15*
26.H.II.3. Best predictors:	*Cusp number LM2 (.453), Cusp number LM1 (.353), Alveolar prognathism (-.310), Cusp 7 LM1 (.457 - Function 2), 69(1). Mental foramen height (.442 - Function 3), Cusp number LM2 (.495 - Function 4)*
26.H.II.4.a. Wilks' Lambda:	*1 through 4: .059 (Sig. .000), 2 through 4: .197 (Sig. .000), 3 through 4: .390 (Sig. .000), 4: .678 (Sig. .000)*
26.H.II.4.b. Eigenvalues:	*1: 2.308 (r: .835), 2: .985 (r: 704), 3: .738 (r: .652), 4: .474 (r: .567)*
26.H.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
26.H.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -30.704, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*
26.H.III. Results	
26.H.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 83.3%, Southern Sudan (D^2: 2.348), Somalis (D^2: 4.831)*
26.H.III.1.b. Within-groups covariance matrix (Leave-one-out):	*72.2%*
26.H.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 87.0%, Southern Sudan (D^2: 2.900), Somalis (D^2: 5.706)*
26.H.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali, 3 Haya), Chad (1 Southern Sudan, 4 Mandinka, 1 Somali, 2 Haya), Mandinka (3 Southern Sudan, 2 Chad), Somalis (1 Southern Sudan, 1 Chad), Haya (1 Southern Sudan, 1 Chad, 2 Mandinka, 4 Somalis)*
26.H.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Mandinka, 1 Haya), Chad (1 Southern Sudan, 3 Mandinka, 1 Haya), Mandinka (1 Chad), Somalis (1 Southern Sudan, 1 Chad), Haya (1 Mandinka, 2 Somalis)*
26.H.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

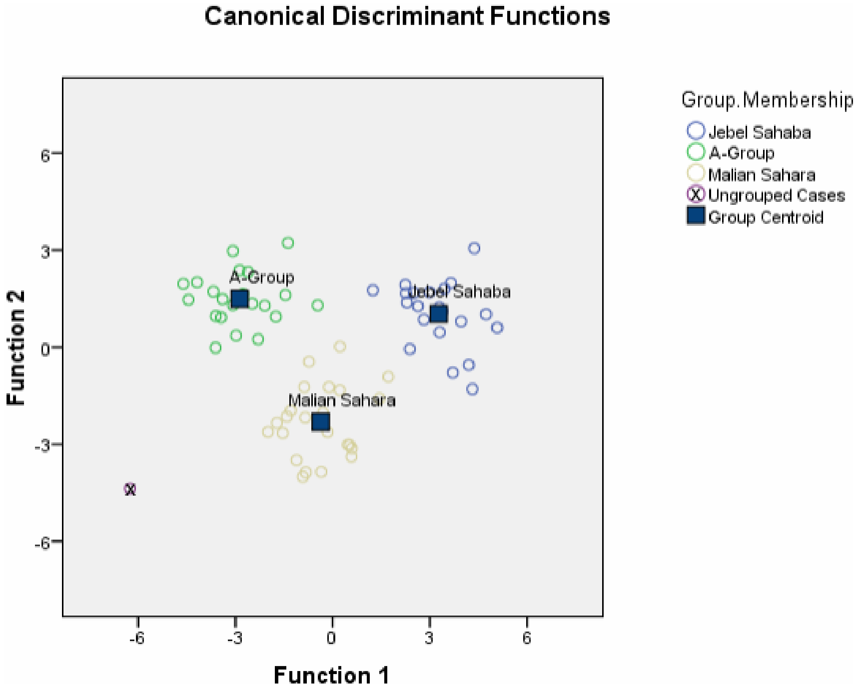


26.H.IV. Additional results	
26.H.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 88.9%, 65.7%), separate-groups covariance matrix (Southern Sudan, 89.8%)*
26.H.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 78.7%, 72.2%), separate-groups covariance matrix (Haya, 75.9%), variables entered (10)*
26.H.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 83.3%, 65.7%; separate-groups*

covariance matrix - Southern Sudan, 85.2%), variables entered (13)*

27. Djabarona 96/1-1

27.A.I. Summary	
27.A.I.1. Individual:	*Djabarona 96/1-1*
27.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
27.A.I.3. Data:	*Cranial and dental measurements*
27.A.I.4. Classification:	*Malian Sahara*
27.A.II. Analysis overview	
27.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
27.A.II.2.a. Variables in matrix:	*46*
27.A.II.2.b. Variables entered:	*14*
27.A.II.3. Best predictors:	*81(1). Crown width LI1 (.467), 81. Crown length LI1 (.383), 69(3). Mental foramen body thickness (.276), 81. Crown length LP1 (-.343 - Function 2)*
27.A.II.4.a. Wilks' Lambda:	*1 through 2: .033 (Sig. .000), 2: .244 (Sig. .000)*
27.A.II.4.b. Eigenvalues:	*1: 6.477 (r: .931), 2: 3.091 (r: .869)*
27.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
27.A.II.6. Remarks:	*Box's M (Sig. .001; Log determinants: A-Group - -28.911, Jebel Sahaba/Tushka - -26.602, Malian Sahara - -25.067), no outliers detected (except ungrouped case - D^2: 36.285; critical value: 23.685 - p 0.95, df 14), no variables failed tolerance test*
27.A.III. Results	
27.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 38.907), A-Group (D^2: 45.894)*
27.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.4%*
27.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 36.285), A-Group (D^2: 59.060)*
27.A.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (2 Jebel Sahaba/Tushka)*
27.A.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
27.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



27.A.IV. Additional results	
27.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 80.0%), separate-groups covariance matrix (A-Group, 100.0%)*
27.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 98.5%, 95.4%), separate-groups covariance matrix (A-Group, 98.5%), variables entered (11)*
27.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 92.8%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (14)*

27.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 95.2%; separate-groups covariance matrix - A-Group, 100.0%), variables entered (17)*

27.B.I. Summary

27.B.I.1. Individual: *Djabarona 96/1-1*

27.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

27.B.I.3. Data: *Scaled cranial and dental measurements*

27.B.I.4. Classification: *Malian Sahara*

27.B.II. Analysis overview

27.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

27.B.II.2.a. Variables in matrix: *38*

27.B.II.2.b. Variables entered: *14*

27.B.II.3. Best predictors: *81(1). Crown width LI1 (.379), 48(1). Nasospinale-Prosthion height (.289), 81(1). Crown width LC (.205), 71a. Minimum ramus width (-.421 - Function 2)*

27.B.II.4.a. Wilks' Lambda: *1 through 2: .044 (Sig. .000), 2: .287 (Sig. .000)*

27.B.II.4.b. Eigenvalues: *1: 5.495 (r: .920), 2: 2.485 (r: .844)*

27.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

27.B.II.6. Remarks: *Box's M (Sig. .011; Log determinants: A-Group - -89.567, Jebel Sahaba/Tushka - -86.286, Malian Sahara - -84.976), no outliers detected, no variables failed tolerance test*

27.B.III. Results

27.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 2.968), A-Group (D^2: 20.685)*

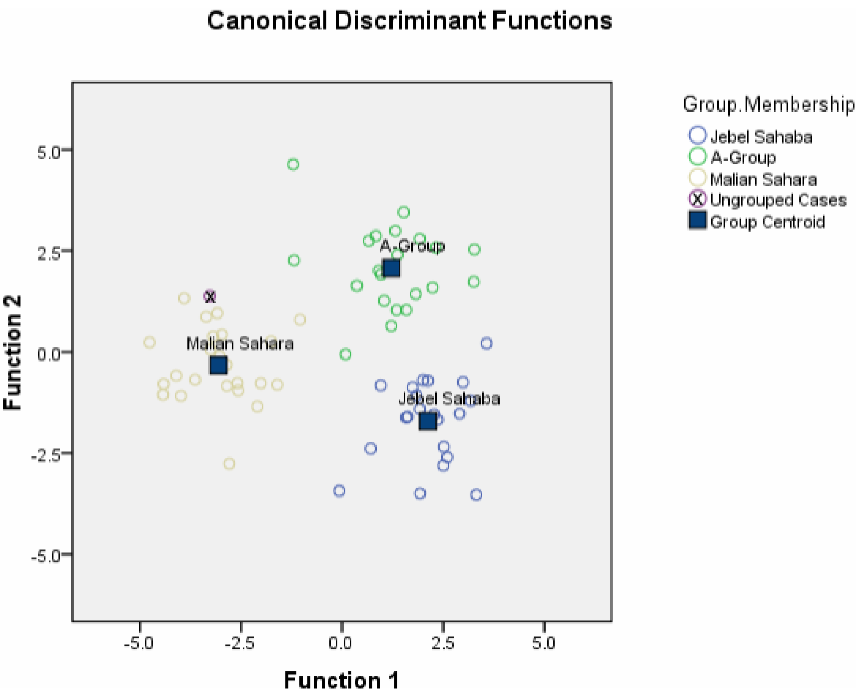
27.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*

27.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 3.450), A-Group (D^2: 17.238)*

27.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 A-Group)*

27.B.III.2.b. Misclassifications (separate-groups): *No misclassifications*

27.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



27.B.IV. Additional results

27.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 83.1%), separate-groups covariance matrix (Malian Sahara, 100.0%)*

27.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 90.8%), separate-groups covariance matrix (Malian Sahara, 96.9%), variables entered (12)*

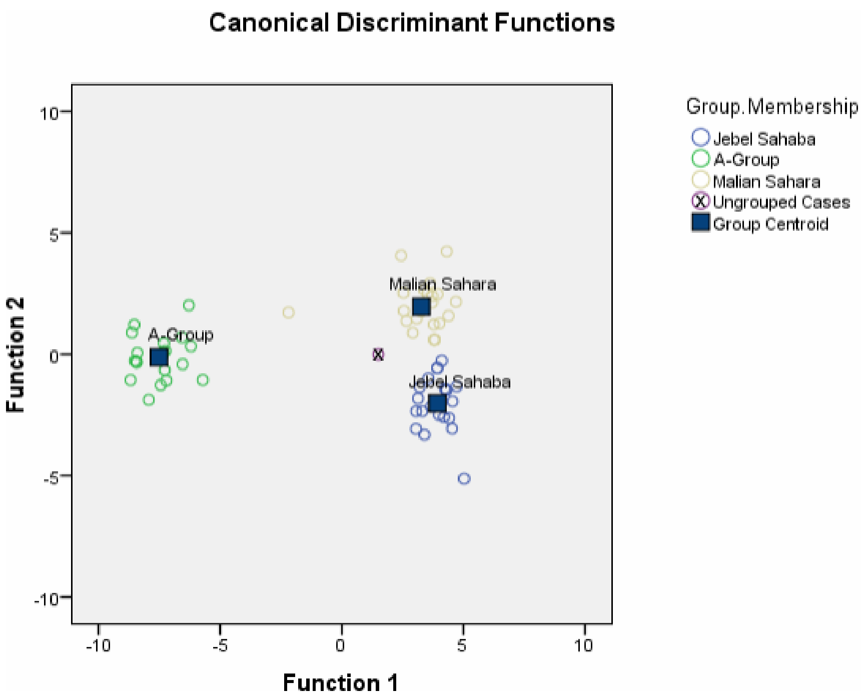
27.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 94.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (15)*

27.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 94.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), variables entered (23)*

27.C.I. Summary
27.C.I.1. Individual: *Djabarona 96/1-1*
27.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
27.C.I.3. Data: *Non-metric cranial and dental traits*
27.C.I.4. Classification: *Malian Sahara*

27.C.II. Analysis overview
27.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
27.C.II.2.a. Variables in matrix: *45*
27.C.II.2.b. Variables entered: *14*
27.C.II.3. Best predictors: *Distal accessory ridge UC (.502), Shovel UI1 (.254), Canine mesial ridge UC (.079), Premolar mesial and distal accessory cusps UP1 (.296 - Function 2)*
27.C.II.4.a. Wilks' Lambda: *1 through 2: .009 (Sig. .000), 2: .263 (Sig. .000)*
27.C.II.4.b. Eigenvalues: *1: 28.294 (r: .983), 2: 2.797 (r: .858)*
27.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
27.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

27.C.III. Results
27.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 6.958), Jebel Sahaba/Tushka (D^2: 9.961)*
27.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.4%*
27.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 5.727), Jebel Sahaba/Tushka (D^2: 18.686)*
27.C.III.2.a. Misclassifications (leave-one-out): *Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 A-Group)*
27.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
27.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



27.C.IV. Additional results
27.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 83.1%), separate-groups covariance matrix (Malian Sahara, 100.0%)*
27.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 87.7%), separate-groups covariance matrix (Malian Sahara, 96.9%), variables entered (13)*
27.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 97.6%, 86.7%; separate-groups covariance matrix - Malian Sahara, 96.4%), variables entered (17)*

27.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 94.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), variables entered (23)*

27.D.I. Summary

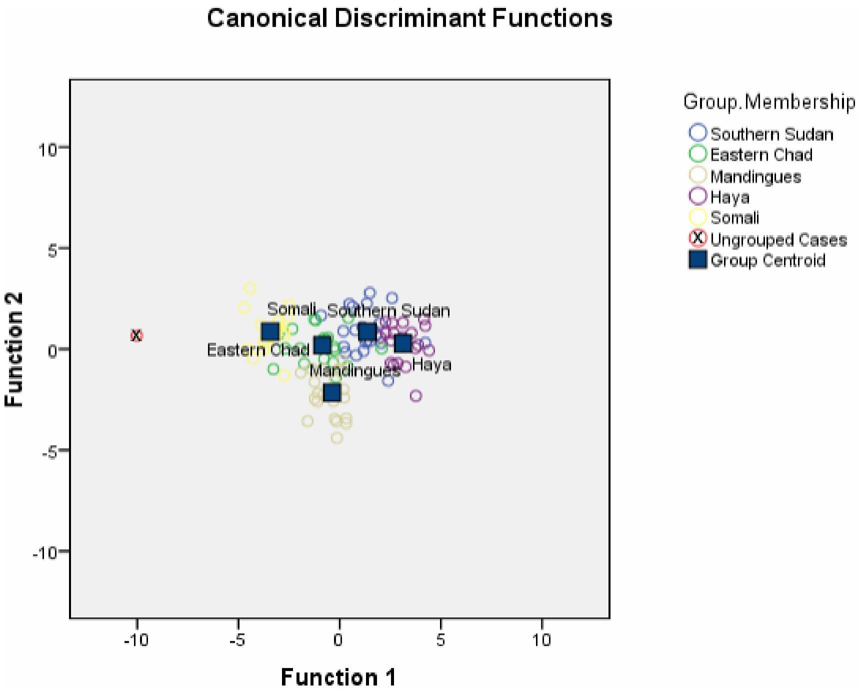
27.D.I.1. Individual:	*Djabarona 96/1-1*
27.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
27.D.I.3. Data:	*Cranial and dental measurements*
27.D.I.4. Classification:	*Chad*

27.D.II. Analysis overview

27.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
27.D.II.2.a. Variables in matrix:	*33*
27.D.II.2.b. Variables entered:	*14*
27.D.II.3. Best predictors:	*80a. Dental arch length of the mandible (.657), 81. Crown length LC (.566), 63(2)d. 4th internal dental arch breadth (md) (.229), 69c. Thickness of the mandibular symphysis (.263 - Function 2), 63(2)d. 4th internal dental arch breadth (md) (.430 - Function 3), 54. Nasal breadth (.403 - Function 4)*
27.D.II.4.a. Wilks' Lambda:	*1 through 4: .023 (Sig. .000), 2 through 4: .131 (Sig. .000), 3 through 4: .306 (Sig. .000), 4: .630 (Sig. .000)*
27.D.II.4.b. Eigenvalues:	*1: 4.812 (r: .910), 2: 1.330 (r: .755), 3: 1.058 (r: .717), 4: .588 (r: .609)*
27.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
27.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -11.738, Chad - -17.332, Mandinka - -8.308, Somalis - -18.590, Haya - -13.435), no outliers detected (except ungrouped case - D^2: 51.442; critical value: 23.685 - p 0.95, df 14), no variables failed tolerance test*

27.D.III. Results

27.D.III.1.a. Within-groups covariance matrix:	*Somalis, 92.6%, Somalis (D^2: 69.077), Chad (D^2: 92.306)*
27.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*80.6%*
27.D.III.1.c. Separate-groups covariance matrix:	*Chad, 92.6%, Chad (D^2: 51.442), Southern Sudan (D^2: 126.891)*
27.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 1 Mandinka, 3 Haya), Chad (1 Mandinka, 2 Somalis, 2 Haya), Mandinka (2 Southern Sudan, 2 Chad, 1 Somali, 1 Haya), Somalis (1 Mandinka), Haya (2 Southern Sudan)*
27.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Haya), Chad (1 Southern Sudan, 1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Haya), Haya (1 Southern Sudan)*
27.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

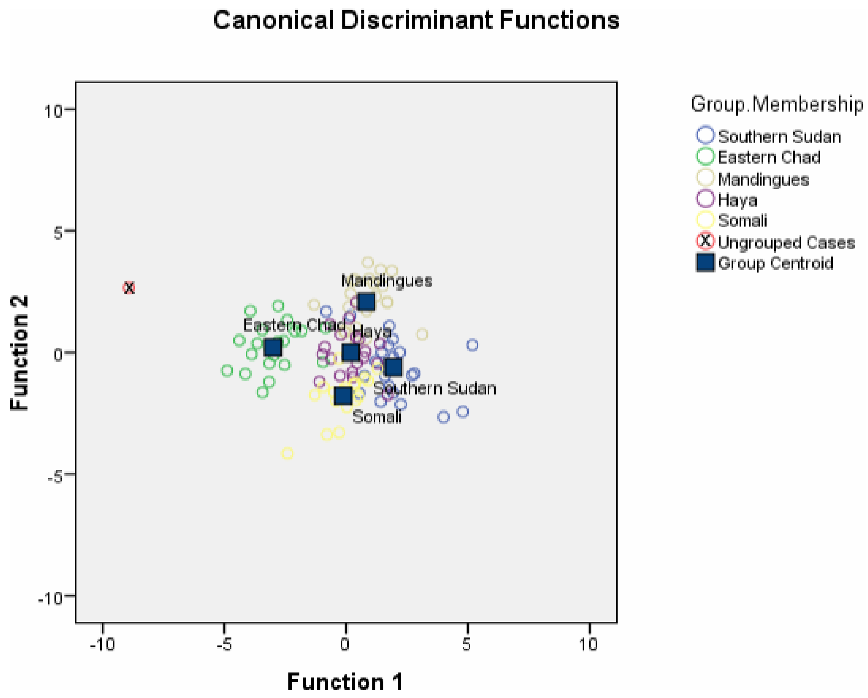


27.D.IV. Additional results	
27.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 93.5%, 71.3%), separate-groups covariance matrix (Chad, 93.5%)*
27.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 90.7%, 82.4%), separate-groups covariance matrix (Chad, 92.6%), variables entered (15)*
27.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 97.2%, 84.3%; separate-groups covariance matrix - Chad, 98.1%), variables entered (22)*

27.E.I. Summary	
27.E.I.1. Individual:	*Djabarona 96/1-1*
27.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
27.E.I.3. Data:	*Scaled cranial and dental measurements*
27.E.I.4. Classification:	*Chad*

27.E.II. Analysis overview	
27.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
27.E.II.2.a. Variables in matrix:	*29*
27.E.II.2.b. Variables entered:	*16*
27.E.II.3. Best predictors:	*80a. Dental arch length of the mandible (.755), 63(2)d. 4th internal dental arch breadth (md) (.245), 48(1). Nasospinale-Prosthion height (-.232), 69c. Thickness of the mandibular symphysis (-.327 - Function 2), 30. Bregma-Lambda chord (-.424 - Function 3), 69c. Thickness of the mandibular symphysis (-.436 - Function 4)*
27.E.II.4.a. Wilks' Lambda:	*1 through 4: .029 (Sig. .000), 2 through 4: .114 (Sig. .000), 3 through 4: .300 (Sig. .000), 4: .571 (Sig. .000)*
27.E.II.4.b. Eigenvalues:	*1: 2.961 (r: .865), 2: 1.632 (r: .787), 3: .902 (r: .689), 4: .752 (r: .655)*
27.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
27.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -74.673, Chad - -82.169, Mandinka - -72.958, Somalis - -79.711, Haya - -78.190), no outliers detected (except ungrouped case - D^2: 75.548; critical value: 26.296 - p 0.95, df 16), no variables failed tolerance test*

27.E.III. Results	
27.E.III.1.a. Within-groups covariance matrix:	*Chad, 91.7%, Chad (D^2: 57.636), Mandinka (D^2: 109.059)*
27.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*78.7%*
27.E.III.1.c. Separate-groups covariance matrix:	*Chad, 97.2%, Chad (D^2: 75.548), Southern Sudan (D^2: 87.027)*
27.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 1 Mandinka, 2 Somalis, 4 Haya), Chad (2 Mandinka, 1 Somali), Mandinka (1 Southern Sudan, 1 Somali, 1 Haya), Somalis (4 Haya), Haya (3 Southern Sudan, 1 Chad, 1 Mandinka)*
27.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Mandinka), Mandinka (1 Southern Sudan), Haya (1 Southern Sudan)*
27.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



27.E.IV. Additional results

27.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 96.3%, 69.4%), separate-groups covariance matrix (Chad, 96.3%)*

27.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 90.7%, 81.5%), separate-groups covariance matrix (Chad, 91.7%), variables entered (12)*

27.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 97.2%, 85.2%; separate-groups covariance matrix - Chad, 100.0%), variables entered (21)*

27.F.I. Summary

27.F.I.1. Individual: *Djabarona 96/1-1*

27.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

27.F.I.3. Data: *Non-metric cranial and dental traits*

27.F.I.4. Classification: *Southern Sudan*

27.F.II. Analysis overview

27.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

27.F.II.2.a. Variables in matrix: *48*

27.F.II.2.b. Variables entered: *16*

27.F.II.3. Best predictors: *Midline diastema (.756), Premolar mesial and distal accessory cusps UP1 (.402), Double shovel UI1 (-.251), Premolar mesial and distal accessory cusps UP1 (-.548 - Function 2), Parastyle UM3 (-.503 - Function 3), Cusp 5 UM1 (.604 - Function 4)*

27.F.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .020 (Sig. .000), 3 through 4: .136 (Sig. .000), 4: .541 (Sig. .000)*

27.F.II.4.b. Eigenvalues: *1: 25.412 (r: .981), 2: 5.643 (r: .922), 3: 2.987 (r: .866), 4: .847 (r: .677)*

27.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

27.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

27.F.III. Results

27.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 93.5%, Southern Sudan (D^2: 13.240), Somalis (D^2: 13.603)*

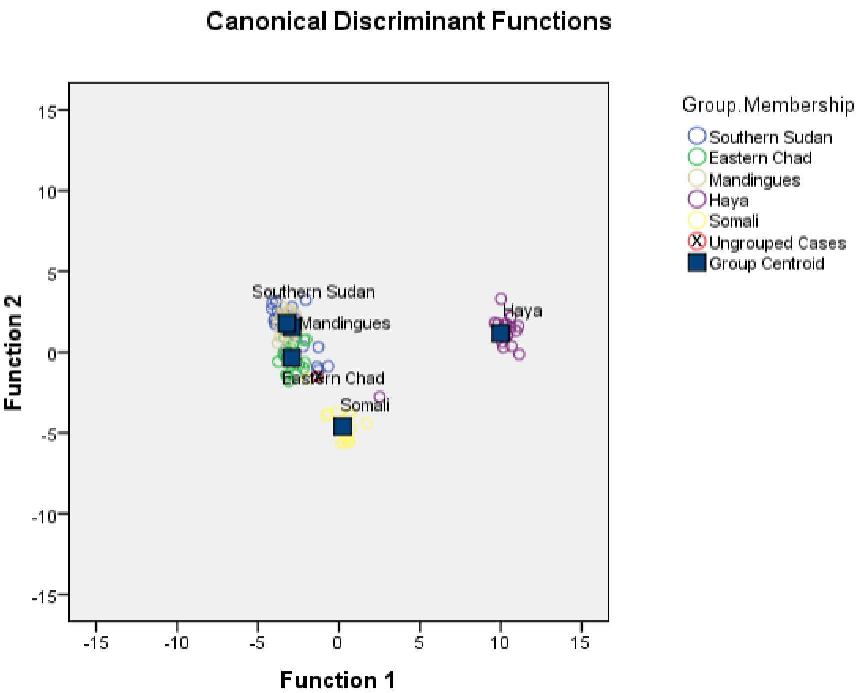
27.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *87.0%*

27.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 96.3%, Southern Sudan (D^2: 7.508), Somalis (D^2: 21.781)*

27.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 3 Mandinka, 3 Somalis), Chad (2 Southern Sudan, 1 Mandinka), Mandinka (1 Chad), Somalis (1 Chad), Haya (1 Somali)*

27.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Mandinka), Chad (1 Southern Sudan), Mandinka (1 Chad)*

27.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



27.F.IV. Additional results

27.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 97.2%, 84.3%), separate-groups covariance matrix (Somalis, 99.1%)*

27.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 90.7%, 86.1%), separate-groups covariance matrix (Somalis, 94.4%), variables entered (12)*

27.F.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 90.7%, 88.9%; separate-groups covariance matrix - Somalis, 94.4%), variables entered (11)*

28. Djabarona 96/1-2

28.A.I. Summary

28.A.I.1. Individual: *Djabarona 96/1-2*

28.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

28.A.I.3. Data: *Dental measurements*

28.A.I.4. Classification: *Malian Sahara*

28.A.II. Analysis overview

28.A.II.1. Method: *Simultaneous entry*

28.A.II.2.a. Variables in matrix: *7*

28.A.II.2.b. Variables entered: *7*

28.A.II.3. Best predictors: *81(1). Crown width UM2 (.484), 81(1). Crown width LM3 (.448), 81. Crown length UM3 (-.252), 81(1). Crown width LM2 (.929 - Function 2)*

28.A.II.4.a. Wilks' Lambda: *1 through 2: .415 (Sig. .000), 2: .700 (Sig. .002)*

28.A.II.4.b. Eigenvalues: *1: .687 (r: .638), 2: .428 (r: .547)*

28.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

28.A.II.6. Remarks: *Box's M (Sig. .004; Log determinants: A-Group - -17.642, Jebel Sahaba/Tushka - -19.199, Malian Sahara - -15.046), no outliers detected, no variables failed tolerance test*

28.A.III. Results

28.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 75.4%, Malian Sahara (D^2: .823), Jebel Sahaba/Tushka (D^2: 2.523)*

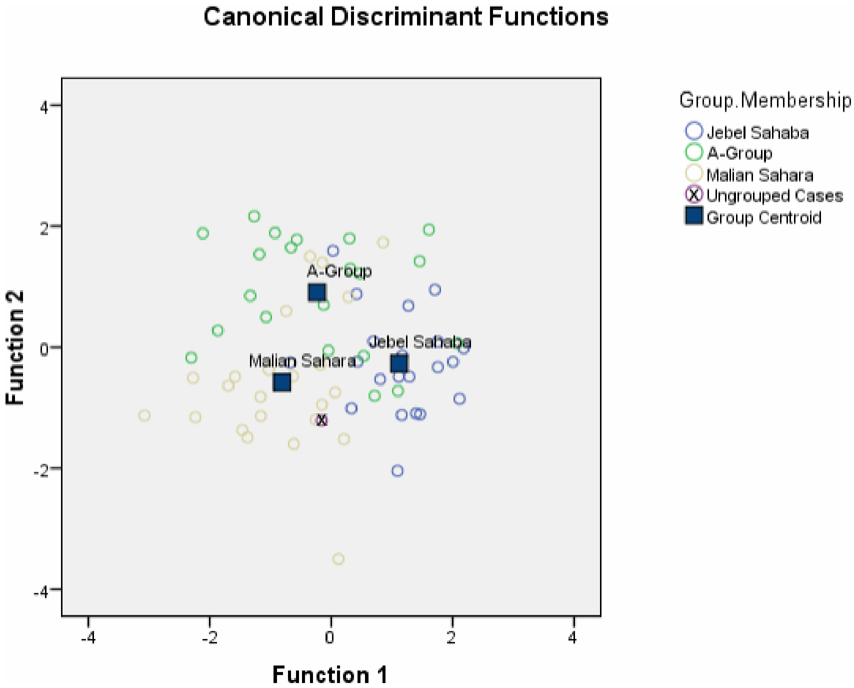
28.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *67.7%*

28.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 76.9%, Malian Sahara (D^2: 1.010), Jebel Sahaba/Tushka (D^2: 5.247)*

28.A.III.2.a. Misclassifications (leave-one-out): *A-Group (6 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 2 Malian Sahara), Malian Sahara (5 A-Group, 2 Jebel Sahaba/Tushka)*

28.A.III.2.b. Misclassifications (separate-groups): *A-Group (4 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 1 Malian Sahara), Malian Sahara (5 A-Group)*

28.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



28.A.IV. Additional results	
28.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 75.4%, 67.7%), separate-groups covariance matrix (Malian Sahara, 76.9%)*
28.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 70.8%, 69.2%), separate-groups covariance matrix (Malian Sahara, 70.8%), variables entered (2)*
28.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 69.9%, 66.3%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 78.3%), variables entered (5)*
28.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 67.5%, 61.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 72.3%), variables entered (4)*

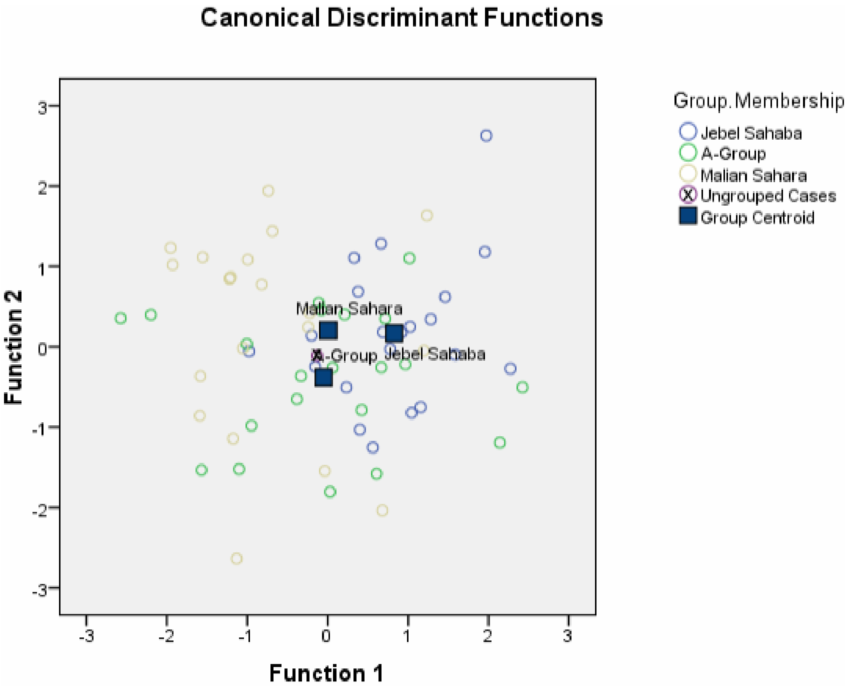
28.B.I. Summary	
28.B.I.1. Individual:	*Djabarona 96/1-2*
28.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
28.B.I.3. Data:	*Scaled dental measurements*
28.B.I.4. Classification:	*Malian Sahara*

28.B.II. Analysis overview	
28.B.II.1. Method:	*Simultaneous entry*
28.B.II.2.a. Variables in matrix:	*3*
28.B.II.2.b. Variables entered:	*3*
28.B.II.3. Best predictors:	*81(1). Crown width LM3 (1.269), 81. Crown length UM3 (.726), 81. Crown length LM3 (-.551), 81. Crown length UM3 (.806 - Function 2)*
28.B.II.4.a. Wilks' Lambda:	*1 through 2: .648 (Sig. .000), 2: .930 (Sig. .115)*
28.B.II.4.b. Eigenvalues:	*1: .435 (r: .551), 2: .075 (r: .264)*
28.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.7%)*
28.B.II.6. Remarks:	*Box's M (Sig. .398; Log determinants: A-Group - -17.975, Jebel Sahaba/Tushka - -18.812, Malian Sahara - -17.644), removed outliers: Malian Sahara MN27/H10 (D^2: 8.674; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test*

28.B.III. Results	
28.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 54.7%, Malian Sahara (D^2: .117), A-Group (D^2: .081)*
28.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*59.4%*
28.B.III.1.c. Separate-groups covariance matrix:	*A-Group, 62.5%, A-Group (D^2: .111), Malian Sahara (D^2: .101)*
28.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (7 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 2 Malian Sahara), Malian Sahara (5 A-Group, 2 Jebel Sahaba/Tushka)*

28.B.III.2.b. Misclassifications (separate-groups): *A-Group (6 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 2 Malian Sahara), Malian Sahara (6 A-Group, 2 Jebel Sahaba/Tushka)*

28.B.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



28.B.IV. Additional results

28.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 54.7%, 59.4%), separate-groups covariance matrix (A-Group, 62.5%)*

28.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (A-Group, 60.0%, 55.4%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 61.5%), variables entered (2)*

28.B.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 63.9%, 62.7%; separate-groups covariance matrix - A-Group, 72.3%), variables entered (4)*

28.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 63.9%, 62.7%; separate-groups covariance matrix - A-Group, 72.3%), variables entered (4)*

28.C.I. Summary

28.C.I.1. Individual: *Djabarona 96/1-2*

28.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

28.C.I.3. Data: *Non-metric dental traits*

28.C.I.4. Classification: *Malian Sahara*

28.C.II. Analysis overview

28.C.II.1. Method: *Simultaneous entry*

28.C.II.2.a. Variables in matrix: *6*

28.C.II.2.b. Variables entered: *6*

28.C.II.3. Best predictors: *Groove pattern LM2 (.735), Cusp number LM2 (.523), Cusp number LM1 (.245), Groove pattern LM2 (-.493 - Function 2)*

28.C.II.4.a. Wilks' Lambda: *1 through 2: .537 (Sig. .000), 2: .842 (Sig. .069)*

28.C.II.4.b. Eigenvalues: *1: .568 (r: .602), 2: .188 (r: .397)*

28.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

28.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

28.C.III. Results

28.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 63.1%, Malian Sahara (D^2: .795), Jebel Sahaba/Tushka (D^2: 1.332)*

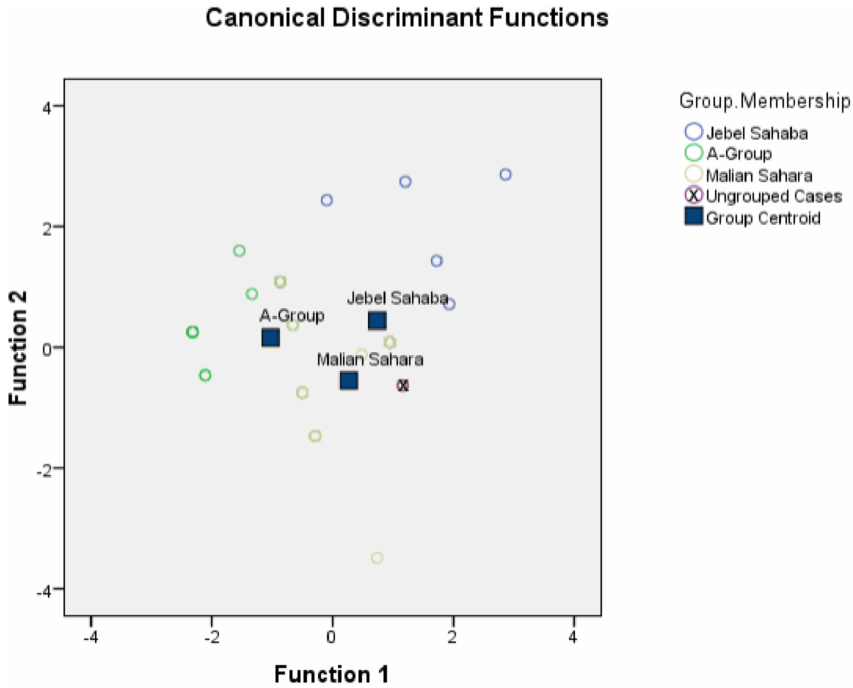
28.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *58.5%*

28.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 60.0%, Malian Sahara (D^2: 1.339), Jebel Sahaba/Tushka (D^2: 1.159)*

28.C.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 5 Malian Sahara), Malian Sahara (3 A-Group, 8 Jebel Sahaba/Tushka)*

28.C.III.2.b. Misclassifications (separate-groups): *A-Group (7 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group), 13 Malian Sahara), Malian Sahara (3 A-Group)*

28.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



28.C.IV. Additional results

28.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 63.1%, 58.5%), separate-groups covariance matrix (Malian Sahara, 60.0%)*

28.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%, 60.0%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 60.0%), variables entered (2)*

28.C.IV.2. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 51.8%, 38.6%; separate-groups covariance matrix - "Sudanese Hotchpotch", 44.6%), variables entered (3)*

28.C.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 45.8%, 42.2%; separate-groups covariance matrix - Malian Sahara, 43.4%), variables entered (3)*

28.D.I. Summary

28.D.I.1. Individual: *Djabarona 96/1-2*

28.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

28.D.I.3. Data: *Dental measurements*

28.D.I.4. Classification: *Haya*

28.D.II. Analysis overview

28.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

28.D.II.2.a. Variables in matrix: *4*

28.D.II.2.b. Variables entered: *3*

28.D.II.3. Best predictors: *81(1). Crown width LM2 (.713), 81. Crown length UM3 (.603), 81. Crown length UM2 (.113), 81. Crown length UM3 (.796 - Function 2), 81. Crown length UM2 (.891 - Function 3)*

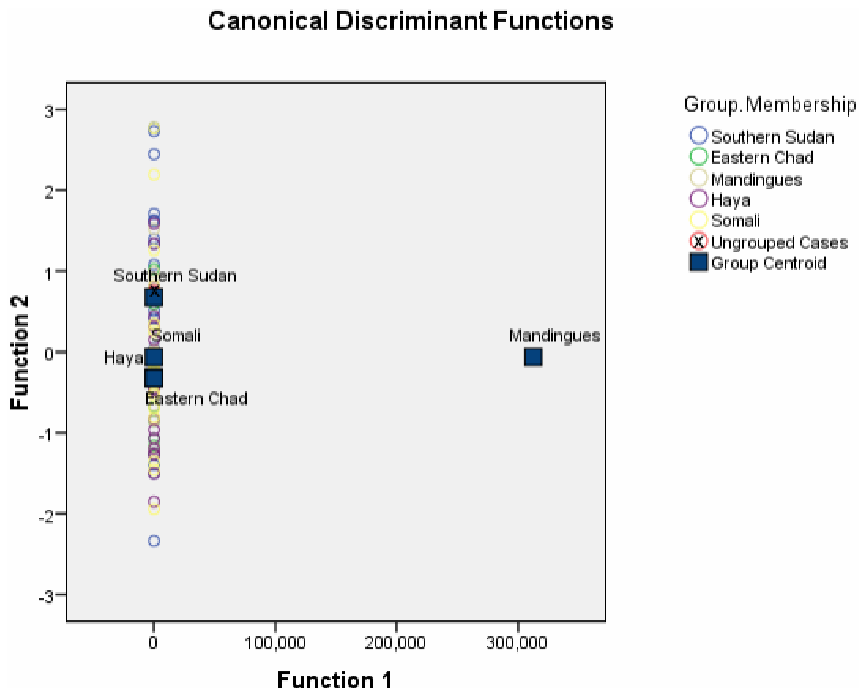
28.D.II.4.a. Wilks' Lambda: *1 through 3: .654 (Sig. .000), 2 through 3: .847 (Sig. .017), 3: .977 (Sig. .341)*

28.D.II.4.b. Eigenvalues: *1: .296 (r: .478), 2: .153 (r: .364), 3: .023 (r: .151)*

28.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

28.D.II.6. Remarks: *Box's M (Sig. .240; Log determinants: Southern Sudan - -3.465, Chad - -5.468, Mandinka - -4.819, Somalis - -4.134, Haya - -3.975), removed outliers: Southern Sudan 18.515 (D^2: 8.149; critical value: 7.815 - p 0.95, df 3), Southern Sudan E.1028-10 (D^2: 8.707; critical value: 7.815 - p 0.95, df 3), Chad 17.589 (D^2: 7.900; critical value: 7.815 - p 0.95, df 3), Chad 19.675 (D^2: 8.466; critical value: 7.815 - p 0.95, df 3), Mandinka 0.141-13 (D^2: 8.411; critical value: 7.815 - p 0.95, df 3), Mandinka 0.141-14 (D^2: 9.861; critical value: 7.815 - p 0.95, df 3),*

	Mandinka 3.804 (D^2: 9.466; critical value: 7.815 - p 0.95, df 3), Mandinka 9.539 (D^2: 7.927; critical value: 7.815 - p 0.95, df 3), Somalis Af.15.0.31 (D^2: 8.056; critical value: 7.815 - p 0.95, df 3), Haya Af.23.0.127/205 (D^2: 8.256; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test
28.D.III. Results	
28.D.III.1.a. Within-groups covariance matrix:	*Haya, 50.0%, Haya (D^2: 7.594), Southern Sudan (D^2: 8.348)*
28.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*46.9%*
28.D.III.1.c. Separate-groups covariance matrix:	*Haya, 45.9%, Haya (D^2: 6.225), Southern Sudan (D^2: 10.180)*
28.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 3 Somalis, 3 Haya), Chad (3 Mandinka, 6 Somalis, 2 Haya), Mandinka (3 Southern Sudan, 3 Chad, 2 Somalis, 6 Haya), Somalis (3 Southern Sudan, 2 Chad, 2 Mandinka), Haya (5 Southern Sudan, 2 Chad, 1 Mandinka, 3 Somalis)*
28.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (4 Chad, 4 Somalis), Chad (1 Southern Sudan, 4 Somalis, 2 Haya), Mandinka (4 Southern Sudan, 9 Chad, 1 Somali, 4 Haya), Somalis (3 Southern Sudan, 6 Chad), Haya (2 Southern Sudan, 6 Chad, 3 Somalis)*
28.D.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*

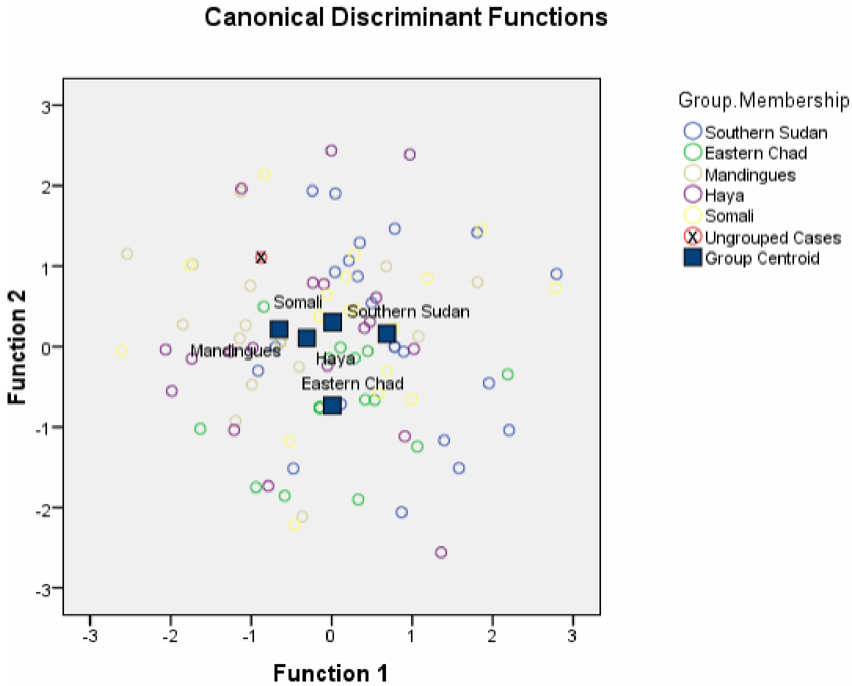


28.D.IV. Additional results	
28.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 43.5%, 42.6%), separate-groups covariance matrix (Somalis, 37.0%)*
28.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 43.5%, 42.6%), separate-groups covariance matrix (Somalis, 37.0%), variables entered (4)*
28.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 54.6%, 50.9%; separate-groups covariance matrix - Haya, 60.2%), variables entered (5)*

28.E.I. Summary	
28.E.I.1. Individual:	*Djabarona 96/1-2*
28.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
28.E.I.3. Data:	*Scaled dental measurements*
28.E.I.4. Classification:	*Mandinka*
28.E.II. Analysis overview	
28.E.II.1. Method:	*Simultaneous entry*
28.E.II.2.a. Variables in matrix:	*2*
28.E.II.2.b. Variables entered:	*2*
28.E.II.3. Best predictors:	*81. Crown length UM2 (.884), 81(1). Crown width UM3 (-.174), 81(1). Crown width UM3 (.985 - Function 2)*

28.E.II.4.a. Wilks' Lambda: *1 through 2: .713 (Sig. .000), 2: .868 (Sig. .003)*
28.E.II.4.b. Eigenvalues: *1: .217 (r: .423), 2: .152 (r: .364)*
28.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
28.E.II.6. Remarks: *Box's M (Sig. .190; Log determinants: Southern Sudan - -11.794, Chad - -13.582, Mandinka - -12.285, Somalis - -11.674, Haya - -11.480), removed outliers: Southern Sudan 9.992 (D^2: 7.414; critical value: 5.991 - p 0.95, df 2), Southern Sudan 18.515 (D^2: 6.332; critical value: 5.991 - p 0.95, df 2), Chad 19.675 (D^2: 6.325; critical value: 5.991 - p 0.95, df 2), Mandinka 0.141-13 (D^2: 6.318; critical value: 5.991 - p 0.95, df 2), Mandinka 0.141-14 (D^2: 6.609; critical value: 5.991 - p 0.95, df 2), Mandinka 3.804 (D^2: 6.021; critical value: 5.991 - p 0.95, df 2), Somalis Af.15.0.41 (D^2: 6.294; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

28.E.III. Results
28.E.III.1.a. Within-groups covariance matrix: *Mandinka, 35.6%, Mandinka (D^2: .852), Haya (D^2: 1.331)*
28.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *34.7%*
28.E.III.1.c. Separate-groups covariance matrix: *Mandinka, 46.5%, Mandinka (D^2: 1.108), Haya (D^2: .974)*
28.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (5 Chad, 2 Mandinka, 6 Somalis), Chad (4 Southern Sudan, 2 Mandinka, 1 Haya), Mandinka (3 Southern Sudan, 2 Chad, 6 Haya), Somalis (8 Southern Sudan, 3 Chad, 3 Mandinka, 2 Haya), Haya (5 Southern Sudan, 5 Chad, 6 Mandinka, 3 Somalis)*
28.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 2 Mandinka, 1 Haya), Chad (1 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (3 Southern Sudan, 4 Chad, 1 Haya), Somalis (8 Southern Sudan, 4 Chad, 5 Mandinka, 2 Haya), Haya (7 Southern Sudan, 4 Chad, 8 Mandinka)*
28.E.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



28.E.IV. Additional results
28.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 35.6%, 34.7%), separate-groups covariance matrix (Mandinka, 46.5%)*
28.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 35.6%, 34.7%), separate-groups covariance matrix (Mandinka, 46.5%), variables entered (2)*
28.E.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 50.0%, 47.2%; separate-groups covariance matrix - Somalis, 53.7%), variables entered (4)*

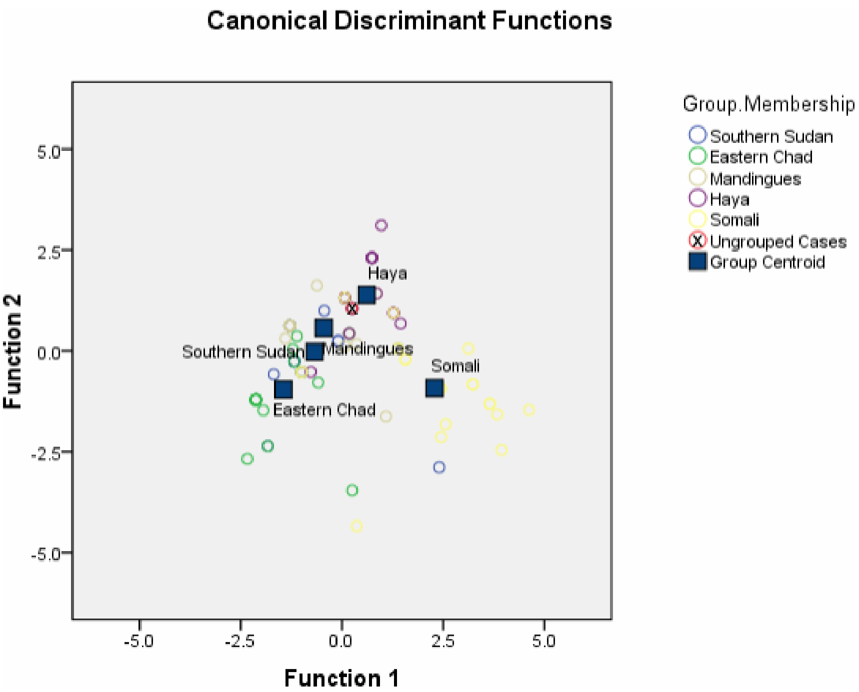
28.F.I. Summary
28.F.I.1. Individual: *Djabarona 96/1-2*
28.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
28.F.I.3. Data: *Non-metric dental traits*
28.F.I.4. Classification: *Mandinka*

28.F.II. Analysis overview

28.F.II.1. Method:	*Simultaneous entry*
28.F.II.2.a. Variables in matrix:	*10*
28.F.II.2.b. Variables entered:	*10*
28.F.II.3. Best predictors:	*Cusp number LM2 (.589), Deflecting wrinkle LM1 (-.583), Parastyle UM3 (-.404), Parastyle UM3 (-.586 - Function 2), Parastyle UM3 (.657 - Function 3), Cusp number LM1 (.563 - Function 4)*
28.F.II.4.a. Wilks' Lambda:	*1 through 4: .112 (Sig. .000), 2 through 4: .301 (Sig. .000), 3 through 4: .544 (Sig. .000), 4: .905 (Sig. .195)*
28.F.II.4.b. Eigenvalues:	*1: 1.688 (r: .792), 2: .805 (r: .668), 3: .665 (r: .632), 4: .105 (r: .308)*
28.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
28.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

28.F.III. Results

28.F.III.1.a. Within-groups covariance matrix:	*Haya, 65.7%, Haya (D^2: 1.917), Mandinka (D^2: 3.060)*
28.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*52.8%*
28.F.III.1.c. Separate-groups covariance matrix:	*Mandinka, 64.8%, Mandinka (D^2: 4.370), Haya (D^2: 3.044)*
28.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 2 Mandinka, 2 Somalis, 3 Haya), Chad (2 Southern Sudan, 4 Mandinka, 1 Somali, 1 Haya), Mandinka (11 Southern Sudan, 1 Somali, 7 Haya), Somalis (3 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Chad, 7 Mandinka)*
28.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 14 Mandinka, 1 Somali), Chad (1 Southern Sudan, 5 Mandinka), Mandinka (2 Southern Sudan, 1 Somali, 1 Haya), Somalis (1 Southern Sudan, 1 Mandinka, 1 Haya), Haya (1 Chad, 7 Mandinka)*
28.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



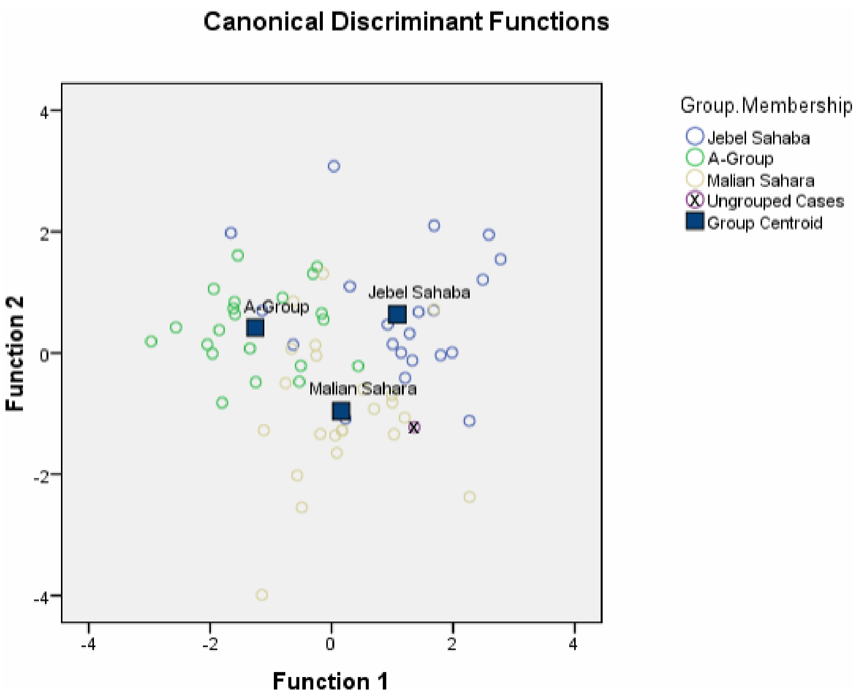
28.F.IV. Additional results

28.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 65.7%, 52.8%), separate-groups covariance matrix (Mandinka, 64.8%)*
28.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 63.9%, 47.2%), separate-groups covariance matrix (Mandinka, 46.3%), variables entered (5)*
28.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Mandinka, 58.3%, 56.5%; separate-groups covariance matrix - Mandinka, 58.3%), variables entered (5)*

28.G.I. Summary

28.G.I.1. Individual:	*Djabarona 96/1-2*
28.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
28.G.I.3. Data:	*Dental measurements and non-metric traits*

28.G.I.4. Classification:	*Malian Sahara*
28.G.II. Analysis overview	
28.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
28.G.II.2.a. Variables in matrix:	*13*
28.G.II.2.b. Variables entered:	*8*
28.G.II.3. Best predictors:	*81(1). Crown width UM2 (.651), Groove pattern LM2 (.533), 81(1). Crown width LM2 (-.500), 81(1). Crown width LM2 (.502 - Function 2)*
28.G.II.4.a. Wilks' Lambda:	*1 through 2: .336 (Sig. .000), 2: .652 (Sig. .001)*
28.G.II.4.b. Eigenvalues:	*1: .938 (r: .696), 2: .534 (r: .590)*
28.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
28.G.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - -18.792, Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*
28.G.III. Results	
28.G.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 80.0%, Malian Sahara (D^2: 1.523), Jebel Sahaba/Tushka (D^2: 3.529)*
28.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*66.2%*
28.G.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 81.5%, Malian Sahara (D^2: 1.940), Jebel Sahaba/Tushka (D^2: 3.055)*
28.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 3 Malian Sahara), Malian Sahara (6 A-Group, 2 Jebel Sahaba/Tushka)*
28.G.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 1 Malian Sahara), Malian Sahara (3 A-Group, 2 Jebel Sahaba/Tushka)*
28.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



28.G.IV. Additional results	
28.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 78.5%, 61.5%), separate-groups covariance matrix (Malian Sahara, 78.5%)*
28.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%, 66.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 78.5%), variables entered (6)*
28.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 78.3%, 67.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 79.5%), variables entered (7)*
28.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 68.7%, 61.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 77.1%), variables entered (6)*
28.H.I. Summary	
28.H.I.1. Individual:	*Djabarona 96/1-2*

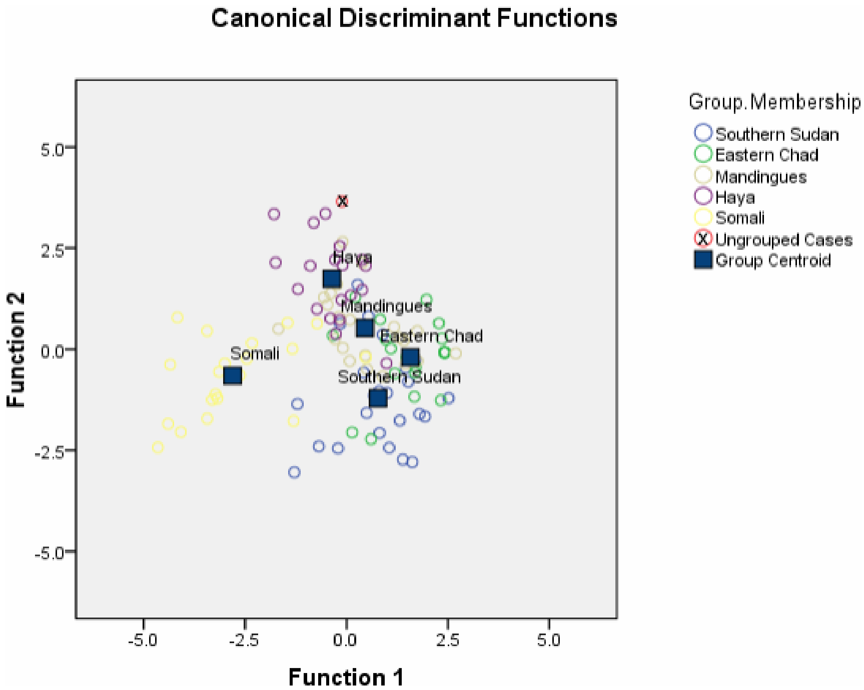
28.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
28.H.I.3. Data:	*Dental measurements and non-metric traits*
28.H.I.4. Classification:	*Haya*

28.H.II. Analysis overview

28.H.II.1. Method:	*Mahalanobis distance, simultaneous entry*
28.H.II.2.a. Variables in matrix:	*14*
28.H.II.2.b. Variables entered:	*13*
28.H.II.3. Best predictors:	*Deflecting wrinkle LM1 (.537), Cusp number LM2 (-.473), Cusp number LM1 (-.334), Cusp number LM2 (.447 - Function 2), Parastyle UM3 (.841 - Function 3), 81. Crown length UM2 (.390 - Function 4)*
28.H.II.4.a. Wilks' Lambda:	*1 through 4: .064 (Sig. .000), 2 through 4: .210 (Sig. .000), 3 through 4: .438 (Sig. .000), 4: .796 (Sig. .013)*
28.H.II.4.b. Eigenvalues:	*1: 2.270 (r: .833), 2: 1.082 (r: .721), 3: .817 (r: .671), 4: .256 (r: .451)*
28.H.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
28.H.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

28.H.III. Results

28.H.III.1.a. Within-groups covariance matrix:	*Mandinka, 74.1%, Mandinka (D^2: 12.064), Haya (D^2: 12.107)*
28.H.III.1.b. Within-groups covariance matrix (Leave-one-out):	*63.9%*
28.H.III.1.c. Separate-groups covariance matrix:	*Haya, 76.9%, Haya (D^2: 15.264), Somalis (D^2: 22.692)*
28.H.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 5 Mandinka, 1 Somali, 1 Haya), Chad (1 Southern Sudan, 4 Mandinka, 2 Haya), Mandinka (5 Southern Sudan, 1 Somali, 6 Haya), Somalis (1 Chad, 1 Mandinka, 3 Haya), Haya (2 Southern Sudan, 1 Chad, 2 Mandinka)*
28.H.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 4 Mandinka, 2 Haya), Chad (1 Southern Sudan, 4 Mandinka, 1 Haya), Mandinka (5 Haya), Somalis (1 Chad, 1 Haya), Haya (1 Southern Sudan, 3 Mandinka)*
28.H.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



28.H.IV. Additional results

28.H.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Mandinka, 73.1%, 63.0%), separate-groups covariance matrix (Haya, 74.1%)*
28.H.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 68.5%, 63.0%), separate-groups covariance matrix (Haya, 71.3%), variables entered (8)*
28.H.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 77.8%, 66.7%; separate-groups covariance matrix - Haya, 73.1%), variables entered (11)*

29. Djabarona 96-4

29.A.I. Summary

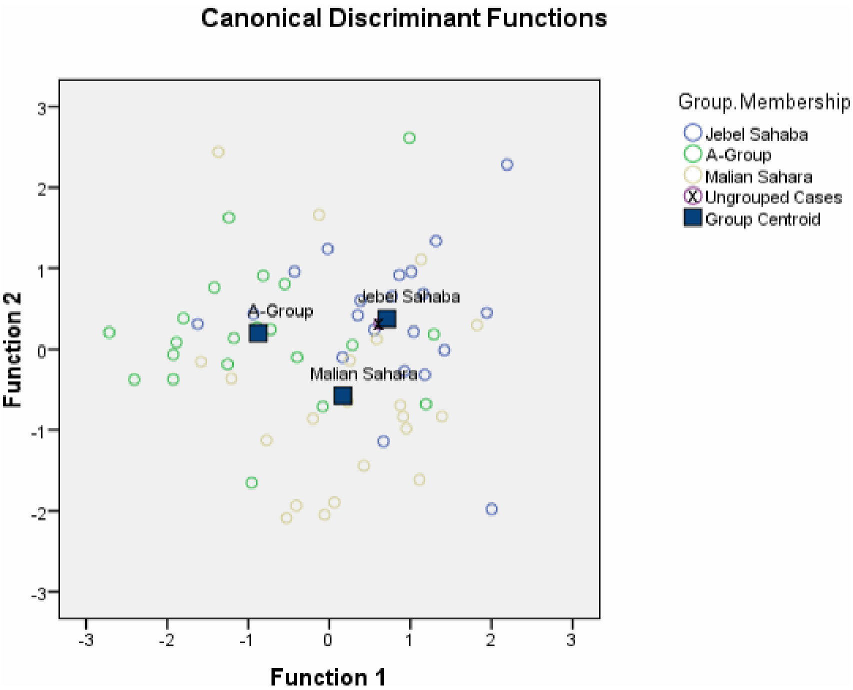
29.A.I.1. Individual:	*Djabarona 96-4*
29.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
29.A.I.3. Data:	*Dental measurements*
29.A.I.4. Classification:	*Jebel Sahaba/Tushka*

29.A.II. Analysis overview

29.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
29.A.II.2.a. Variables in matrix:	*4*
29.A.II.2.b. Variables entered:	*2*
29.A.II.3. Best predictors:	*81(1). Crown width UM2 (.969), 81(1). Crown width LM2 (-.781), 81(1). Crown width LM2 (.625 - Function 2)*
29.A.II.4.a. Wilks' Lambda:	*1 through 2: .583 (Sig. .000), 2: .849 (Sig. .002)*
29.A.II.4.b. Eigenvalues:	*1: .456 (r: .560), 2: .178 (r: .388)*
29.A.II.5. Prior classification probability:	*33.3% (prior prob. + 25%: 41.6%)*
29.A.II.6. Remarks:	*Box's M (Sig. .628; Log determinants: A-Group - -5.910, Jebel Sahaba/Tushka - -6.220, Malian Sahara - -5.617), removed outliers: Malian Sahara AZ56/H8 (D^2: 6.718; critical value: 5.991 - p 0.95, df 2), Malian Sahara MN27/H9 (D^2: 7.543; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

29.A.III. Results

29.A.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 69.8%, Jebel Sahaba/Tushka (D^2: .013), Malian Sahara (D^2: .991)*
29.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*69.8%*
29.A.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 68.3%, Jebel Sahaba/Tushka (D^2: .016), Malian Sahara (D^2: .850)*
29.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 3 Malian Sahara), Malian Sahara (3 A-Group, 4 Jebel Sahaba/Tushka)*
29.A.III.2.b. Misclassifications (separate-groups):	*A-Group (4 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 2 Malian Sahara), Malian Sahara (3 A-Group, 6 Jebel Sahaba/Tushka)*
29.A.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



29.A.IV. Additional results

29.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 53.8%, 67.7%), separate-groups covariance matrix (Malian Sahara, 53.8%)*
29.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 69.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 69.2%), variables entered (2)*
29.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 59.0%, 62.7%; separate-groups*

covariance matrix - Jebel Sahaba/Tushka, 61.4%), variables entered (2)

29.A.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 61.4%, 59.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 62.7%), variables entered (2)*

29.B.I. Summary

29.B.I.1. Individual: *Djabarona 96-4*

29.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

29.B.I.3. Data: *Scaled dental measurements*

29.B.I.4. Classification: *Malian Sahara*

29.B.II. Analysis overview

29.B.II.1. Method: *Simultaneous entry*

29.B.II.2.a. Variables in matrix: *2*

29.B.II.2.b. Variables entered: *2*

29.B.II.3. Best predictors: *81(1). Crown width LM1 (.567), 81. Crown length LM1 (-.330), 81. Crown length LM1 (.944 - Function 2)*

29.B.II.4.a. Wilks' Lambda: *1 through 2: .709 (Sig. .001), 2: .999 (Sig. .812)*

29.B.II.4.b. Eigenvalues: *1: .409 (r: .539), 2: .001 (r: .031)*

29.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.7%)*

29.B.II.6. Remarks: *Box's M (Sig. .052; Log determinants: A-Group - -13.366, Jebel Sahaba/Tushka - -14.098, Malian Sahara - -15.503), removed outliers: Jebel Sahaba/Tushka 117-16 (D^2: 12.209; critical value: 5.991 - p 0.95, df 2), Malian Sahara AZ56/H1 (D^2: 6.101; critical value: 5.991 - p 0.95, df 2), Malian Sahara MN27/H9 (D^2: 6.095; critical value: 5.991 - p 0.95, df 2), Malian Sahara MT32/H2 (D^2: 6.198; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

29.B.III. Results

29.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 63.9%, Malian Sahara (D^2: 1.312), Jebel Sahaba/Tushka (D^2: 2.383)*

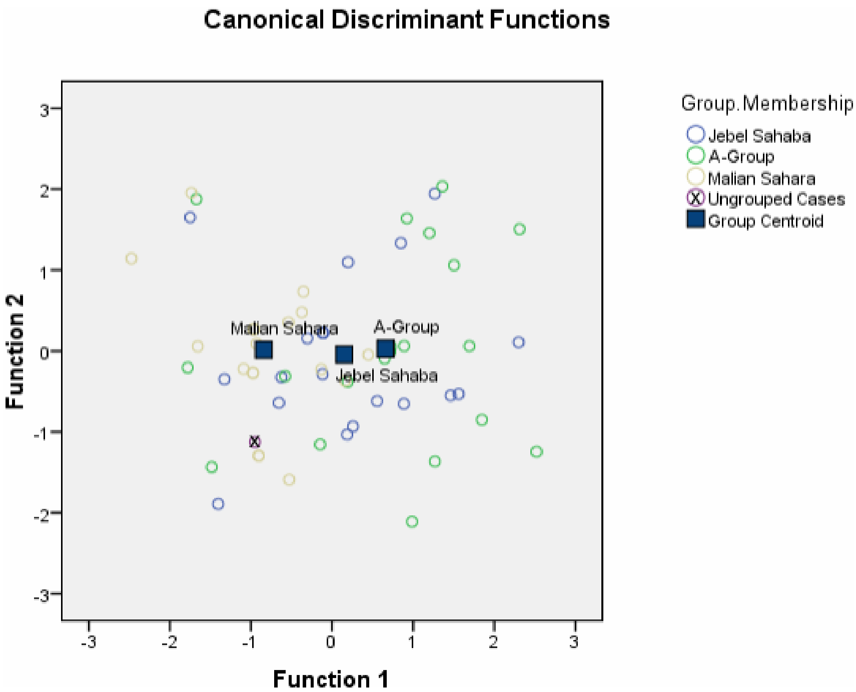
29.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.7%*

29.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 60.7%, Malian Sahara (D^2: 2.553), Jebel Sahaba/Tushka (D^2: 2.176)*

29.B.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (8 A-Group, 5 Malian Sahara), Malian Sahara (1 A-Group, 3 Jebel Sahaba/Tushka)*

29.B.III.2.b. Misclassifications (separate-groups): *A-Group (7 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 6 Malian Sahara), Malian Sahara (2 Jebel Sahaba/Tushka)*

29.B.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*

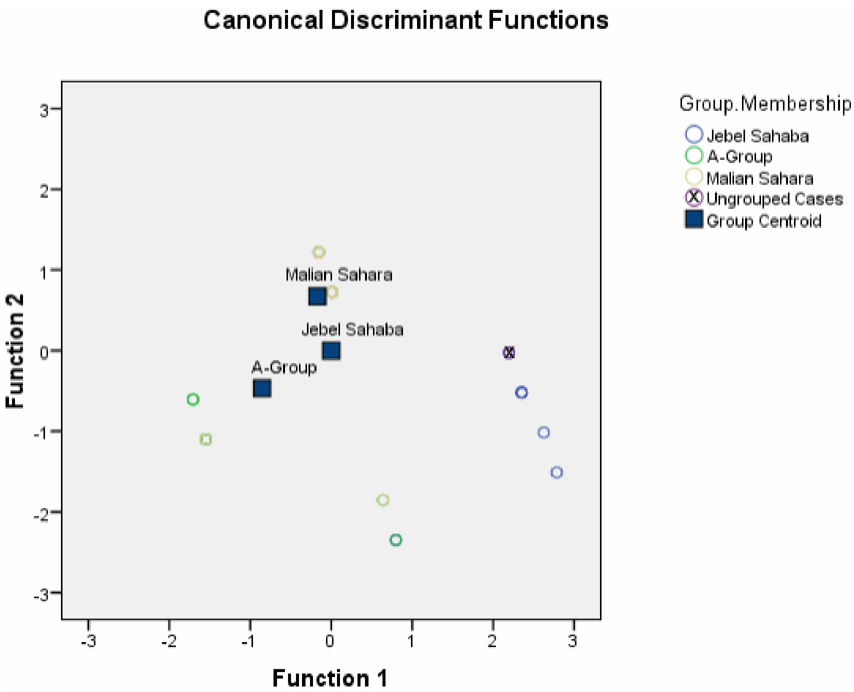


29.B.IV. Additional results	
29.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 63.1%, 58.5%), separate-groups covariance matrix (Malian Sahara, 63.1%)*
29.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 63.1%, 58.5%), separate-groups covariance matrix (Malian Sahara, 63.1%), variables entered (2)*
29.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 54.2%, 51.8%; separate-groups covariance matrix - Malian Sahara, 60.2%), variables entered (2)*
29.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 54.2%, 54.2%; separate-groups covariance matrix - A-Group, 72.3%), variables entered (3)*

29.C.I. Summary	
29.C.I.1. Individual:	*Djabarona 96-4*
29.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
29.C.I.3. Data:	*Non-metric dental traits*
29.C.I.4. Classification:	*Jebel Sahaba/Tushka*

29.C.II. Analysis overview	
29.C.II.1. Method:	*Simultaneous entry*
29.C.II.2.a. Variables in matrix:	*4*
29.C.II.2.b. Variables entered:	*4*
29.C.II.3. Best predictors:	*Cusp 7 LM1 (.614), Groove pattern LM2 (.521), Cusp number LM1 (.315), Groove pattern LM2 (.832 - Function 2)*
29.C.II.4.a. Wilks' Lambda:	*1 through 2: .487 (Sig. .000), 2: .791 (Sig. .003)*
29.C.II.4.b. Eigenvalues:	*1: .623 (r: .620), 2: .264 (r: .457)*
29.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
29.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - -7.351, Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

29.C.III. Results	
29.C.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 67.7%, Jebel Sahaba/Tushka (D^2: 4.822), Malian Sahara (D^2: 6.086)*
29.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*67.7%*
29.C.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 67.7%, Jebel Sahaba/Tushka (D^2: 2.566), A-Group (D^2: 12.163)*
29.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Jebel Sahaba/Tushka, 7 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 7 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
29.C.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 7 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 7 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
29.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



29.C.IV. Additional results	
29.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 67.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%)*
29.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%, 67.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 67.7%), variables entered (3)*
29.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 56.6%, 56.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 49.4%), variables entered (4)*
29.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 47.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 42.2%), variables entered (3)*

29.D.I. Summary	
29.D.I.1. Individual:	*Djabarona 96-4*
29.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
29.D.I.3. Data:	*Dental measurements*
29.D.I.4. Classification:	*Haya*

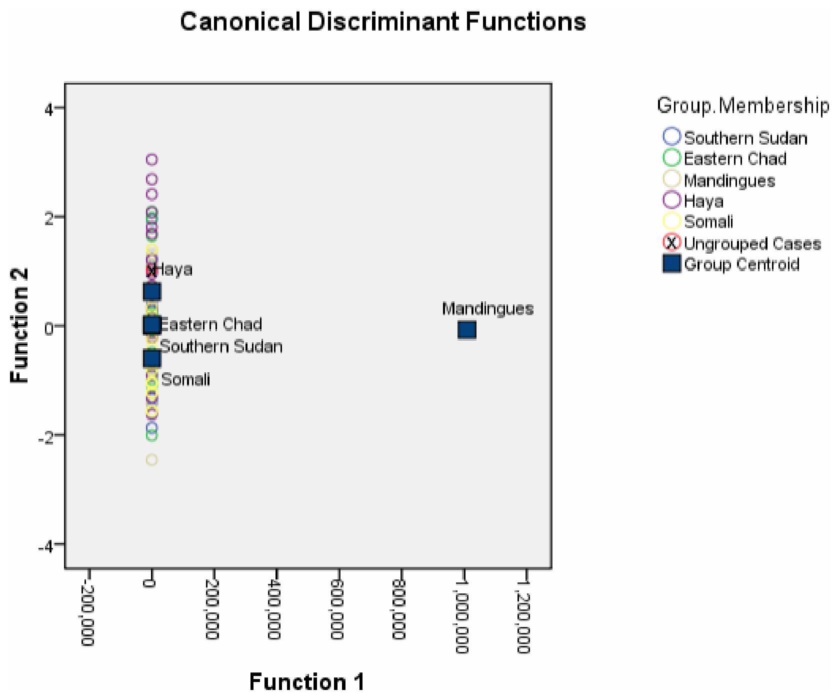
29.D.II. Analysis overview	
29.D.II.1. Method:	*Simultaneous entry*
29.D.II.2.a. Variables in matrix:	*3*
29.D.II.2.b. Variables entered:	*3*
29.D.II.3. Best predictors:	*81. Crown length LM1 (.764), 81(1). Crown width LM1 (.125), 81(1). Crown width LM2 (-.102), 81(1). Crown width LM1 (.935 - Function 2), 81(1). Crown width LM2 (.441 - Function 3)*
29.D.II.4.a. Wilks' Lambda:	*1 through 3: .516 (Sig. .000), 2 through 3: .793 (Sig. .001), 3: .915 (Sig. .012)*
29.D.II.4.b. Eigenvalues:	*1: .537 (r: .591), 2: .153 (r: .364), 3: .093 (r: .292)*
29.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.2%)*
29.D.II.6. Remarks:	*Box's M (Sig. .103; Log determinants: Southern Sudan - -7.034, Chad - -6.556, Mandinka - -5.896, Somalis - -6.740, Haya - -6.435), removed outliers: Chad 17.590 (D^2: 11.231; critical value: 7.815 - p 0.95, df 3), Mandinka 0.141-5 (D^2: 9.226; critical value: 7.815 - p 0.95, df 3), Mandinka 0.141-9 (D^2: 12.737; critical value: 7.815 - p 0.95, df 3), Mandinka 0.141-18 (D^2: 16.387; critical value: 7.815 - p 0.95, df 3), no variables failed tolerance test*

29.D.III. Results	
29.D.III.1.a. Within-groups covariance matrix:	*Haya, 52.9%, Haya (D^2: 1.200), Chad (D^2: 1.335)*
29.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*52.9%*
29.D.III.1.c. Separate-groups covariance matrix:	*Chad, 56.7%, Chad (D^2: 1.206), Haya (D^2: 1.649)*

29.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Mandinka, 2 Somalis, 2 Haya), Chad (3 Southern Sudan, 1 Mandinka, 4 Somalis), Mandinka (3 Southern Sudan, 2 Chad, 3 Somalis, 3 Haya), Somalis (4 Southern Sudan, 6 Chad, 2 Mandinka, 1 Haya), Haya (3 Southern Sudan, 2 Chad, 1 Mandinka, 5 Somalis)*

29.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Somalis, 2 Haya), Chad (3 Southern Sudan, 2 Haya), Mandinka (5 Southern Sudan, 8 Chad, 2 Somalis, 4 Haya), Somalis (3 Southern Sudan, 2 Chad, 1 Haya), Haya (3 Southern Sudan, 3 Chad, 5 Somalis)*

29.D.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



29.D.IV. Additional results

29.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 50.9%, 51.9%), separate-groups covariance matrix (Haya, 54.6%)*

29.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 50.9%, 51.9%), separate-groups covariance matrix (Haya, 54.6%), variables entered (3)*

29.D.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 60.2%, 53.7%; separate-groups covariance matrix - Chad, 66.7%), variables entered (5)*

29.E.I. Summary

29.E.I.1. Individual: *Djabarona 96-4*

29.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

29.E.I.3. Data: *Scaled dental measurements*

29.E.I.4. Classification: *Chad*

29.E.II. Analysis overview

29.E.II.1. Method: *Simultaneous entry*

29.E.II.2.a. Variables in matrix: *1*

29.E.II.2.b. Variables entered: *1*

29.E.II.3. Best predictors: *81. Crown length LM1 (1.000)*

29.E.II.4.a. Wilks' Lambda: *1: .781 (Sig. .000)*

29.E.II.4.b. Eigenvalues: *1: .281 (r: .468)*

29.E.II.5. Prior classification probability: *20.0% (prior prob. + 25%: 25.0%)*

29.E.II.6. Remarks: *Box's M (Sig. .067; Log determinants: Southern Sudan - -7.045, Chad - -7.116, Mandinka - -6.648, Somalis - -6.063, Haya - -6.181), removed outliers: Southern Sudan E.1026-11 (D^2: 4.492; critical value: 3.841 - p 0.95, df 1), Southern Sudan E.1028-10 (D^2: 4.119; critical value: 3.841 - p 0.95, df 1), Chad 17.589 (D^2: 4.483; critical value: 3.841 - p 0.95, df 1), Chad 17.592 (D^2: 4.196; critical value: 3.841 - p 0.95, df 1), Mandinka 0.141-18 (D^2: 5.491; critical value: 3.841 - p 0.95, df 1), Mandinka 9.539 (D^2: 4.378; critical value: 3.841 - p 0.95, df 1), no variables failed tolerance test*

29.E.III. Results

29.E.III.1.a. Within-groups covariance matrix:	*Chad, 40.2%, Chad (D^2: 1.124), Haya (D^2: 1.161)*
29.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*37.3%*
29.E.III.1.c. Separate-groups covariance matrix:	*Haya, 37.3%, Haya (D^2: .821), Chad (D^2: 2.025)*
29.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 2 Somalis), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali, 3 Haya), Mandinka (5 Southern Sudan, 2 Chad), Somalis (8 Southern Sudan, 5 Chad, 2 Mandinka, 1 Haya), Haya (5 Southern Sudan, 8 Chad, 3 Mandinka)*
29.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (4 Chad), Chad (4 Southern Sudan, 2 Haya), Mandinka (5 Southern Sudan, 1 Haya), Somalis (9 Southern Sudan, 7 Chad, 3 Haya), Haya (5 Southern Sudan, 10 Chad)*
29.E.III.3. All groups scatter plot:	*No histogram available*

29.E.IV. Additional results

29.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 44.4%, 44.4%), separate-groups covariance matrix (Chad, 35.2%)*
29.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 44.4%, 44.4%), separate-groups covariance matrix (Chad, 35.2%), variables entered (1)*
29.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 51.9%, 49.1%; separate-groups covariance matrix - Somalis, 50.9%), variables entered (3)*

29.F.I. Summary

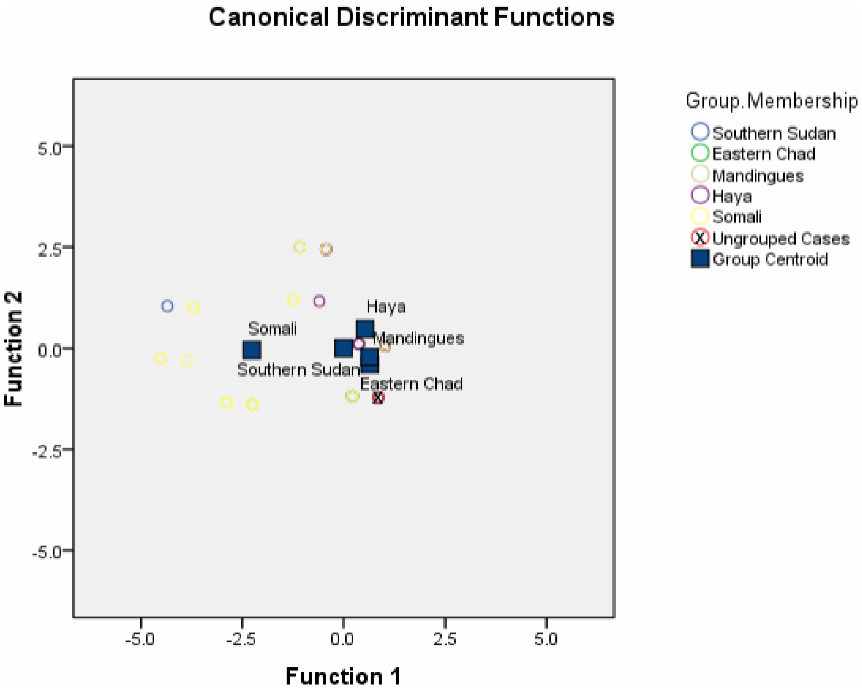
29.F.I.1. Individual:	*Djabarona 96-4*
29.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
29.F.I.3. Data:	*Non-metric dental traits*
29.F.I.4. Classification:	*Chad*

29.F.II. Analysis overview

29.F.II.1. Method:	*Simultaneous entry*
29.F.II.2.a. Variables in matrix:	*4*
29.F.II.2.b. Variables entered:	*4*
29.F.II.3. Best predictors:	*Deflecting wrinkle LM1 (.811), Cusp number LM1 (-.430), Groove pattern LM2 (.233), Cusp number LM1 (.786 - Function 2), Groove pattern LM2 (.886 - Function 3), Hypocone UM2 (.896 - Function 4)*
29.F.II.4.a. Wilks' Lambda:	*1 through 4: .378 (Sig. .000), 2 through 4: .850 (Sig. .054), 3 through 4: .934 (Sig. .134), 4: .993 (Sig. .406)*
29.F.II.4.b. Eigenvalues:	*1: 1.246 (r: .745), 2: .099 (r: .300), 3: .064 (r: .245), 4: .007 (r: .082)*
29.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
29.F.II.6. Remarks:	*Box's M (Sig. .003; Log determinants: Southern Sudan - -8.785, Chad - 'singular', Mandinka - 'singular', Somalis - -6.126, Haya - -'singular'), no outliers detected, no variables failed tolerance test*

29.F.III. Results

29.F.III.1.a. Within-groups covariance matrix:	*Chad, 42.6%, Chad (D^2: 3.694), Mandinka (D^2: 5.273)*
29.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*42.6%*
29.F.III.1.c. Separate-groups covariance matrix:	*Chad, 42.6%, Chad (D^2: 2.993), Haya (D^2: 5.982)*
29.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Chad, 9 Mandinka, 1 Somali, 2 Haya), Chad (3 Southern Sudan, 11 Mandinka, 1 Somali), Mandinka (4 Southern Sudan, 4 Chad, 1 Somali), Somalis (4 Southern Sudan, 1 Chad, 1 Mandinka, 1 Haya), Haya (3 Southern Sudan, 2 Chad, 10 Mandinka)*
29.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (4 Chad, 16 Mandinka, 2 Somalis, 2 Haya), Chad (14 Mandinka, 1 Somali), Mandinka (4 Chad, 1 Somali), Somalis (1 Chad, 1 Mandinka, 1 Haya), Haya (2 Chad, 13 Mandinka)*
29.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



29.F.IV. Additional results

29.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 42.6%, 42.6%), separate-groups covariance matrix (Chad, 42.6%)*
29.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 40.7%, 40.7%), separate-groups covariance matrix (Chad, 40.7%), variables entered (3)*
29.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 43.5%, 36.1%; separate-groups covariance matrix - Madingues, 38.9%), variables entered (4)*

29.G.I. Summary

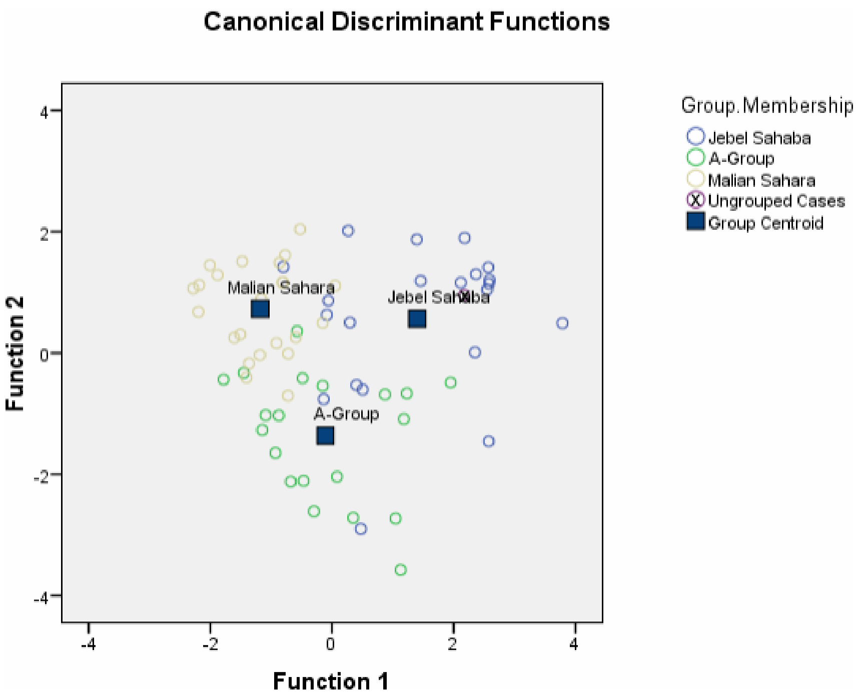
29.G.I.1. Individual:	*Djabarona 96-4*
29.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
29.G.I.3. Data:	*Dental measurements and non-metric traits*
29.G.I.4. Classification:	*Jebel Sahaba/Tushka*

29.G.II. Analysis overview

29.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
29.G.II.2.a. Variables in matrix:	*8*
29.G.II.2.b. Variables entered:	*6*
29.G.II.3. Best predictors:	*Cusp 7 LM1 (.478), 81(1). Crown width UM2 (.307), Cusp number LM1 (.224), Groove pattern LM2 (.615 - Function 2)*
29.G.II.4.a. Wilks' Lambda:	*1 through 2: .237 (Sig. .000), 2: .518 (Sig. .000)*
29.G.II.4.b. Eigenvalues:	*1: 1.181 (r: .736), 2: .931 (r: .694)*
29.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
29.G.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - -11.971, Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

29.G.III. Results

29.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 80.0%, Jebel Sahaba/Tushka (D^2: .748), A-Group (D^2: 10.549)*
29.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*70.8%*
29.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 80.0%, Jebel Sahaba/Tushka (D^2: .416), A-Group (D^2: 13.654)*
29.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 4 Malian Sahara), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
29.G.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 3 Malian Sahara), Malian Sahara (1 A-Group)*
29.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



29.G.IV. Additional results

29.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%, 66.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 78.5%)*
29.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%, 70.8%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%), variables entered (6)*
29.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 72.3%, 68.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 74.7%), variables entered (6)*
29.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 68.7%, 60.2%; separate-groups covariance matrix - "Sudanese Hotchpotch", 67.5%), variables entered (5)*

29.H.I. Summary

29.H.I.1. Individual:	*Djabarona 96-4*
29.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
29.H.I.3. Data:	*Dental measurements and non-metric traits*
29.H.I.4. Classification:	*Chad*

29.H.II. Analysis overview

29.H.II.1. Method:	*Simultaneous entry*
29.H.II.2.a. Variables in matrix:	*7*
29.H.II.2.b. Variables entered:	*7*
29.H.II.3. Best predictors:	*Deflecting wrinkle LM1 (.717), Cusp number LM1 (-.377), 81(1). Crown width LM2 (.280), 81. Crown length LM1 (.748 - Function 2), 81(1). Crown width LM1 (.701 - Function 3), Hypocone UM2 (.576 - Function 4)*
29.H.II.4.a. Wilks' Lambda:	*1 through 4: .211 (Sig. .000), 2 through 4: .548 (Sig. .000), 3 through 4: .833 (Sig. .048), 4: .980 (Sig. .738)*
29.H.II.4.b. Eigenvalues:	*1: 1.594 (r: .784), 2: .519 (r: .584), 3: .177 (r: .388), 4: .020 (r: .140)*
29.H.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
29.H.II.6. Remarks:	*Box's M (Sig. .004; Log determinants: Southern Sudan - -16.885, Chad - 'singular', Mandinka - 'singular', Somalis - -13.687, Haya - 'singular'), no outliers detected, no variables failed tolerance test*

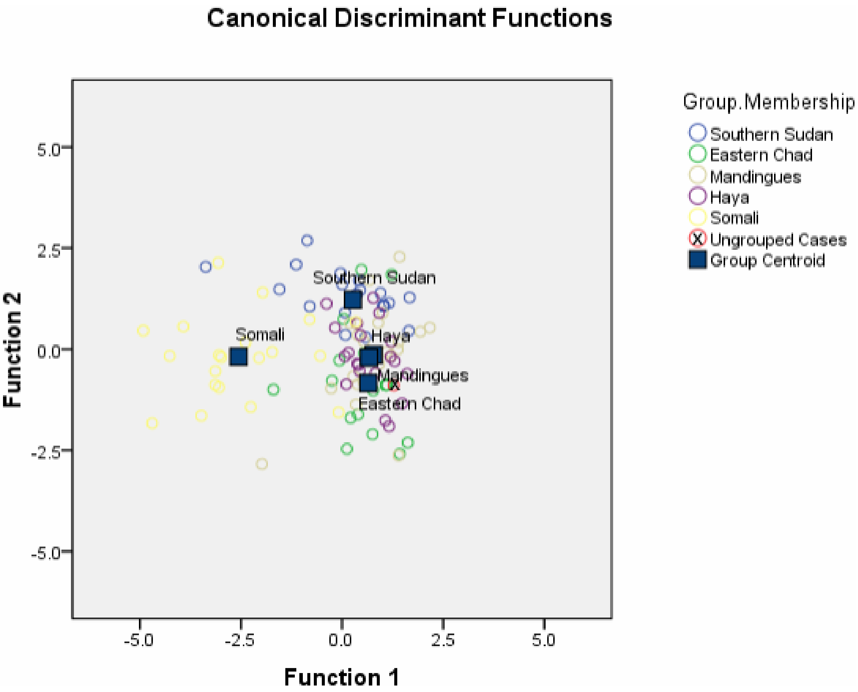
29.H.III. Results

29.H.III.1.a. Within-groups covariance matrix:	*Chad, 66.7%, Chad (D^2: .739), Mandinka (D^2: 1.823)*
29.H.III.1.b. Within-groups covariance matrix (Leave-one-out):	*60.2%*
29.H.III.1.c. Separate-groups covariance matrix:	*Chad, 63.9%, Chad (D^2: 1.115), Haya (D^2: 2.603)*
29.H.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Mandinka, 2 Somalis, 1 Haya), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali), Mandinka (4 Southern Sudan, 6 Chad, 1 Somali, 3 Haya), Somalis (2*

Southern Sudan, 1 Chad, 2 Haya), Haya (4 Southern Sudan, 5 Chad, 2 Mandinka)

29.H.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Mandinka, 1 Somali, 2 Haya), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali, 1 Haya), Mandinka (4 Southern Sudan, 2 Chad, 1 Somali, 7 Haya), Somalis (2 Southern Sudan, 1 Chad), Haya (3 Southern Sudan, 4 Chad, 3 Mandinka)*

29.H.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



29.H.IV. Additional results

29.H.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 66.7%, 60.2%), separate-groups covariance matrix (Chad, 63.9%)*

29.H.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Haya, 65.7%, 58.3%), separate-groups covariance matrix (Haya, 66.7%), variables entered (6)*

29.H.IV.2. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 72.2%, 60.2%; separate-groups covariance matrix - Somalis, 75.9%), variables entered (9)*

30. Djabarona 96/120-3

no data

31. Djabarona 96/120-4

31.A.I. Summary

31.A.I.1. Individual: *Djabarona 96/120-4*

31.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

31.A.I.3. Data: *Cranial and dental measurements*

31.A.I.4. Classification: *Jebel Sahaba/Tushka*

31.A.II. Analysis overview

31.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

31.A.II.2.a. Variables in matrix: *2*

31.A.II.2.b. Variables entered: *1*

31.A.II.3. Best predictors: *81(1). Crown width LM3 (1.000)*

31.A.II.4.a. Wilks' Lambda: *1: .806 (Sig. .002)*

31.A.II.4.b. Eigenvalues: *1: .241 (r: .441)*

31.A.II.5. Prior classification probability: *33.3% (prior prob. + 25%: 41.6%)*

31.A.II.6. Remarks: *Box's M (Sig. .380; Log determinants: A-Group - -.788, Jebel Sahaba/Tushka - -.934, Malian Sahara - -1.401), removed outliers: A-Group 308/17 (D^2: 5.422; critical value: .3841 - p 0.95, df 1), Malian Sahara KBD89/H37 (D^2: 4.278; critical value: .3841 - p 0.95, df 1), no variables failed tolerance test*

31.A.III. Results

31.A.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 68.3%, Jebel Sahaba/Tushka (D^2: .001), Malian Sahara (D^2: .399)*
31.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*66.7%*
31.A.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 58.7%, Jebel Sahaba/Tushka (D^2: .001), Malian Sahara (D^2: .585)*
31.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 2 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 2 Malian Sahara), Malian Sahara (4 A-Group, 6 Jebel Sahaba/Tushka)*
31.A.III.2.b. Misclassifications (separate-groups):	*A-Group (4 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 5 Malian Sahara), Malian Sahara (3 A-Group, 6 Jebel Sahaba/Tushka)*
31.A.III.3. All groups scatter plot:	*No histogram available*

31.A.IV. Additional results

31.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 61.5%, 61.5%), separate-groups covariance matrix (A-Group, 61.5%)*
31.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 61.5%, 61.5%), separate-groups covariance matrix (A-Group, 61.5%), variables entered (2)*
31.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 55.4%, 51.8%; separate-groups covariance matrix - "Sudanese Hotchpotch", 57.8%), variables entered (2)*
31.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 56.6%, 53.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 50.6%), variables entered (2)*

31.B.I. Summary

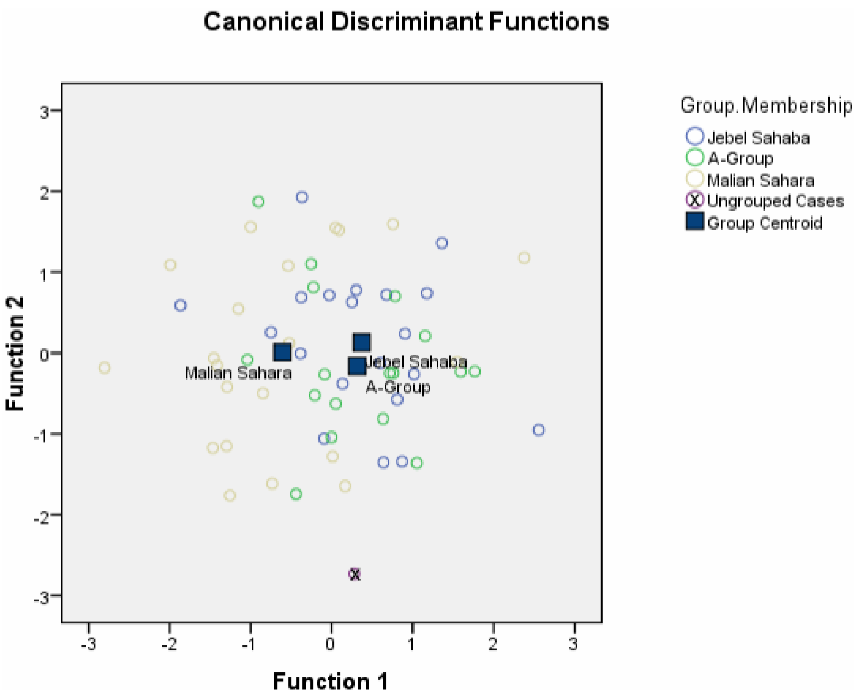
31.B.I.1. Individual:	*Djabarona 96/120-4*
31.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
31.B.I.3. Data:	*Scaled cranial and dental measurements*
31.B.I.4. Classification:	*A-Group*

31.B.II. Analysis overview

31.B.II.1. Method:	*Simultaneous entry*
31.B.II.2.a. Variables in matrix:	*2*
31.B.II.2.b. Variables entered:	*2*
31.B.II.3. Best predictors:	*81(1). Crown width LM3 (.907), 50(1). Interorbital breadth (-.021), 50(1). Interorbital breadth (1.000 - Function 2)*
31.B.II.4.a. Wilks' Lambda:	*1 through 2: .807 (Sig. .020), 2: .986 (Sig. .383)*
31.B.II.4.b. Eigenvalues:	*1: .222 (r: .426), 2: .014 (r: .118)*
31.B.II.5. Prior classification probability:	*33.6% (prior prob. + 25%: 42.0%)*
31.B.II.6. Remarks:	*Box's M (Sig. .238; Log determinants: A-Group - -10.516, Jebel Sahaba/Tushka - -10.365, Malian Sahara - -9.304), removed outliers: A-Group 25/22a (D^2: 6.697; critical value: 5.991 - p 0.95, df 2), A-Group 25/106F (D^2: 8.006; critical value: 5.991 - p 0.95, df 2), A-Group 277/47 (D^2: 6.331; critical value: 5.991 - p 0.95, df 2), A-Group 401/43 (D^2: 7.099; critical value: 5.991 - p 0.95, df 2), Jebel Sahaba/Tushka 117-17 (D^2: 6.292; critical value: 5.991 - p 0.95, df 2), Malian Sahara AZ56/H9 (D^2: 6.216; critical value: 5.991 - p 0.95, df 2), Malian Sahara MN27/H10 (D^2: 6.056; critical value: 5.991 - p 0.95, df 2), outliers - not removed: ungrouped case (D^2: 6.606; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test*

31.B.III. Results

31.B.III.1.a. Within-groups covariance matrix:	*A-Group, 51.7%, A-Group (D^2: 6.606), Jebel Sahaba/Tushka (D^2: 8.185)*
31.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*44.8%*
31.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 55.2%, Malian Sahara (D^2: 7.585), A-Group (D^2: 8.555)*
31.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (8 Jebel Sahaba/Tushka, 8 Malian Sahara), Jebel Sahaba/Tushka (3 A-Group, 6 Malian Sahara), Malian Sahara (2 A-Group, 5 Jebel Sahaba/Tushka)*
31.B.III.2.b. Misclassifications (separate-groups):	*A-Group (8 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 4 Malian Sahara), Malian Sahara (2 A-Group, 4 Jebel Sahaba/Tushka)*
31.B.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



31.B.IV. Additional results

31.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 52.3%, 52.3%), separate-groups covariance matrix (A-Group, 53.8%)*

31.B.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 49.2%, 49.2%), separate-groups covariance matrix (Malian Sahara, 52.3%), variables entered (1)*

31.B.IV.2. Alternative comparative prehistoric samples: *No data*

31.B.IV.3. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 43.4%, 48.2%; separate-groups covariance matrix - "Sudanese Hotchpotch", 41.0%), variables entered (2)*

31.C.I. Summary

31.C.I.1. Individual: *Djabarona 96/120-4*

31.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

31.C.I.3. Data: *Non-metric cranial traits*

31.C.I.4. Classification: *Jebel Sahaba/Tushka*

31.C.II. Analysis overview

31.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

31.C.II.2.a. Variables in matrix: *4*

31.C.II.2.b. Variables entered: *3*

31.C.II.3. Best predictors: *Sella nasi (main) (.961), Sella nasi (additional tendency/superstructure) (-.268), Interorbital breadth (.022), Sella nasi (additional tendency/superstructure) (.836 - Function 2)*

31.C.II.4.a. Wilks' Lambda: *1 through 2: .595 (Sig. .000), 2: .978 (Sig. .511)*

31.C.II.4.b. Eigenvalues: *1: .645 (r: .626), 2: .022 (r: .148)*

31.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

31.C.II.6. Remarks: *Box's M (test result not accepted; Sig. .369; Log determinants: A-Group - -4.782, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -5.299), no outliers detected, no variables failed tolerance test*

31.C.III. Results

31.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 56.9%, Jebel Sahaba/Tushka (D^2: 1.504), Malian Sahara (D^2: 2.751)*

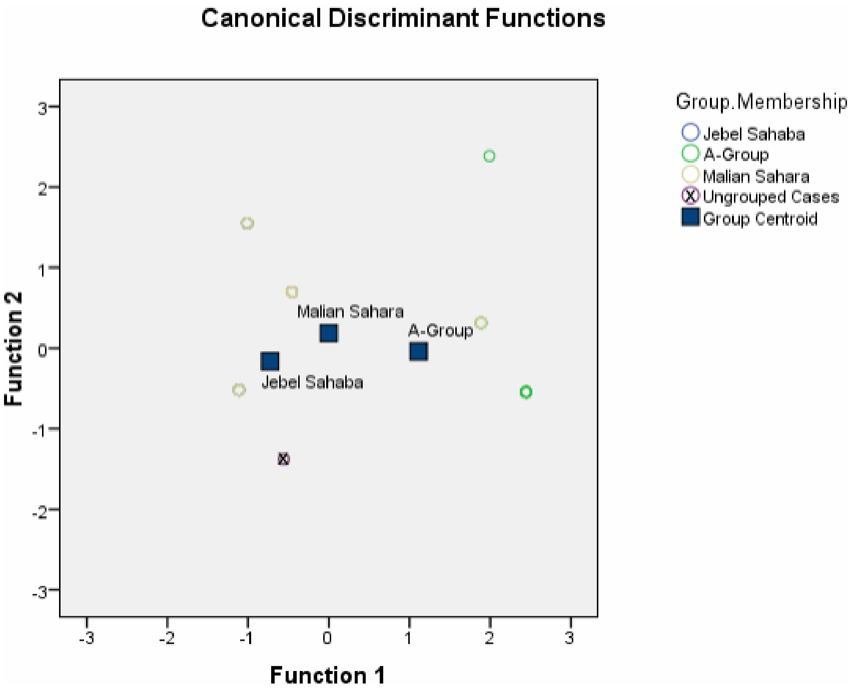
31.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *56.9%*

31.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 52.3%, Jebel Sahaba/Tushka (D^2: 1.421), Malian Sahara (D^2: 2.975)*

31.C.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (9 Malian Sahara), Malian Sahara (3 A-Group, 8 Jebel Sahaba/Tushka)*

31.C.III.2.b. Misclassifications (separate-groups): *A-Group (8 Jebel Sahaba/Tushka), Malian Sahara (3 A-Group, 20 Jebel Sahaba/Tushka)*

31.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



31.C.IV. Additional results

31.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 55.4%, 55.4%), separate-groups covariance matrix (Malian Sahara, 50.8%)*
31.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 50.8%, 50.8%), separate-groups covariance matrix (Malian Sahara, 50.8%), variables entered (1)*
31.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 39.8%, 39.8%; separate-groups covariance matrix - "Sudanese Hotchpotch", 36.1%), variables entered (1)*
31.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 32.5%, 26.5%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 41.0%), variables entered (1)*

31.F.I. Summary

31.F.I.1. Individual:	*Djabarona 96/120-4*
31.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
31.F.I.3. Data:	*Non-metric cranial traits*
31.F.I.4. Classification:	*Haya*

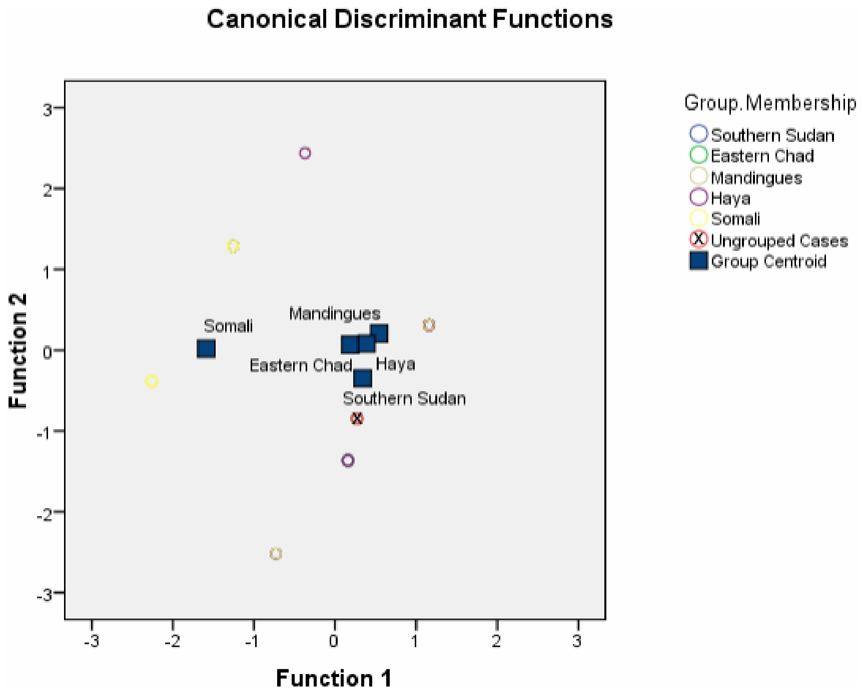
31.F.II. Analysis overview

31.F.II.1. Method:	*Simultaneous entry*
31.F.II.2.a. Variables in matrix:	*4*
31.F.II.2.b. Variables entered:	*3*
31.F.II.3. Best predictors:	*Sella nasi (main) (-.841), Sella nasi (additional tendency/superstructure) (.768), Interorbital breadth (.447), Interorbital breadth (.746 - Function 2), Sella nasi (additional tendency/superstructure) (.640 - Function 3)*
31.F.II.4.a. Wilks' Lambda:	*1 through 3: .586 (Sig. .000), 2 through 3: .949 (Sig. .506), 3: .986 (Sig. .485)*
31.F.II.4.b. Eigenvalues:	*1: .621 (r: .619), 2: .038 (r: .192), 3: .014 (r: .119)*
31.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
31.F.II.6. Remarks:	*Box's M (Sig. .012; Log determinants: Southern Sudan - -5.593, Chad - -6.298, Mandinka - -6.387, Somalis - -6.825, Haya - -5.464), removed outliers: Southern Sudan 9.956 (D^2: 23.856; critical value: 9.488 - p 0.95, df 4), variables failing tolerance test - removed: Sutura metopica*

31.F.III. Results

31.F.III.1.a. Within-groups covariance matrix:	*Haya, 41.1%, Haya (D^2: 5.740), Southern Sudan (D^2: 6.170)*
31.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*37.4%*
31.F.III.1.c. Separate-groups covariance matrix:	*Haya, 41.1%, Haya (D^2: 3.530), Southern Sudan (D^2: 5.701)*

31.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (10 Mandinka, 3 Somalis, 2 Haya), Chad (5 Southern Sudan, 10 Mandinka, 6 Somalis, 1 Haya), Mandinka (1 Southern Sudan, 1 Chad, 3 Somalis, 2 Haya), Somalis (1 Southern Sudan, 1 Mandinka, 1 Haya), Haya (6 Southern Sudan, 1 Chad, 10 Mandinka, 3 Somalis)*
31.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (10 Mandinka, 3 Somalis, 2 Haya), Chad (5 Southern Sudan, 10 Mandinka, 6 Somalis, 1 Haya), Mandinka (1 Southern Sudan, 3 Somalis, 3 Haya), Somalis (1 Southern Sudan, 1 Mandinka, 1 Haya), Haya (3 Southern Sudan, 10 Mandinka, 3 Somalis)*
31.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



31.F.IV. Additional results	
31.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 39.8%, 38.0%), separate-groups covariance matrix (Haya, 39.8%)*
31.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Mandinka, 38.9%, 38.9%), separate-groups covariance matrix (Mandinka, 38.9%), variables entered (2)*
31.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 42.6%, 35.2%; separate-groups covariance matrix - Haya, 42.6%), variables entered (3)*

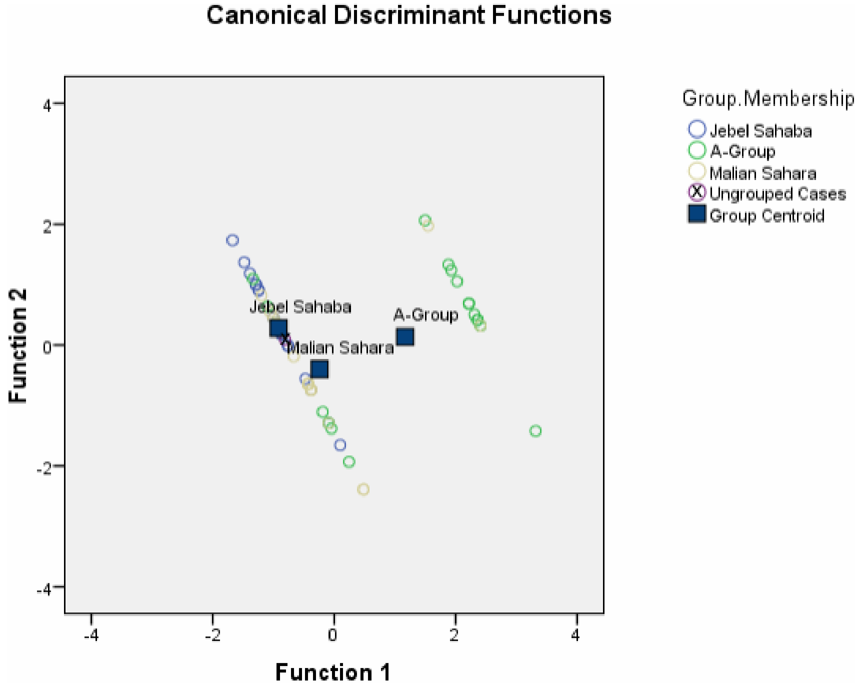
31.G.I. Summary	
31.G.I.1. Individual:	*Djabarona 96/120-4*
31.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
31.G.I.3. Data:	*Cranial and dental measurements and cranial non-metric traits*
31.G.I.4. Classification:	*Jebel Sahaba/Tushka*

31.G.II. Analysis overview	
31.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
31.G.II.2.a. Variables in matrix:	*6*
31.G.II.2.b. Variables entered:	*2*
31.G.II.3. Best predictors:	*Sella nasi (main) (.886), 81(1). Crown width LM3 (-.815), 81(1). Crown width LM3 (.579 - Function 2)*
31.G.II.4.a. Wilks' Lambda:	*1 through 2: .515 (Sig. .000), 2: .916 (Sig. .025)*
31.G.II.4.b. Eigenvalues:	*1: .780 (r: .662), 2: .091 (r: .289)*
31.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.7%)*
31.G.II.6. Remarks:	*Box's M (test result not accepted; Sig. .160; Log determinants: A-Group - -2.729, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -3.931), removed outliers: A-Group 95/34 (D^2: 9.079; critical value: 5.991 - p 0.95, df 2), Jebel Sahaba/Tushka 117-28 (D^2: 8.843; critical value: 5.991 - p 0.95, df 2), Malian Sahara MT32/H2 (D^2: 8.074; critical value: 5.991 - p 0.95, df 2), Malian Sahara*

KBD89/37 (D^2: 7.187; critical value: 5.991 - p 0.95, df 2), no variables failed tolerance test

31.G.III. Results

31.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 68.9%, Jebel Sahaba/Tushka (D^2: .049), Malian Sahara (D^2: .561)*
31.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*68.9%*
31.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 59.0%, Jebel Sahaba/Tushka (D^2: .052), Malian Sahara (D^2: .674)*
31.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (4 Malian Sahara), Malian Sahara (2 A-Group, 5 Jebel Sahaba/Tushka)*
31.G.III.2.b. Misclassifications (separate-groups):	*A-Group (3 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (3 Malian Sahara), Malian Sahara (2 A-Group, 12 Jebel Sahaba/Tushka)*
31.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



31.G.IV. Additional results

31.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 61.5%, 53.8%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 55.4%)*
31.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 52.3%, 52.3%), separate-groups covariance matrix (Malian Sahara, 50.8%), variables entered (1)*
31.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 55.4%, 55.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 45.8%), variables entered (2)*
31.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 55.4%, 54.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 48.2%), variables entered (2)*

32. Djabarona 96/120-5

32.A.I. Summary

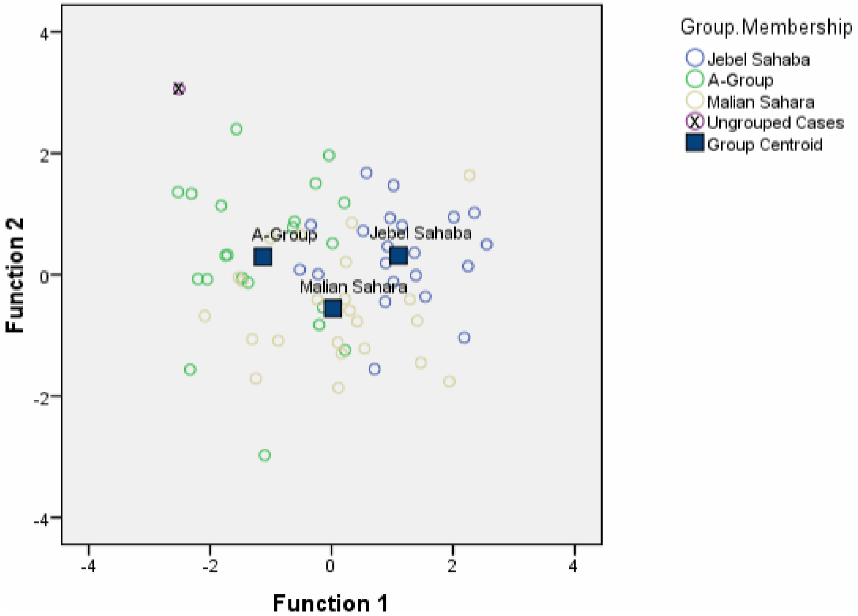
32.A.I.1. Individual:	*Djabarona 96/120-5*
32.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
32.A.I.3. Data:	*Cranial measurements*
32.A.I.4. Classification:	*A-Group*

32.A.II. Analysis overview

32.A.II.1. Method:	*Simultaneous entry*
32.A.II.2.a. Variables in matrix:	*6*
32.A.II.2.b. Variables entered:	*6*
32.A.II.3. Best predictors:	*69. Height of the mandibular symphysis (.802), 69(2). 2nd molar mandibular body height (.638), 54. Nasal breadth (.571), 54. Nasal breadth (-.643 - Function 2)*

32.A.II.4.a. Wilks' Lambda:	*1 through 2: .461 (Sig. .000), 2: .849 (Sig. .084)*
32.A.II.4.b. Eigenvalues:	*1: .844 (r: .676), 2: .177 (r: .388)*
32.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
32.A.II.6. Remarks:	*Box's M (Sig. .621; Log determinants: A-Group - 1.180, Jebel Sahaba/Tushka - 1.381, Malian Sahara - 1.486), no outliers detected, no variables failed tolerance test*

32.A.III. Results	
32.A.III.1.a. Within-groups covariance matrix:	*A-Group, 69.2%, A-Group (D^2: 9.554), Malian Sahara (D^2: 19.482)*
32.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*58.5%*
32.A.III.1.c. Separate-groups covariance matrix:	*A-Group, 70.8%, A-Group (D^2: 6.889), Malian Sahara (D^2: 21.291)*
32.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 4 Malian Sahara), Malian Sahara (7 A-Group, 7 Jebel Sahaba/Tushka)*
32.A.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 3 Malian Sahara), Malian Sahara (5 A-Group, 5 Jebel Sahaba/Tushka)*
32.A.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



32.A.IV. Additional results	
32.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 69.2%, 58.5%), separate-groups covariance matrix (A-Group, 70.8%)*
32.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 58.5%, 56.9%), separate-groups covariance matrix (A-Group, 63.1%), variables entered (2)*
32.A.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 36.1%, 43.4%; separate-groups covariance matrix - A-Group, 50.6%), variables entered (2)*
32.A.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 63.9%, 53.0%; separate-groups covariance matrix - A-Group, 68.7%), variables entered (5)*

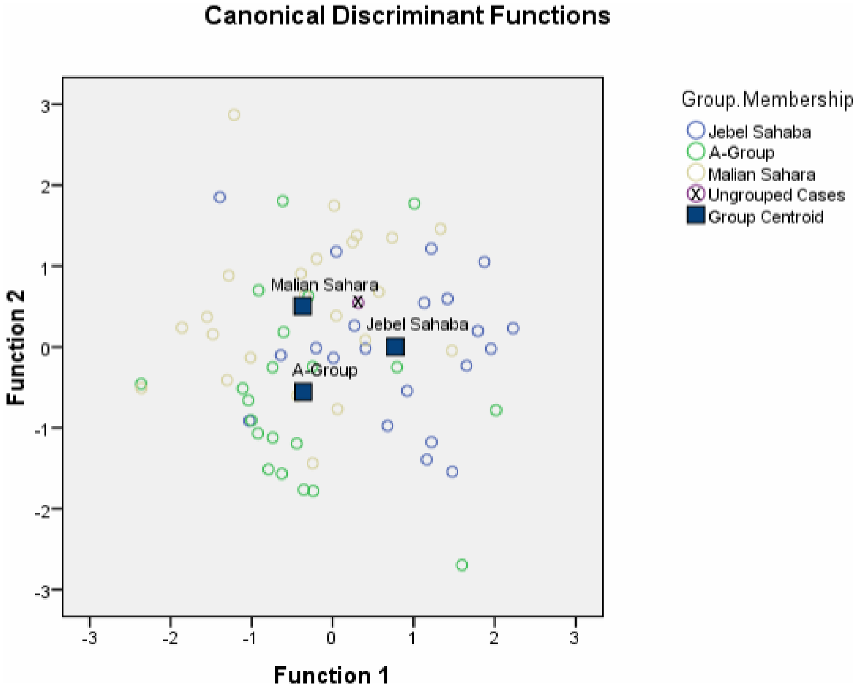
32.B.I. Summary	
32.B.I.1. Individual:	*Djabarona 96/120-5*
32.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
32.B.I.3. Data:	*Scaled cranial measurements*
32.B.I.4. Classification:	*Malian Sahara*

32.B.II. Analysis overview	
32.B.II.1. Method:	*Simultaneous entry*
32.B.II.2.a. Variables in matrix:	*5*
32.B.II.2.b. Variables entered:	*5*
32.B.II.3. Best predictors:	*69. Height of the mandibular symphysis (.927), 69(2). 2nd molar mandibular body height (.680), 69c. Thickness of*

	the mandibular symphysis (-.208), 19a. Mastoid height (.777 - Function 2)
32.B.II.4.a. Wilks' Lambda:	*1 through 2: .643 (Sig. .003), 2: .834 (Sig. .028)*
32.B.II.4.b. Eigenvalues:	*1: .297 (r: .478), 2: .200 (r: .408)*
32.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
32.B.II.6. Remarks:	*Box's M (Sig. .209; Log determinants: A-Group - -18.280, Jebel Sahaba/Tushka - -19.640, Malian Sahara - -19.747), no outliers detected, no variables failed tolerance test*

32.B.III. Results

32.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 61.5%, Malian Sahara (D^2: .476), Jebel Sahaba/Tushka (D^2: .499)*
32.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*52.3%*
32.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 66.2%, Malian Sahara (D^2: .483), Jebel Sahaba/Tushka (D^2: .498)*
32.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 7 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 5 Malian Sahara), Malian Sahara (6 A-Group, 5 Jebel Sahaba/Tushka)*
32.B.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 7 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 5 Malian Sahara), Malian Sahara (4 A-Group, 3 Jebel Sahaba/Tushka)*
32.B.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



32.B.IV. Additional results

32.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 61.5%, 52.3%), separate-groups covariance matrix (Malian Sahara, 66.2%)*
32.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 58.5%, 55.4%), separate-groups covariance matrix (Malian Sahara, 60.0%), variables entered (2)*
32.B.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 31.3%, 30.1%; separate-groups covariance matrix - "Sudanese Hotchpotch", 41.0%), variables entered (1)*
32.B.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 71.1%, 65.1%; separate-groups covariance matrix - Malian Sahara, 67.5%), variables entered (4)*

32.C.I. Summary

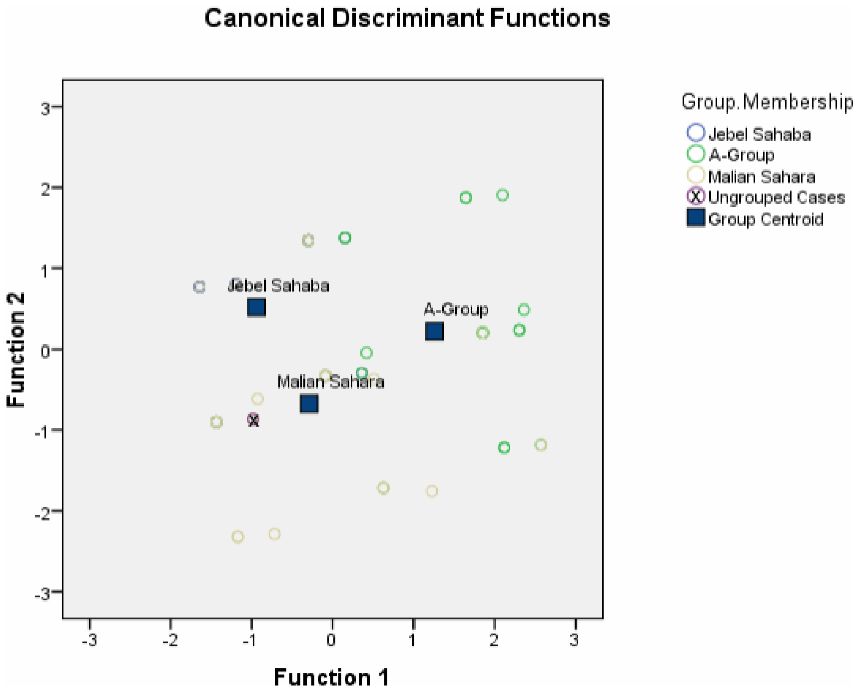
32.C.I.1. Individual:	*Djabarona 96/120-5*
32.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
32.C.I.3. Data:	*Non-metric cranial and dental traits*
32.C.I.4. Classification:	*Malian Sahara*

32.C.II. Analysis overview

32.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*

32.C.II.2.a. Variables in matrix:	*7*
32.C.II.2.b. Variables entered:	*5*
32.C.II.3. Best predictors:	*Margo infranasalis (.774), Alveolar prognathism (-.634), Rocker jaw (.248), Symphyseal height (.779 - Function 2)*
32.C.II.4.a. Wilks' Lambda:	*1 through 2: .418 (Sig. .000), 2: .782 (Sig. .005)*
32.C.II.4.b. Eigenvalues:	*1: .869 (r: .682), 2: .278 (r: .467)*
32.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
32.C.II.6. Remarks:	*Box's M (test result not accepted; Sig. .205; Log determinants: A-Group - -9.164, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -8.301), no outliers detected, no variables failed tolerance test*

32.C.III. Results	
32.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 69.2%, Malian Sahara (D^2: .520), Jebel Sahaba/Tushka (D^2: 1.927)*
32.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*64.6%*
32.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 69.2%, Malian Sahara (D^2: .435), Jebel Sahaba/Tushka (D^2: 3.151)*
32.C.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 6 Malian Sahara), Malian Sahara (4 A-Group, 4 Jebel Sahaba/Tushka)*
32.C.III.2.b. Misclassifications (separate-groups):	*A-Group (3 Jebel Sahaba/Tushka, 5 Malian Sahara), Jebel Sahaba/Tushka (6 Malian Sahara), Malian Sahara (2 A-Group, 4 Jebel Sahaba/Tushka)*
32.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



32.C.IV. Additional results	
32.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 69.2%, 58.5%), separate-groups covariance matrix (Malian Sahara, 67.7%)*
32.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 67.7%, 64.6%), separate-groups covariance matrix (Malian Sahara, 67.7%), variables entered (3)*
32.C.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 62.7%, 61.4%; separate-groups covariance matrix - Malian Sahara, 62.7%), variables entered (4)*
32.C.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 65.1%, 62.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 73.5%), variables entered (4)*

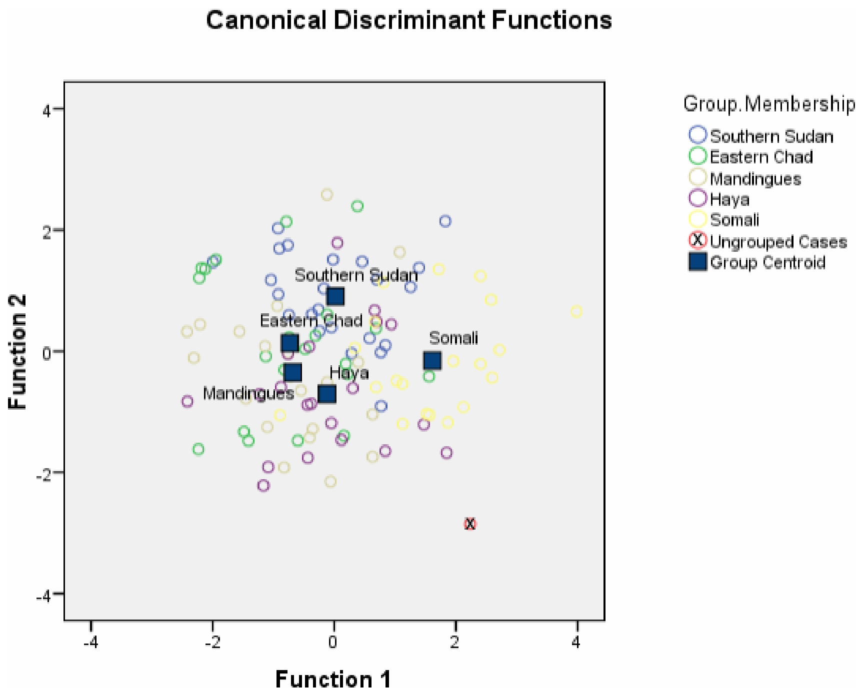
32.D.I. Summary	
32.D.I.1. Individual:	*Djabarona 96/120-5*
32.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
32.D.I.3. Data:	*Cranial measurements*
32.D.I.4. Classification:	*Somalis*

32.D.II. Analysis overview

32.D.II.1. Method:	*Simultaneous entry*
32.D.II.2.a. Variables in matrix:	*7*
32.D.II.2.b. Variables entered:	*7*
32.D.II.3. Best predictors:	*54. Nasal breadth (-.545), 19a. Mastoid height (.361), 69b. 2nd molar mandibular body thickness (.248), 69c. Thickness of the mandibular symphysis (.716 - Function 2), 69. Height of the mandibular symphysis (.843 - Function 3), 13a. Mastoid width (.694 - Function 4)*
32.D.II.4.a. Wilks' Lambda:	*1 through 4: .325 (Sig. .000), 2 through 4: .560 (Sig. .000), 3 through 4: .741 (Sig. .001), 4: .873 (Sig. .009)*
32.D.II.4.b. Eigenvalues:	*1: .725 (r: .648), 2: .324 (r: .494), 3: .177 (r: .388), 4: .146 (r: .357)*
32.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
32.D.II.6. Remarks:	*Box's M (Sig. .085; Log determinants: Southern Sudan - 3.339, Chad - 3.854, Mandinka - 4.901, Somalis - 3.496, Haya - 6.065), removed outliers: Mandinka 0.141-14 (D^2: 14.414; critical value: 14.067 - p 0.95, df 7), no variables failed tolerance test*

32.D.III. Results

32.D.III.1.a. Within-groups covariance matrix:	*Somalis, 61.7%, Somalis (D^2: 7.675), Haya (D^2: 11.171)*
32.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*49.5%*
32.D.III.1.c. Separate-groups covariance matrix:	*Somalis, 65.4%, Somalis (D^2: 13.181), Chad (D^2: 14.405)*
32.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (6 Chad, 1 Mandinka, 4 Somalis, 2 Haya), Chad (3 Southern Sudan, 3 Mandinka, 1 Somali, 5 Haya), Mandinka (2 Southern Sudan, 3 Chad, 1 Somali, 3 Haya), Somalis (3 Southern Sudan, 1 Chad, 2 Mandinka), Haya (5 Southern Sudan, 3 Chad, 4 Mandinka, 2 Somalis)*
32.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 2 Mandinka, 1 Somali, 1 Haya), Chad (2 Southern Sudan, 2 Mandinka, 1 Somali, 3 Haya), Mandinka (2 Southern Sudan, 3 Chad, 2 Somalis, 2 Haya), Somalis (3 Southern Sudan, 1 Mandinka), Haya (3 Southern Sudan, 5 Chad, 2 Mandinka)*
32.D.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



32.D.IV. Additional results

32.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 61.7%, 49.5%), separate-groups covariance matrix (Somalis, 65.4%)*
32.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 60.7%, 53.3%), separate-groups covariance matrix (Somalis, 64.5%), variables entered (6)*

32.D.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 56.5%, 49.1%; separate-groups covariance matrix - Haya, 59.3%), variables entered (5)*

32.E.I. Summary

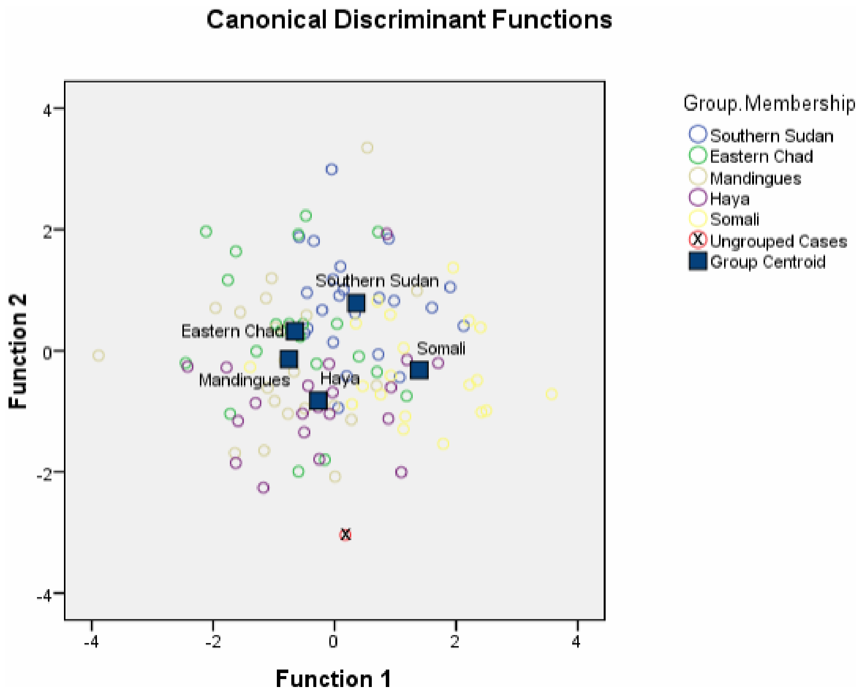
32.E.I.1. Individual:	*Djabarona 96/120-5*
32.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
32.E.I.3. Data:	*Scaled cranial measurements*
32.E.I.4. Classification:	*Haya*

32.E.II. Analysis overview

32.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
32.E.II.2.a. Variables in matrix:	*7*
32.E.II.2.b. Variables entered:	*6*
32.E.II.3. Best predictors:	*19a. Mastoid height (.590), 69c. Thickness of the mandibular symphysis (.550), 13a. Mastoid width (.380), 69c. Thickness of the mandibular symphysis (.687 - Function 2), 69. Height of the mandibular symphysis (.840 - Function 3), 13a. Mastoid width (.800 - Function 4)*
32.E.II.4.a. Wilks' Lambda:	*1 through 4: .367 (Sig. .000), 2 through 4: .599 (Sig. .000), 3 through 4: .791 (Sig. .003), 4: .919 (Sig. .035)*
32.E.II.4.b. Eigenvalues:	*1: .634 (r: .623), 2: .320 (r: .493), 3: .161 (r: .373), 4: .088 (r: .285)*
32.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
32.E.II.6. Remarks:	*Box's M (Sig. .253; Log determinants: Southern Sudan - -21.487, Chad - -21.360, Mandinka - -20.312, Somalis - -21.733, Haya - -21.041), no outliers detected, no variables failed tolerance test*

32.E.III. Results

32.E.III.1.a. Within-groups covariance matrix:	*Haya, 59.3%, Haya (D^2: 6.650), Somalis (D^2: 9.200)*
32.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*53.7%*
32.E.III.1.c. Separate-groups covariance matrix:	*Chad, 66.7%, Chad (D^2: 9.453), Mandinka (D^2: 9.382)*
32.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 1 Mandinka, 4 Somalis, 2 Haya), Chad (3 Southern Sudan, 4 Mandinka, 2 Somalis, 4 Haya), Mandinka (1 Southern Sudan, 4 Chad, 2 Somalis, 4 Haya), Somalis (4 Southern Sudan, 1 Chad, 3 Mandinka), Haya (1 Southern Sudan, 2 Chad, 2 Mandinka, 3 Somalis)*
32.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (2 Chad, 1 Mandinka, 1 Somali, 2 Haya), Chad (2 Southern Sudan, 2 Mandinka, 2 Somalis, 3 Haya), Mandinka (2 Southern Sudan, 3 Chad, 1 Somali, 1 Haya), Somalis (5 Southern Sudan, 1 Mandinka), Haya (1 Southern Sudan, 2 Chad, 1 Mandinka, 4 Somalis)*
32.E.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*

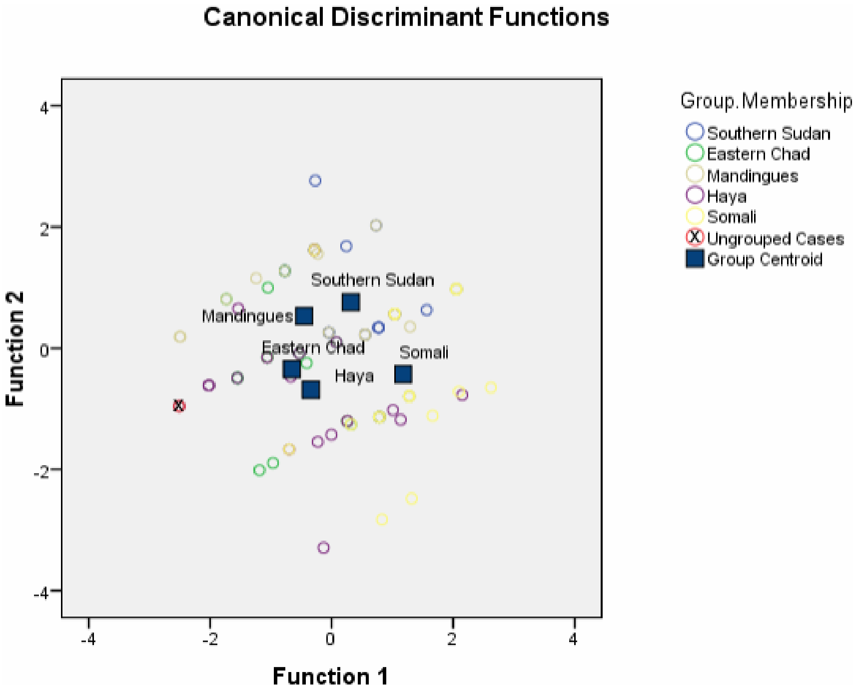


32.E.IV. Additional results	
32.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 61.1%, 51.9%), separate-groups covariance matrix (Chad, 63.9%)*
32.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 59.3%, 50.9%), separate-groups covariance matrix (Chad, 62.0%), variables entered (5)*
32.E.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 57.4%, 51.9%; separate-groups covariance matrix - Haya, 60.2%), variables entered (4)*

32.F.I. Summary	
32.F.I.1. Individual:	*Djabarona 96/120-5*
32.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
32.F.I.3. Data:	*Non-metric cranial and dental traits*
32.F.I.4. Classification:	*Mandinka*

32.F.II. Analysis overview	
32.F.II.1. Method:	*Simultaneous entry*
32.F.II.2.a. Variables in matrix:	*7*
32.F.II.2.b. Variables entered:	*7*
32.F.II.3. Best predictors:	*Alveolar prognathism (-.651), Margo infranasalis (main) (.434), Symphyseal height (.360), Symphyseal height (.648 - Function 2), Ramus angle (.785 - Function 3), Rocker jaw (.874 - Function 4)*
32.F.II.4.a. Wilks' Lambda:	*1 through 4: .454 (Sig. .000), 2 through 4: .659 (Sig. .001), 3 through 4: .886 (Sig. .272), 4: .948 (Sig. .248)*
32.F.II.4.b. Eigenvalues:	*1: .451 (r: .557), 2: .346 (r: .507), 3: .070 (r: .255), 4: .055 (r: .228)*
32.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
32.F.II.6. Remarks:	*Box's M (test result not accepted; Sig. .402; Log determinants: Southern Sudan - -15.864, Chad - -15.375, Mandinka - 'singular', Somalis - 'singular', Haya - -12.619), no outliers detected, no variables failed tolerance test*

32.F.III. Results	
32.F.III.1.a. Within-groups covariance matrix:	*Chad, 50.0%, Chad (D^2: 4.215), Haya (D^2: 5.010)*
32.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*41.7%*
32.F.III.1.c. Separate-groups covariance matrix:	*Mandinka, 50.0%, Mandinka (D^2: 5.148), Haya (D^2: 3.601)*
32.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (4 Chad, 1 Mandinka, 3 Haya), Chad (2 Southern Sudan, 4 Mandinka, 3 Somalis, 2 Haya), Mandinka (11 Southern Sudan, 4 Chad, 2 Somalis), Somalis (5 Southern Sudan, 5 Haya), Haya (2 Southern Sudan, 9 Chad, 2 Mandinka, 4 Somalis)*
32.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 16 Mandinka, 2 Somalis), Chad (6 Mandinka, 2 Somalis, 1 Haya), Mandinka (3 Chad, 1 Somali), Somalis (2 Chad, 5 Mandinka, 1 Haya), Haya (8 Chad, 5 Mandinka, 1 Somali)*
32.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

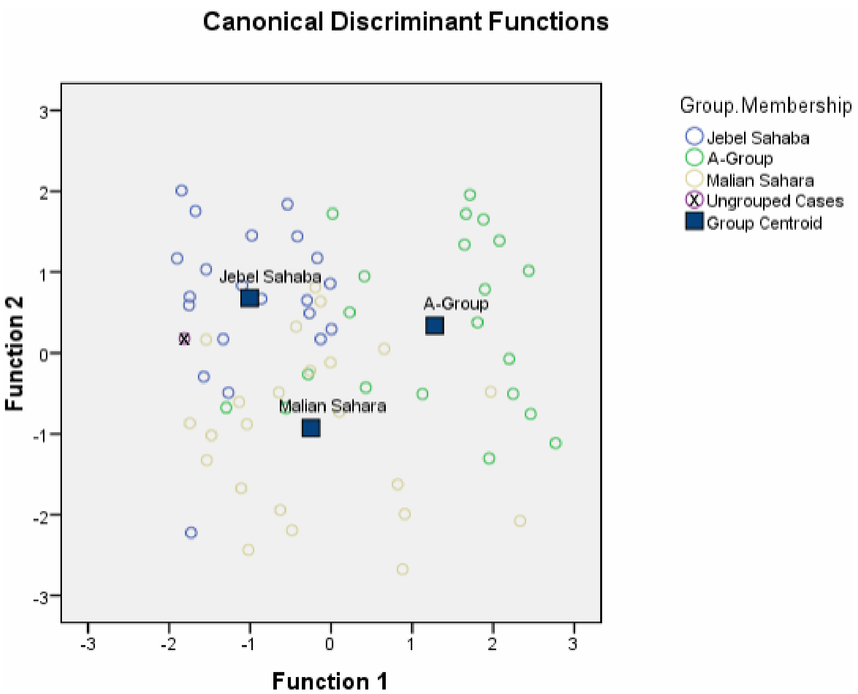


32.F.IV. Additional results	
32.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 50.0%, 41.7%), separate-groups covariance matrix (Mandinka, 50.0%)*
32.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 43.5%, 34.3%), separate-groups covariance matrix (Mandinka, 48.1%), variables entered (4)*
32.F.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 50.9%, 44.4%; separate-groups covariance matrix - Mandinka, 48.1%), variables entered (4)*

32.G.I. Summary	
32.G.I.1. Individual:	*Djabarona 96/120-5*
32.G.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
32.G.I.3. Data:	*Scaled cranial measurements and cranial and dental non-metric traits*
32.G.I.4. Classification:	*Jebel Sahaba/Tushka*

32.G.II. Analysis overview	
32.G.II.1. Method:	*Mahalanobis distance, simultaneous entry*
32.G.II.2.a. Variables in matrix:	*12*
32.G.II.2.b. Variables entered:	*11*
32.G.II.3. Best predictors:	*Margo infranasalis (main) (.751), Alveolar prognathism (-.611), Rocker jaw (.255), Symphyseal height (.561 - Function 2)*
32.G.II.4.a. Wilks' Lambda:	*1 through 2: .344 (Sig. .000), 2: .660 (Sig. .008)*
32.G.II.4.b. Eigenvalues:	*1: .919 (r: .692), 2: .515 (r: .583)*
32.G.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
32.G.II.6. Remarks:	*Box's M (test result not accepted; Sig. .570; Log determinants: A-Group - -31.773, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -31.436), no outliers detected, no variables failed tolerance test*

32.G.III. Results	
32.G.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 78.5%, Jebel Sahaba/Tushka (D^2: .901), Malian Sahara (D^2: 3.669)*
32.G.III.1.b. Within-groups covariance matrix (Leave-one-out):	*61.5%*
32.G.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 81.5%, Jebel Sahaba/Tushka (D^2: 1.545), Malian Sahara (D^2: 2.822)*
32.G.III.2.a. Misclassifications (leave-one-out):	*A-Group (3 Jebel Sahaba/Tushka, 6 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 5 Malian Sahara), Malian Sahara (3 A-Group, 7 Jebel Sahaba/Tushka)*
32.G.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 A-Group, 4 Jebel Sahaba/Tushka)*
32.G.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



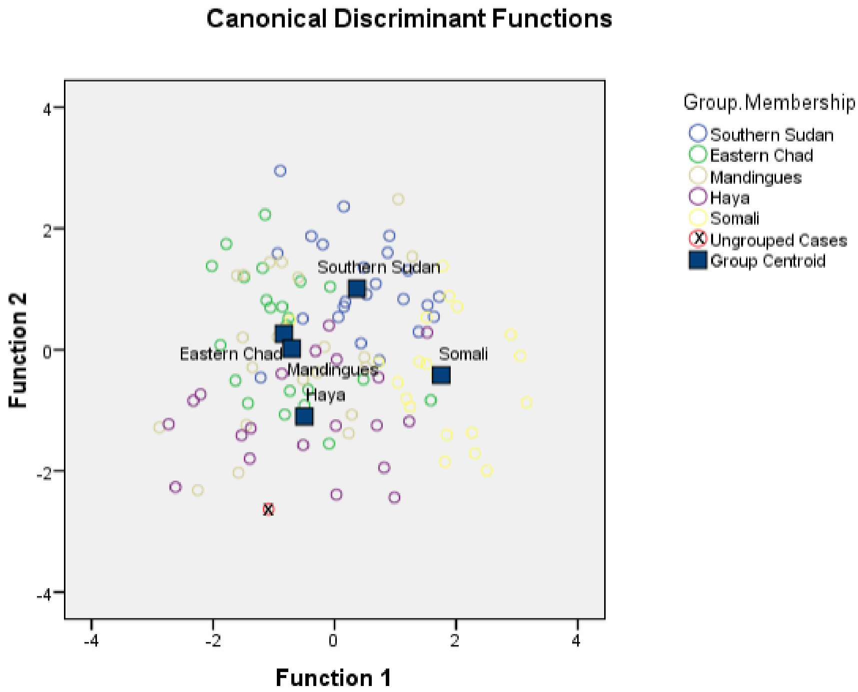
32.G.IV. Additional results	
32.G.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 76.9%, 58.5%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 80.0%)*
32.G.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 67.7%, 64.6%), separate-groups covariance matrix (Malian Sahara, 67.7%), variables entered (3)*
32.G.IV.2. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 71.1%, 68.7%; separate-groups covariance matrix - Malian Sahara, 73.5%), variables entered (5)*
32.G.IV.3. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 77.1%, 68.7%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 83.1%), variables entered (7)*

32.H.I. Summary	
32.H.I.1. Individual:	*Djabarona 96/120-5*
32.H.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
32.H.I.3. Data:	*Scaled cranial measurements and cranial and dental non-metric traits*
32.H.I.4. Classification:	*Haya*

32.H.II. Analysis overview	
32.H.II.1. Method:	*Mahalanobis distance, simultaneous entry*
32.H.II.2.a. Variables in matrix:	*14*
32.H.II.2.b. Variables entered:	*13*
32.H.II.3. Best predictors:	*19a. Mastoid height (.488), Alveolar prognathism (-.469), 69c. Thickness of the mandibular symphysis (.455), 69c. Thickness of the mandibular symphysis (.513 - Function 2), 13a. Mastoid width (.440 - Function 3), 69. Height of the mandibular symphysis (.547 - Function 4)*
32.H.II.4.a. Wilks' Lambda:	*1 through 4: .207 (Sig. .000), 2 through 4: .400 (Sig. .000), 3 through 4: .608 (Sig. .001), 4: .797 (Sig. .014)*
32.H.II.4.b. Eigenvalues:	*1: .932 (r: .694), 2: .520 (r: .585), 3: .311 (r: .487), 4: .255 (r: .451)*
32.H.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
32.H.II.6. Remarks:	*Box's M (test result not accepted; Sig. .057; Log determinants: Southern Sudan - -40.450, Chad - -42.117, Mandinka - 'singular', Somalis - 'singular', Haya - -39.700), no outliers detected, no variables failed tolerance test*

32.H.III. Results	
32.H.III.1.a. Within-groups covariance matrix:	*Haya, 71.3%, Haya (D^2: 3.452), Mandinka (D^2: 8.112)*
32.H.III.1.b. Within-groups covariance matrix (Leave-one-out):	*55.6%*
32.H.III.1.c. Separate-groups covariance matrix:	*Haya, 74.1%, Haya (D^2: 7.633), Mandinka (D^2: 8.691)*

32.H.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Mandinka, 5 Somalis, 3 Haya), Chad (3 Southern Sudan, 3 Mandinka, 1 Somali, 5 Haya), Mandinka (3 Southern Sudan, 2 Chad, 1 Somali, 4 Haya), Somalis (3 Southern Sudan, 1 Chad, 2 Mandinka, 1 Haya), Haya (1 Southern Sudan, 3 Chad, 3 Mandinka, 3 Somalis)*
32.H.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 2 Somalis, 1 Haya), Chad (2 Southern Sudan, 3 Mandinka, 1 Somali, 2 Haya), Mandinka (3 Southern Sudan, 3 Chad, 2 Haya), Somalis (1 Southern Sudan, 1 Chad, 1 Mandinka, 1 Haya), Haya (2 Southern Sudan, 1 Chad, 1 Mandinka)*
32.H.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



32.H.IV. Additional results	
32.H.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 67.6%, 51.9%), separate-groups covariance matrix (Haya, 73.1%)*
32.H.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 65.7%, 56.5%), separate-groups covariance matrix (Mandinka, 67.6%), variables entered (7)*
32.H.IV.2. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 63.9%, 60.2%; separate-groups covariance matrix - Mandinka, 70.4%), variables entered (6)*

Appendix XXV.A.1.b. Mean individuals

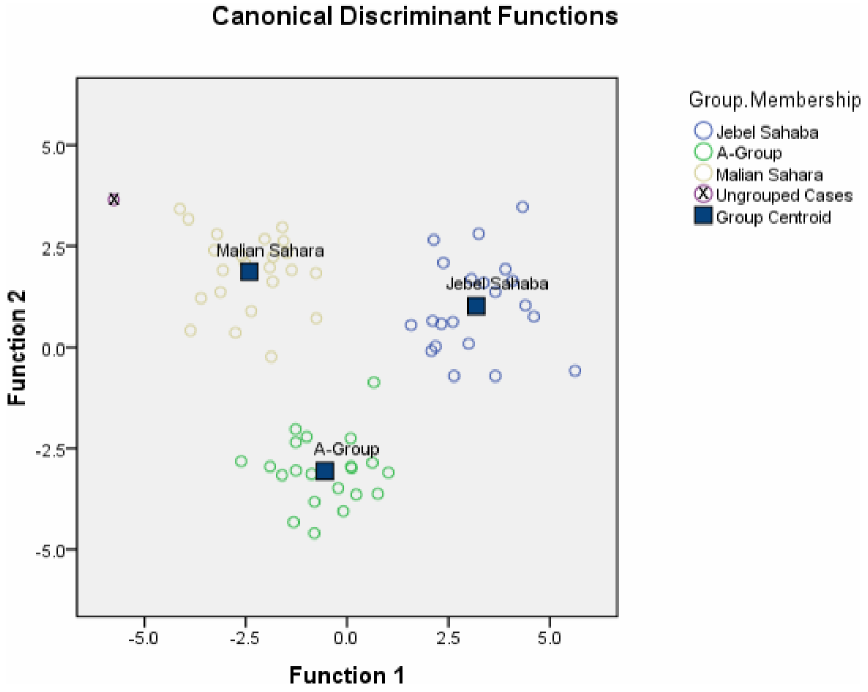
Appendix XXV.A.1.b.1. Wadi Howar

1. Abu Tabari 02/1

1.A.I. Summary
1.A.I.1. Individual: *Abu Tabari 02/1 (Mean individual)*
1.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.A.I.3. Data: *Cranial and dental measurements*
1.A.I.4. Classification: *Malian Sahara*

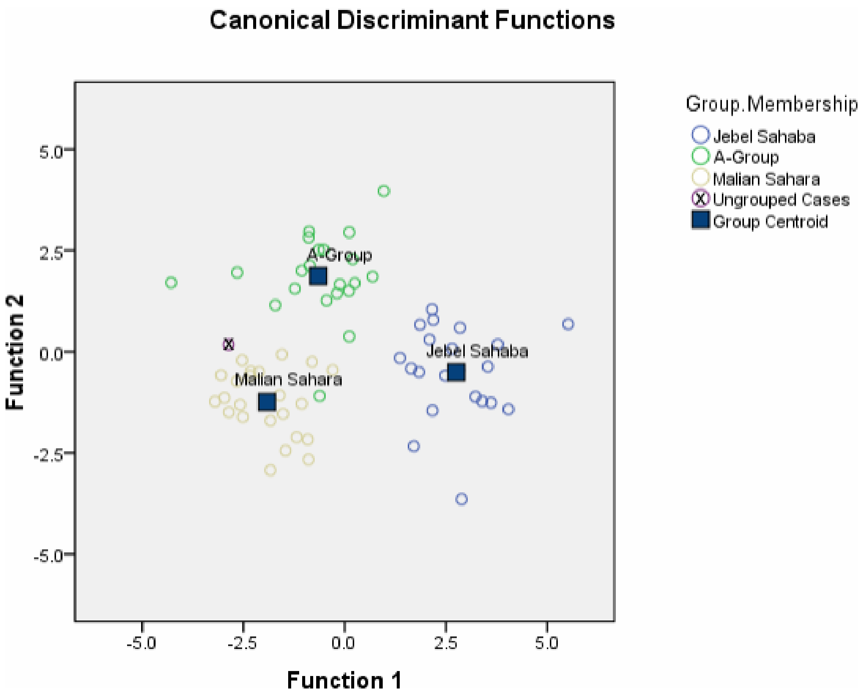
1.A.II. Analysis overview
1.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
1.A.II.2.a. Variables in matrix: *62*
1.A.II.2.b. Variables entered: *14*
1.A.II.3. Best predictors: *81(1). Crown width LI2 (.313), 61a(2). 1st premolar alveolar breadth (md) (.265), 71a. Minimum ramus width (.223), 81(1). Crown width LI2 (.515 - Function 2)*
1.A.II.4.a. Wilks' Lambda: *1 through 2: .026 (Sig. .000), 2: .172 (Sig. .000)*
1.A.II.4.b. Eigenvalues: *1: 5.705 (r: .922), 2: 4.824 (r: .910)*
1.A.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
1.A.II.6. Remarks: *Box's M (Sig. .072; Log determinants: A-Group - -29.611, Jebel Sahaba/Tushka - -27.723, Malian Sahara - -22.536), no outliers detected, no variables failed tolerance test*

1.A.III. Results
1.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 14.359), A-Group (D^2: 72.197)*
1.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *98.5%*
1.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 13.500), Jebel Sahaba/Tushka (D^2: 82.044)*
1.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka)*
1.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*
1.A.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



1.A.IV. Additional results
1.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 49.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (62)*
1.A.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 98.5%, 96.9%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (15), F values for pairwise distances (A-Group/Jebel*

	Sahaba/Tushka: 16.975, A-Group/Malian Sahara: 21.293, Jebel Sahaba/Tushka/Malian Sahara: 19.655)
1.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 98.5%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (11), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 20.203, A-Group/Malian Sahara: 23.786, Jebel Sahaba/Tushka/Malian Sahara: 24.093)*
1.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (21), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 16.898, A-Group/Malian Sahara: 15.445, A-Group/"Sudanese Hotchpotch": 34.588, Jebel Sahaba/Tushka/Malian Sahara: 16.089, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 55.136, Malian Sahara/"Sudanese Hotchpotch": 49.192)*
1.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 84.3%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (57)*
1.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (Sig. .000), variables entered (20), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 23.219, A-Group/Malian Sahara: 21.492, A-Group/"Sudanese Hotchpotch": 25.439, Jebel Sahaba/Tushka/Malian Sahara: 21.310, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 25.700, Malian Sahara/"Sudanese Hotchpotch": 32.594)*
1.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 56.6%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (111)*
1.B.I. Summary	
1.B.I.1. Individual:	*Abu Tabari 02/1 (Mean individual)*
1.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.B.I.3. Data:	*Scaled cranial and dental measurements*
1.B.I.4. Classification:	*Malian Sahara*
1.B.II. Analysis overview	
1.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.B.II.2.a. Variables in matrix:	*50*
1.B.II.2.b. Variables entered:	*14*
1.B.II.3. Best predictors:	*81(1). Crown width LI1 (.365), 71a. Minimum ramus width (.284), 69. Height of the mandibular symphysis (.241), 81(1), Crown width LI1 (.365 - Function 2)*
1.B.II.4.a. Wilks' Lambda:	*1 through 2: .069 (Sig. .000), 2: .352 (Sig. .000)*
1.B.II.4.b. Eigenvalues:	*1: 4.080 (r: .896), 2: 1.842 (r: .805)*
1.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
1.B.II.6. Remarks:	*Box's M (Sig. .006; Log determinants: A-Group - -89.013, Jebel Sahaba/Tushka - -87.664, Malian Sahara - -85.292), no outliers detected, no variables failed tolerance test*
1.B.III. Results	
1.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 2.897), A-Group (D^2: 7.780)*
1.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.8%*
1.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 3.627), A-Group (D^2: 5.554)*
1.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Malian Sahara), Malian Sahara (2 A-Group)*
1.B.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Malian Sahara)*
1.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



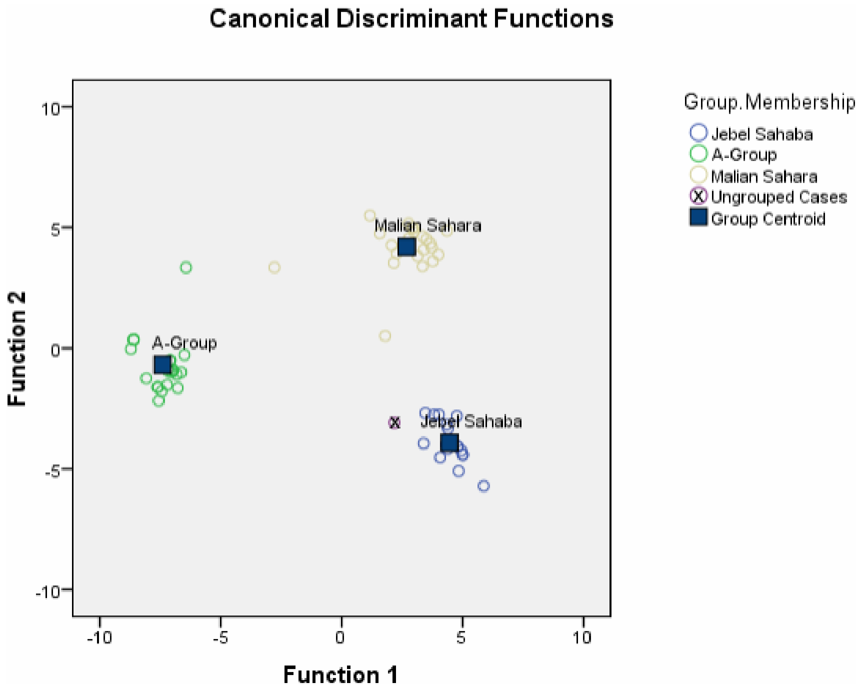
1.B.IV. Additional results

1.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 70.8%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (test not possible), variables entered (50)*
1.B.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 93.8%, 89.2%), separate-groups covariance matrix (A-Group, 95.4%), Box's M (Sig. .000), variables entered (10), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 12.332, A-Group/Malian Sahara: 14.066, Jebel Sahaba/Tushka/Malian Sahara: 20.752)*
1.B.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 96.9%, 93.8%), separate-groups covariance matrix (A-Group, 98.5%), Box's M (Sig. .000), variables entered (10), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 17.042, A-Group/Malian Sahara: 12.684, Jebel Sahaba/Tushka/Malian Sahara: 19.745)*
1.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (23), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 15.810, A-Group/Malian Sahara: 18.267, A-Group/"Sudanese Hotchpotch": 22.857, Jebel Sahaba/Tushka/Malian Sahara: 14.547, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 42.484, Malian Sahara/"Sudanese Hotchpotch": 28.159)*
1.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 83.1%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (47)*
1.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 98.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (23), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 15.528, A-Group/Malian Sahara: 18.722, A-Group/"Sudanese Hotchpotch": 27.065, Jebel Sahaba/Tushka/Malian Sahara: 24.020, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 46.914, Malian Sahara/"Sudanese Hotchpotch": 38.099)*
1.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 38.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (109)*

1.C.I. Summary
1.C.I.1. Individual: *Abu Tabari 02/1 (Mean individual)*
1.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.C.I.3. Data: *Non-metric cranial and dental traits*
1.C.I.4. Classification: *Jebel Sahaba/Tushka*

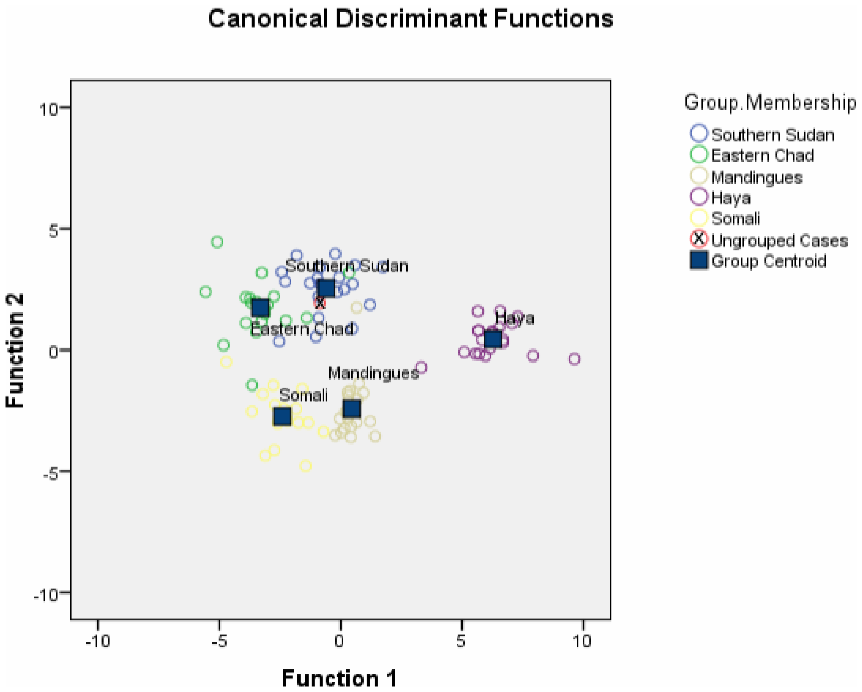
1.C.II. Analysis overview
1.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
1.C.II.2.a. Variables in matrix: *43*
1.C.II.2.b. Variables entered: *14*
1.C.II.3. Best predictors: *Distal accessory ridge (.505), Interruption groove (.240), Tuberculum dentale (.170), Tuberculum dentale (.709 - Function 2)*
1.C.II.4.a. Wilks' Lambda: *1 through 2: .003 (Sig. .000), 2: .078 (Sig. .000)*
1.C.II.4.b. Eigenvalues: *1: 27.939 (r: .983), 2: 11.884 (r: .960)*
1.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
1.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

1.C.III. Results
1.C.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 5.854), Malian Sahara (D^2: 53.298)*
1.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*
1.C.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 20.763), Malian Sahara (D^2: 53.939)*
1.C.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
1.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
1.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



1.C.IV. Additional results
1.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 90.8%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (43)*
1.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 96.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 119.426, A-Group/Malian Sahara: 99.156, Jebel Sahaba/Tushka/Malian Sahara: 69.587)*
1.C.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 96.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 111.937, A-*

	Group/Malian Sahara: 99.156, Jebel Sahaba/Tushka/Malian Sahara: 69.587)
1.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 95.2%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (18), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 57.609, A-Group/Malian Sahara: 73.001, A-Group/"Sudanese Hotchpotch": 69.229, Jebel Sahaba/Tushka/Malian Sahara: 42.385, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 37.371, Malian Sahara/"Sudanese Hotchpotch": 49.508)*
1.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 92.8%; separate-groups covariance matrix - Sudanese Hotchpotch', 100.0%), Box's M (test not possible), variables entered (43)*
1.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 95.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (24), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 94.989, A-Group/Malian Sahara: 73.758, A-Group/"Sudanese Hotchpotch": 50.905, Jebel Sahaba/Tushka/Malian Sahara: 72.026, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 30.639, Malian Sahara/"Sudanese Hotchpotch": 27.330)*
1.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 90.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (84)*
1.D.I. Summary	
1.D.I.1. Individual:	*Abu Tabari 02/1 (Mean individual)*
1.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.D.I.3. Data:	*Cranial and dental measurements*
1.D.I.4. Classification:	*Chad*
1.D.II. Analysis overview	
1.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.D.II.2.a. Variables in matrix:	*47*
1.D.II.2.b. Variables entered:	*16*
1.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.546), 80(4)b. 1st premolar dental arch length (mx) (.532), 80a. Dental arch length of the mandible (.382), 81. Crown length LC (.405 - Function 2), 81. Crown length UI2 (.570 - Function 3), 81. Crown length LM1 (.328 - Function 4)*
1.D.II.4.a. Wilks' Lambda:	*1 through 4: .001 (Sig. .000), 2 through 4: .017 (Sig. .000), 3 through 4: .102 (Sig. .000), 4: .459 (Sig. .000)*
1.D.II.4.b. Eigenvalues:	*1: 11.232 (r: .958), 2: 4.891 (r: .911), 3: 3.488 (r: .882), 4: 1.176 (r: .735)*
1.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
1.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -22.122, Chad - -25.040, Mandinka - 'singular', Somalis - -28.923, Haya - -60.072), no outliers detected, no variables failed tolerance test*
1.D.III. Results	
1.D.III.1.a. Within-groups covariance matrix:	*Chad, 99.1%, Chad (D^2: 17.059), Southern Sudan (D^2: 18.581)*
1.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.7%*
1.D.III.1.c. Separate-groups covariance matrix:	*Chad, 99.1%, Chad (D^2: 16.212), Southern Sudan (D^2: 31.909)*
1.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali), Chad (1 Mandinka, 1 Somali, 1 Haya), Somalis (1 Chad), Haya (1 Mandinka)*
1.D.III.2.b. Misclassifications (separate-groups):	*Mandinka (1 Southern Sudan)*
1.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.D.IV. Additional results

1.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 100.0%, 85.2%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (47)*
1.D.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Chad, 98.1%, 88.9%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.443, Southern Sudan/Mandinka: 18.512, Southern Sudan/Somalis:22.818 , Southern Sudan/Haya: 35.005, Chad/Mandinka: 25.711, Chad/Somalis: 15.419, Chad/Haya: 50.460, Mandinka/Somalis: 20.219, Mandinka/Haya: 34.971, Somalis/Haya: 42.420)*
1.D.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 98.1%, 90.7%), separate-groups covariance matrix (Chad, 99.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.949, Southern Sudan/Mandinka: 18.583, Southern Sudan/Somalis: 23.858, Southern Sudan/Haya: 34.608, Chad/Mandinka: 25.525, Chad/Somalis: 15.521, Chad/Haya: 50.971, Mandinka/Somalis: 20.257, Mandinka/Haya: 34.358, Somalis/Haya: 43.601)*
1.D.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 99.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (40), F values for pairwise distances (Southern Sudan/Chad: 38.372, Southern Sudan/Mandinka: 53.086, Southern Sudan/Somalis: 39.042, Southern Sudan/Haya: 90.864, Chad/Mandinka: 50.525, Chad/Somalis: 42.378, Chad/Haya: 47.414, Mandinka/Somalis: 62.836, Mandinka/Haya: 92.648, Somalis/Haya: 63.379)*
1.D.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 59.3%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (111)*

1.E.I. Summary

1.E.I.1. Individual:	*Abu Tabari 02/1 (Mean individual)*
1.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.E.I.3. Data:	*Scaled cranial and dental measurements*
1.E.I.4. Classification:	*Chad*

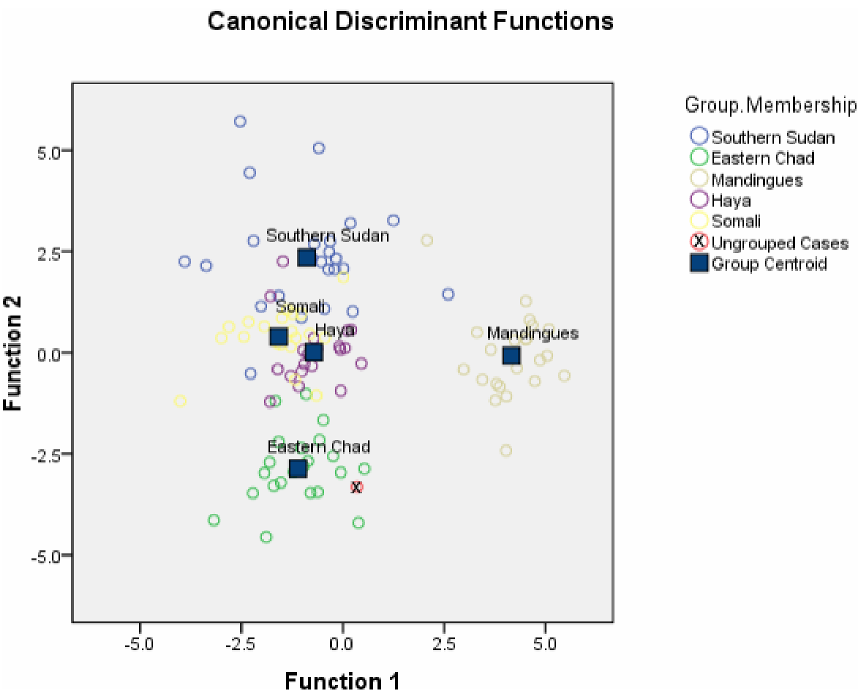
1.E.II. Analysis overview

1.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.E.II.2.a. Variables in matrix:	*39*
1.E.II.2.b. Variables entered:	*18*

1.E.II.3. Best predictors:	*81. Crown length UI2 (-.413), 80(4)a. Canine dental arch length (md) (.351), 81(1). Crown width UC (-.196), 80a. Dental arch length of the mandible (.776 - Function 2), 81. Crown length UI2 (.345 - Function 3), 19a. Mastoid height (-.357 - Function 4)*
1.E.II.4.a. Wilks' Lambda:	*1 through 4: .008 (Sig. .000), 2 through 4: .048 (Sig. .000), 3 through 4: .194 (Sig. .000), 4: .528 (Sig. .000)*
1.E.II.4.b. Eigenvalues:	*1: 4.720 (r: .908), 2: 3.058 (r: .868), 3: 1.723 (r: .795), 4: .892 (r: .687)*
1.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
1.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -94.779, Chad - -112.939, Mandinka - -140.953, Somalis - -106.664, Haya - -109.971), no outliers detected, no variables failed tolerance test*

1.E.III. Results

1.E.III.1.a. Within-groups covariance matrix:	*Chad, 93.5%, Chad (D^2: 4.813), Somalis (D^2: 23.959)*
1.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*89.8%*
1.E.III.1.c. Separate-groups covariance matrix:	*Chad, 96.3%, Chad (D^2: 6.159), Southern Sudan (D^2: 18.544)*
1.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 1 Mandinka, 3 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali), Mandinka (1 Southern Sudan), Somalis (1 Haya), Haya (1 Southern Sudan)*
1.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Mandinka, 1 Somali), Mandinka (1 Southern Sudan), Haya (1 Southern Sudan)*
1.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.E.IV. Additional results

1.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 99.1%, 83.3%), separate-groups covariance matrix (Chad, 99.1%), Box's M (test not possible), variables entered (39)*
1.E.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Chad, 95.4%, 87.0%), separate-groups covariance matrix (Chad, 95.4%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 14.642, Southern Sudan/Mandinka: 18.392, Southern Sudan/Somalis: 5.691, Southern Sudan/Haya: 9.331, Chad/Mandinka: 17.543, Chad/Somalis: 8.317, Chad/Haya: 10.931, Mandinka/Somalis: 16.973, Mandinka/Haya: 16.464, Somalis/Haya: 6.715)*
1.E.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 91.7%, 82.4%), separate-groups covariance matrix (Chad, 92.6%), Box's M (Sig. .000), variables entered (15), F values for pairwise distances (Southern Sudan/Chad: 17.659, Southern Sudan/Mandinka: 22.528, Southern Sudan/Somalis: 4.471, Southern Sudan/Haya: 10.263,*

	Chad/Mandinka: 21.758, Chad/Somalis: 8.882, Chad/Haya: 13.272, Mandinka/Somalis: 19.408, Mandinka/Haya: 20.008, Somalis/Haya: 7.281)
1.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 98.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (38), F values for pairwise distances (Southern Sudan/Chad: 47.480, Southern Sudan/Mandinka: 69.073, Southern Sudan/Somalis: 22.021, Southern Sudan/Haya: 155.708, Chad/Mandinka: 29.108, Chad/Somalis: 31.716, Chad/Haya: 70.871, Mandinka/Somalis: 51.534, Mandinka/Haya: 75.730, Somalis/Haya: 109.357)*
1.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 59.3%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (109)*

1.F.I. Summary

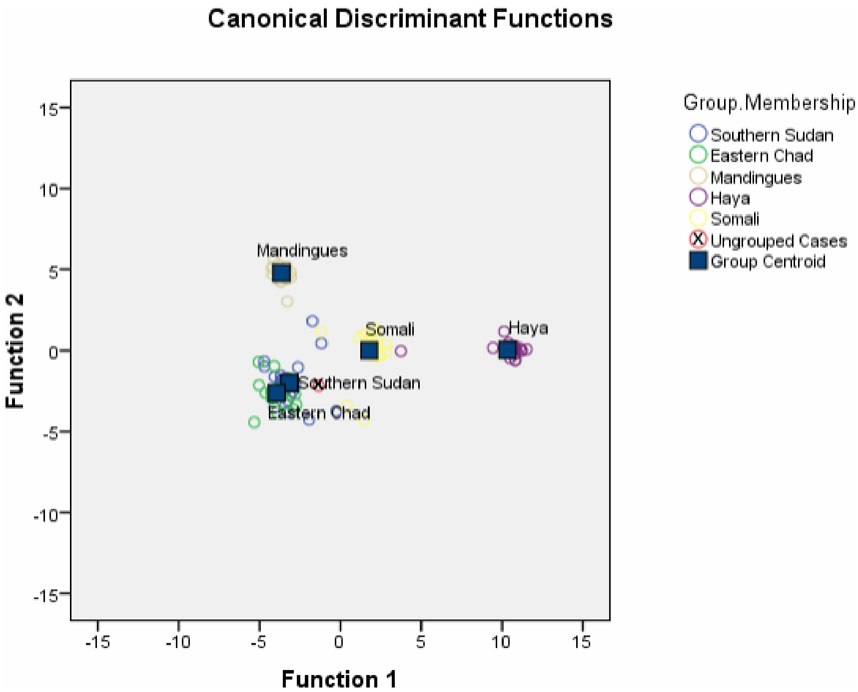
1.F.I.1. Individual:	*Abu Tabari 02/1 (Mean individual)*
1.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.F.I.3. Data:	*Non-metric cranial and dental traits*
1.F.I.4. Classification:	*Southern Sudan*

1.F.II. Analysis overview

1.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.F.II.2.a. Variables in matrix:	*47*
1.F.II.2.b. Variables entered:	*18*
1.F.II.3. Best predictors:	*Midline diastema (.666), Premolar mesial and distal accessory cusps UP1 (.404), Tuberculum dentale UI2 (.264), Tuberculum dentale UI2 (.722 - Function 2), Midline diastema (.610 - Function 3), Interruption groove UI2 (-.446 - Function 4)*
1.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .004 (Sig. .000), 3 through 4: .033 (Sig. .000), 4: .230 (Sig. .000)*
1.F.II.4.b. Eigenvalues:	*1: 29.807 (r: .984), 2: 7.277 (r: .938), 3: 5.974 (r: .926), 4: 3.345 (r: .877)*
1.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
1.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

1.F.III. Results

1.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 19.098), Chad (D^2: 21.723)*
1.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*92.6%*
1.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 100.0%, Southern Sudan (D^2: 10.750), Somalis (D^2: 17.103)*
1.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 1 Mandinka, 2 Haya), Chad (2 Southern Sudan), Somalis (1 Mandinka), Haya (1 Somali)*
1.F.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
1.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.F.IV. Additional results

1.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 99.1%, 88.0%), separate-groups covariance matrix (Somalis, 100.0%), Box's M (test not possible), variables entered (47)*
1.F.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Somalis, 97.2%, 91.7%), separate-groups covariance matrix (Somalis, 99.1%), Box's M (test not possible), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 17.819, Southern Sudan/Mandinka: 37.458, Southern Sudan/Somalis: 50.410, Southern Sudan/Haya: 112.438, Chad/Mandinka: 37.838, Chad/Somalis: 53.944, Chad/Haya: 112.596, Mandinka/Somalis: 54.600, Mandinka/Haya: 110.577, Somalis/Haya: 66.297)*
1.F.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 98.1%, 90.7%), separate-groups covariance matrix (Somalis, 98.1%), Box's M (test not possible), variables entered (16), F values for pairwise distances (Southern Sudan/Chad: 17.545, Southern Sudan/Mandinka: 38.505, Southern Sudan/Somalis: 52.204, Southern Sudan/Haya: 120.720, Chad/Mandinka: 40.662, Chad/Somalis: 57.947, Chad/Haya: 120.246, Mandinka/Somalis: 58.667, Mandinka/Haya: 117.980, Somalis/Haya: 70.221)*
1.F.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 99.1%, 93.5%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (Southern Sudan/Chad: 27.744, Southern Sudan/Mandinka: 56.600, Southern Sudan/Somalis: 55.107, Southern Sudan/Haya: 108.399, Chad/Mandinka: 75.073, Chad/Somalis: 73.225, Chad/Haya: 146.160, Mandinka/Somalis: 74.396, Mandinka/Haya: 88.262, Somalis/Haya: 71.029)*
1.F.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Somalis, 100.0%, 88.0%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (84)*

2. Abu Tabari 02/28

2.A.I. Summary

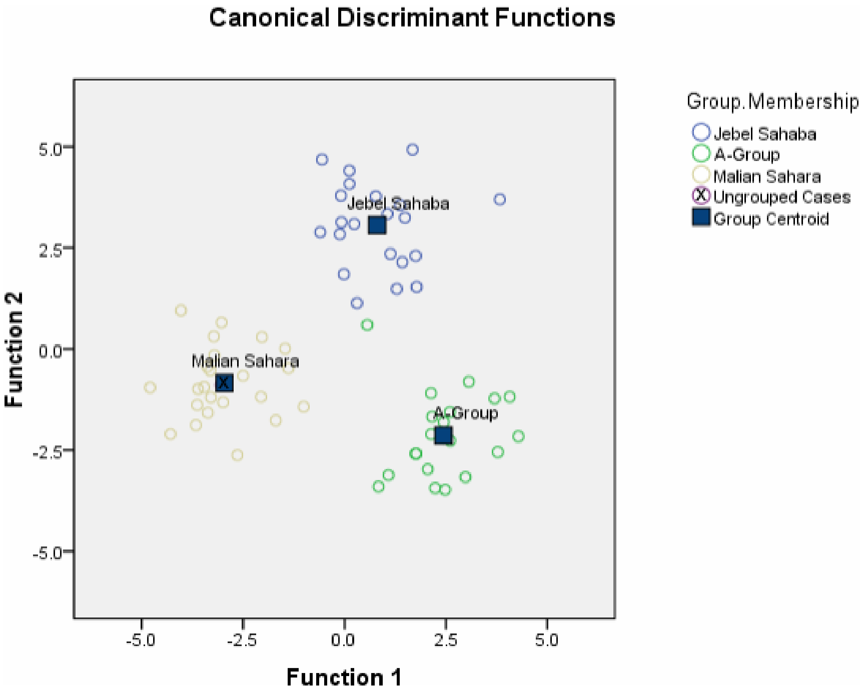
2.A.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*
2.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.A.I.3. Data:	*Cranial and dental measurements*
2.A.I.4. Classification:	*Malian Sahara*

2.A.II. Analysis overview

2.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.A.II.2.a. Variables in matrix:	*69*
2.A.II.2.b. Variables entered:	*14*
2.A.II.3. Best predictors:	*80a. Dental arch length of the mandible (-.379), 81. Crown length UI2 (.316), 81. Crown length LI1 (-.304), 81(1). Crown width LI2 (.558 - Function 2)*
2.A.II.4.a. Wilks' Lambda:	*1 through 2: .026 (Sig. .000), 2: .167 (Sig. .000)*
2.A.II.4.b. Eigenvalues:	*1: 5.480 (r: .920), 2: 4.976 (r: .913)*
2.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
2.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -31.426, Jebel Sahaba/Tushka - -27.769, Malian Sahara - -27.069), no outliers detected, no variables failed tolerance test*

2.A.III. Results

2.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: .011), Jebel Sahaba/Tushka (D^2: 30.484)*
2.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*98.5%*
2.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: .012), Jebel Sahaba/Tushka (D^2: 29.984)*
2.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka)*
2.A.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka)*
2.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

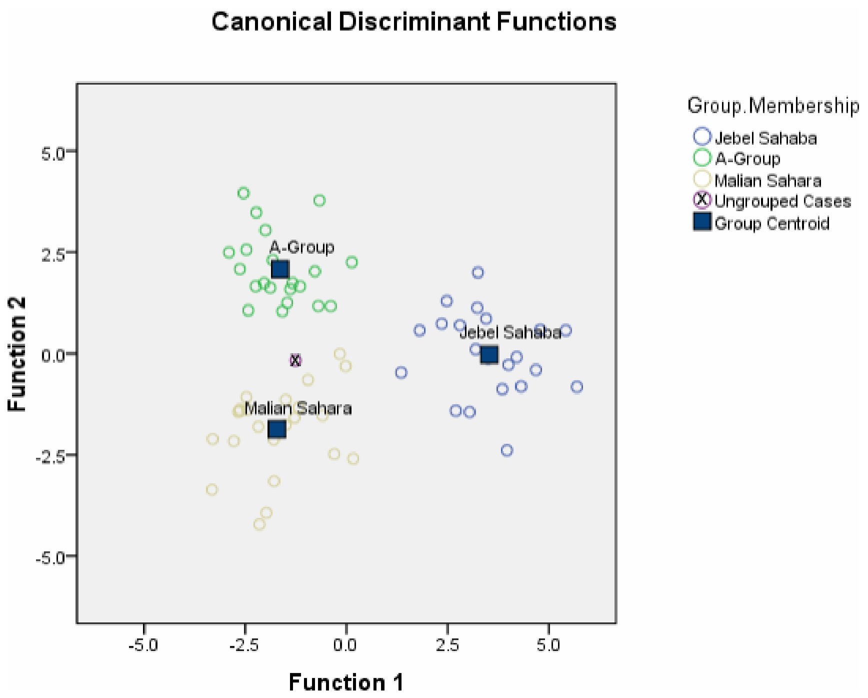


2.A.IV. Additional results

2.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 46.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (69)*
2.A.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 98.5%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 18.728, A-Group/Malian Sahara: 22.483, Jebel Sahaba/Tushka/Malian Sahara: 26.249)*
2.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.623, A-Group/Malian Sahara: 20.356, Jebel Sahaba/Tushka/Malian Sahara: 23.365)*
2.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (21), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 16.898, A-Group/Malian Sahara: 15.445, A-Group/"Sudanese*

	Hotchpotch": 34.588, Jebel Sahaba/Tushka/Malian Sahara: 16.089, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 55.136, Malian Sahara/"Sudanese Hotchpotch": 49.192)
2.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 73.5%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (60)*
2.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (25), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 23.553, A-Group/Malian Sahara: 17.764, A-Group/"Sudanese Hotchpotch": 34.155, Jebel Sahaba/Tushka/Malian Sahara: 24.935, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 35.917, Malian Sahara/"Sudanese Hotchpotch": 46.049)*
2.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (118)*

2.B.I. Summary	
2.B.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*
2.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.B.I.3. Data:	*Scaled cranial and dental measurements*
2.B.I.4. Classification:	*Malian Sahara*
2.B.II. Analysis overview	
2.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.B.II.2.a. Variables in matrix:	*56*
2.B.II.2.b. Variables entered:	*14*
2.B.II.3. Best predictors:	*71a. Minimum ramus width (.264), 81(1), Crown width LI1 (.236), 48(1). Nasospinale-Prosthion height (.206), 81(1). Crown width LI1 (.400 - Function 2)*
2.B.II.4.a. Wilks' Lambda:	*1 through 2: .037 (Sig. .000), 2: .266 (Sig. .000)*
2.B.II.4.b. Eigenvalues:	*1: 6.232 (r: .928), 2: 2.763 (r: .857)*
2.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
2.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -80.771, Jebel Sahaba/Tushka - -75.732, Malian Sahara - -74.697), no outliers detected, no variables failed tolerance test*
2.B.III. Results	
2.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 3.091), A-Group (D^2: 5.221)*
2.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
2.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 2.577), A-Group (D^2: 6.661)*
2.B.III.2.a. Misclassifications (leave-one-out):	*Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
2.B.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
2.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

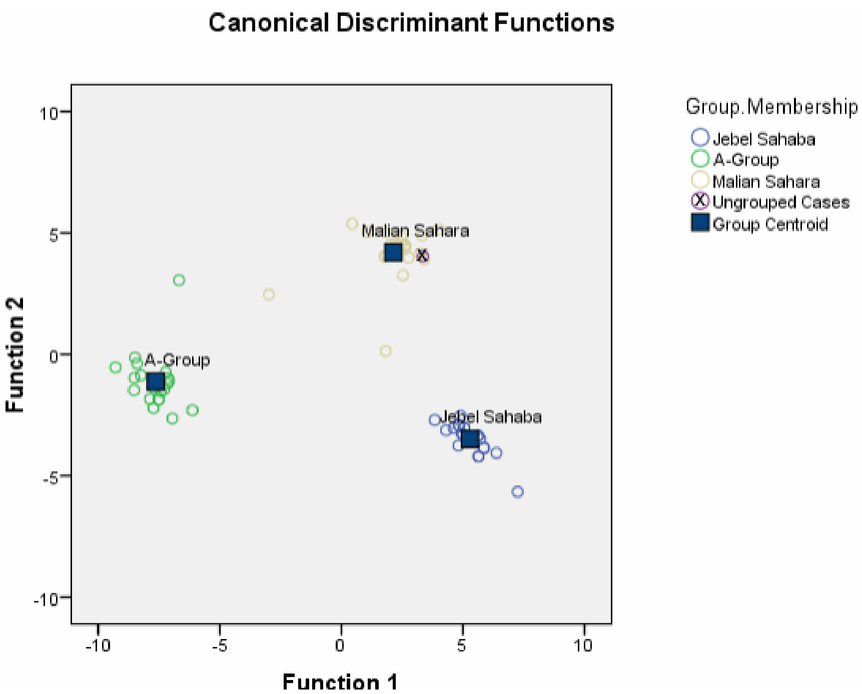


2.B.IV. Additional results	
2.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 100.0%, 72.3%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (test not possible), variables entered (56)*
2.B.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.582, A-Group/Malian Sahara: 11.849, Jebel Sahaba/Tushka/Malian Sahara: 24.246)*
2.B.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (11), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 26.430, A-Group/Malian Sahara: 13.035, Jebel Sahaba/Tushka/Malian Sahara: 22.550)*
2.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 92.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (Sig. .000), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.017, A-Group/Malian Sahara: 11.049, A-Group/"Sudanese Hotchpotch": 25.743, Jebel Sahaba/Tushka/Malian Sahara: 18.616, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.921, Malian Sahara/"Sudanese Hotchpotch": 29.345)*
2.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 81.9%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*
2.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (24), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.285, A-Group/Malian Sahara: 20.082, A-Group/"Sudanese Hotchpotch": 26.401, Jebel Sahaba/Tushka/Malian Sahara: 23.389, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.329, Malian Sahara/"Sudanese Hotchpotch": 41.323)*
2.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 53.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (116)*
2.C.I. Summary	
2.C.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*

2.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.C.I.3. Data: *Non-metric cranial and dental traits*
2.C.I.4. Classification: *Malian Sahara*

2.C.II. Analysis overview
2.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
2.C.II.2.a. Variables in matrix: *53*
2.C.II.2.b. Variables entered: *14*
2.C.II.3. Best predictors: *Distal accessory ridge UC (.475), Interruption groove UI2 (.220), Margo infranasalis (main) (-.130), Tuberculum dentale UI2 (.757 - Function 2)*
2.C.II.4.a. Wilks' Lambda: *1 through 2: .003 (Sig. .000), 2: .083 (Sig. .000)*
2.C.II.4.b. Eigenvalues: *1: 30.880 (r: .984), 2: 11.081 (r: .958)*
2.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
2.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

2.C.III. Results
2.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 1.489), Jebel Sahaba/Tushka (D^2: 60.292)*
2.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*
2.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .994), A-Group (D^2: 250.058)*
2.C.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
2.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
2.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.C.IV. Additional results
2.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 86.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*
2.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 109.426, A-Group/Malian Sahara: 89.734, Jebel Sahaba/Tushka/Malian Sahara: 71.297)*
2.C.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 115.387, A-Group/Malian Sahara: 95.348, Jebel Sahaba/Tushka/Malian Sahara: 65.129)*

2.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 83.820, A-Group/Malian Sahara: 80.165, A-Group/"Sudanese Hotchpotch": 64.570, Jebel Sahaba/Tushka/Malian Sahara: 49.941, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 29.877, Malian Sahara/"Sudanese Hotchpotch": 36.266)*
2.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 90.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*
2.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 144.692, A-Group/Malian Sahara: 89.050, A-Group/"Sudanese Hotchpotch": 61.899, Jebel Sahaba/Tushka/Malian Sahara: 57.544, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 38.454, Malian Sahara/"Sudanese Hotchpotch": 31.106)*
2.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 85.5%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (97)*

2.D.I. Summary

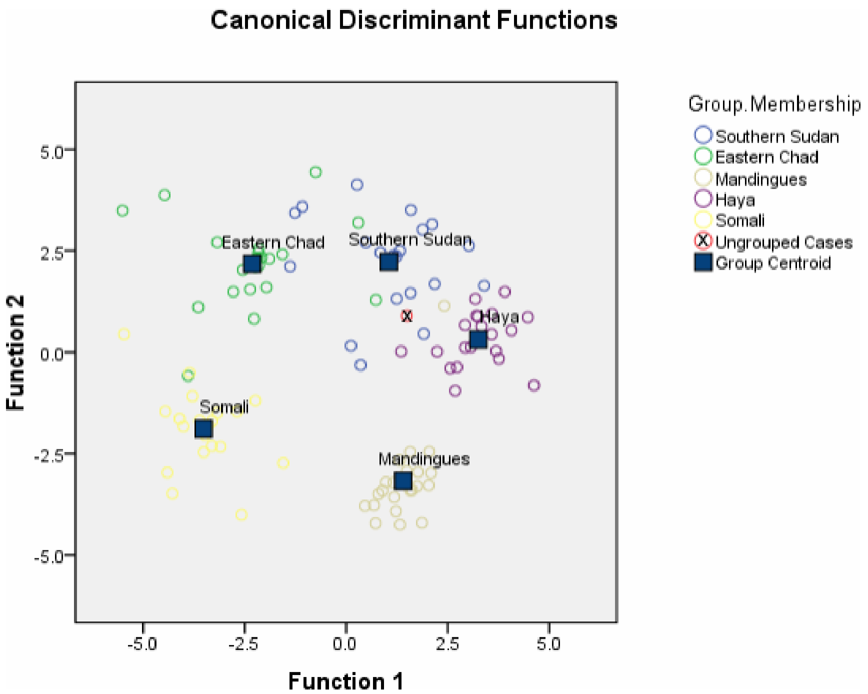
2.D.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*
2.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.D.I.3. Data:	*Cranial and dental measurements*
2.D.I.4. Classification:	*Southern Sudan*

2.D.II. Analysis overview

2.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.D.II.2.a. Variables in matrix:	*53*
2.D.II.2.b. Variables entered:	*18*
2.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.711), 80a. Dental arch length of the mandible (.573), 81(1). Crown width UI2 (.456), 80(4)c. 2nd premolar dental arch length (md) (-.365 - Function 2), 81. Crown length (.408 - Function 3), 81. Crown length LM1 (.318 - Function 4)*
2.D.II.4.a. Wilks' Lambda:	*1 through 4: .003 (Sig. .000), 2 through 4: .020 (Sig. .000), 3 through 4: .118 (Sig. .000), 4: .428 (Sig. .000)*
2.D.II.4.b. Eigenvalues:	*1: 6.292 (r: .929), 2: 5.026 (r: .913), 3: 2.642 (r: .852), 4: 1.336 (r: .756)*
2.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
2.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -27.169, Chad - -31.390, Mandinka - 'singular', Somalis - -30.893, Haya - -65.032), no outliers detected, no variables failed tolerance test*

2.D.III. Results

2.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 11.469), Mandinka (D^2: 18.348)*
2.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.7%*
2.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 14.964), Chad (D^2: 24.940)*
2.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 2 Haya), Mandinka (1 Southern Sudan), Somalis (1 Chad), Haya (1 Southern Sudan)*
2.D.III.2.b. Misclassifications (separate-groups):	*Mandinka (1 Southern Sudan)*
2.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.D.IV. Additional results

2.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 100.0%, 87.0%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (53)*
2.D.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Southern Sudan, 98.1%, 88.9%), separate-groups covariance matrix (Mandinka, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.443, Southern Sudan/Mandinka: 18.512, Southern Sudan/Somalis: 22.818, Southern Sudan/Haya: 35.005, Chad/Mandinka: 25.711, Chad/Somalis: 15.419, Chad/Haya: 50.460, Mandinka/Somalis: 20.219, Mandinka/Haya: 34.971, Somalis/Haya: 42.420)*
2.D.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 98.1%, 90.7%), separate-groups covariance matrix (Mandinka, 99.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.949, Southern Sudan/Mandinka: 18.583, Southern Sudan/Somalis: 23.858, Southern Sudan/Haya: 34.608, Chad/Mandinka: 25.525, Chad/Somalis: 15.521, Chad/Haya: 50.971, Mandinka/Somalis: 20.257, Mandinka/Haya: 34.358, Somalis/Haya: 43.601)*
2.D.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 100.0%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (43), F values for pairwise distances (Southern Sudan/Chad: 41.428, Southern Sudan/Mandinka: 43.794, Southern Sudan/Somalis: 61.500, Southern Sudan/Haya: 94.920, Chad/Mandinka: 46.890, Chad/Somalis: 50.893, Chad/Haya: 55.522, Mandinka/Somalis: 52.606, Mandinka/Haya: 75.668, Somalis/Haya: 58.179)*
2.D.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Chad, 100.0%, 63.9%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (118)*

2.E.I. Summary

2.E.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*
2.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.E.I.3. Data:	*Scaled cranial and dental measurements*
2.E.I.4. Classification:	*Chad*

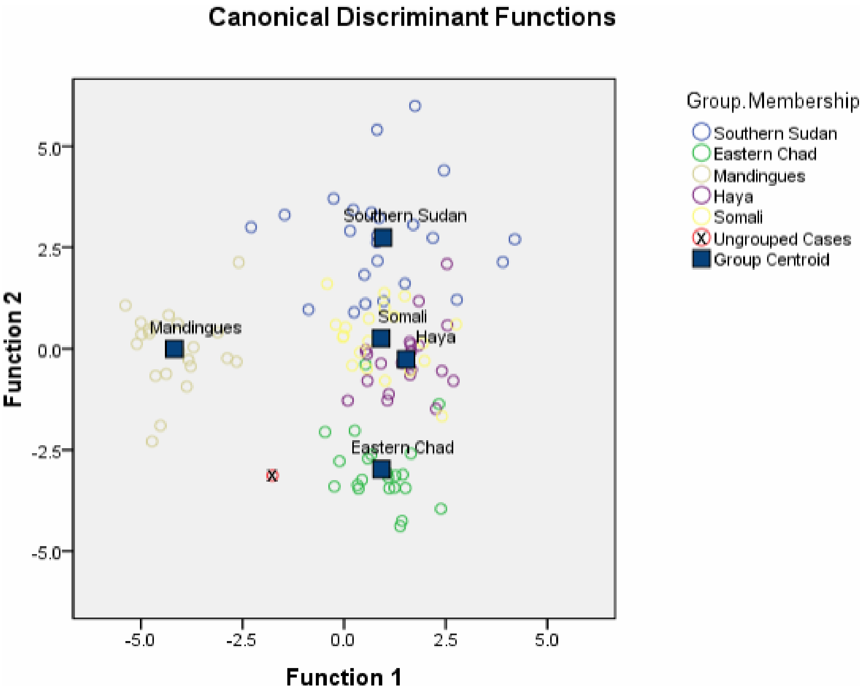
2.E.II. Analysis overview

2.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*

2.E.II.2.a. Variables in matrix:	*45*
2.E.II.2.b. Variables entered:	*18*
2.E.II.3. Best predictors:	*81. Crown length UI2 (.437), 80(4)a. Canine dental arch length (md) (-.332), 81(1). Crown width UC (.217), 80a. Dental arch length of the mandible (.700 - Function 2), 69c. Thickness of the mandibular symphysis (-.327 - Function 3), 1. Maximum cranial length (.435 - Function 4)*
2.E.II.4.a. Wilks' Lambda:	*1 through 4: .007 (Sig. .000), 2 through 4: .038 (Sig. .000), 3 through 4: .180 (Sig. .000), 4: .557 (Sig. .000)*
2.E.II.4.b. Eigenvalues:	*1: 4.732 (r: .909), 2: 3.666 (r: .886), 3: 2.106 (r: .823), 4: .794 (r: .665)*
2.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
2.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -83.008, Chad - -99.435, Mandinka - -133.840, Somalis - -93.251, Haya - -97.012), no outliers detected, no variables failed tolerance test*

2.E.III. Results

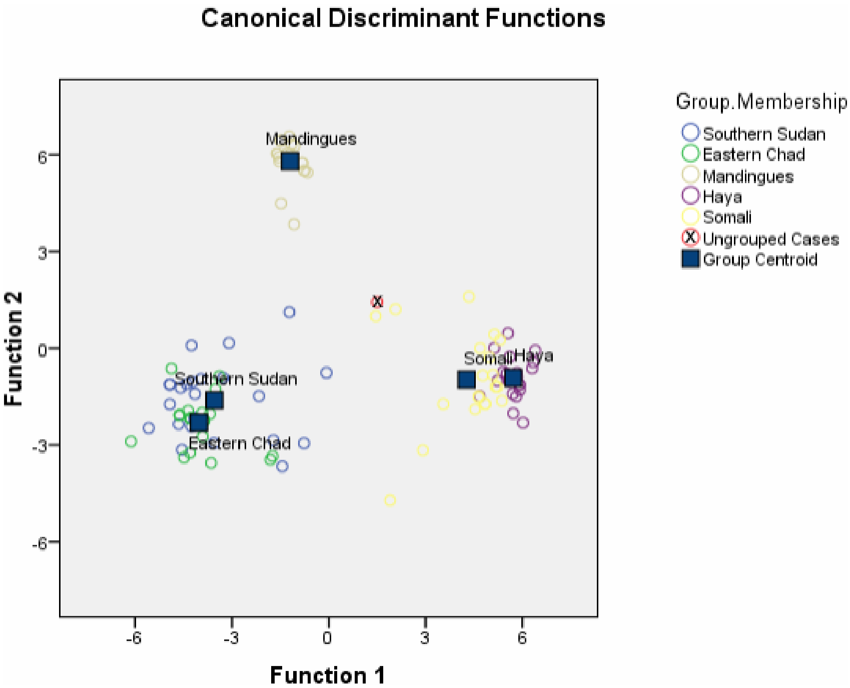
2.E.III.1.a. Within-groups covariance matrix:	*Chad, 98.1%, Chad (D^2: 10.631), Mandinka (D^2: 19.921)*
2.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*87.0%*
2.E.III.1.c. Separate-groups covariance matrix:	*Chad, 100.0%, Chad (D^2: 21.376), Southern Sudan (D^2: 26.234)*
2.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Mandinka, 4 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali, 1 Haya), Somalis (1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Somali)*
2.E.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
2.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.E.IV. Additional results

2.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 99.1%, 77.8%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (45)*
2.E.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Chad, 97.2%, 88.9%), separate-groups covariance matrix (Chad, 97.2%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 16.318, Southern Sudan/Mandinka: 18.635, Southern Sudan/Somalis: 7.910, Southern Sudan/Haya: 10.673, Chad/Mandinka: 18.417, Chad/Somalis: 10.016, Chad/Haya: 10.982, Mandinka/Somalis: 17.228, Mandinka/Haya: 17.343, Somalis/Haya: 8.431)*
2.E.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 96.3%, 89.8%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 17.418, Southern Sudan/Mandinka: 19.922, Southern Sudan/Somalis: 7.411, Southern Sudan/Haya: 11.375,*

	Chad/Mandinka: 19.724, Chad/Somalis: 10.129, Chad/Haya: 11.763, Mandinka/Somalis: 17.778, Mandinka/Haya: 18.574, Somalis/Haya: 8.457)
2.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 99.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (44), F values for pairwise distances (Southern Sudan/Chad: 37.088, Southern Sudan/Mandinka: 57.927, Southern Sudan/Somalis: 18.695, Southern Sudan/Haya: 130.630, Chad/Mandinka: 35.221, Chad/Somalis: 32.417, Chad/Haya: 66.656, Mandinka/Somalis: 55.187, Mandinka/Haya: 91.125, Somalis/Haya: 100.055)*
2.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Chad, 100.0%, 46.3%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (116)*
2.F.I. Summary	
2.F.I.1. Individual:	*Abu Tabari 02/28 (Mean individual)*
2.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.F.I.3. Data:	*Non-metric cranial and dental traits*
2.F.I.4. Classification:	*Southern Sudan*
2.F.II. Analysis overview	
2.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.F.II.2.a. Variables in matrix:	*58*
2.F.II.2.b. Variables entered:	*18*
2.F.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.581), Tuberculum dentale UI2 (.492), Shovel UI1 (-.448), Tuberculum dentale UI2 (.492 - Function 2), Canine mesial ridge UC (.507 - Function 3), Interruption groove UI2 (-.577 - Function 4)*
2.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .004 (Sig. .000), 3 through 4: .044 (Sig. .000), 4: .258 (Sig. .000)*
2.F.II.4.b. Eigenvalues:	*1: 16.574 (r: .971), 2: 9.283 (r: .950), 3: 4.856 (r: .911), 4: 2.881 (r: .862)*
2.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
2.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -49.815, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*
2.F.III. Results	
2.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 35.073), Haya (D^2: 37.058)*
2.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*94.4%*
2.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 18.160), Somalis (D^2: 41.393)*
2.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 1 Haya), Chad (1 Southern Sudan), Somalis (1 Haya)*
2.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad)*
2.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.F.IV. Additional results

2.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 100.0%, 88.0%), separate-groups covariance matrix (Mandinka, 100.0%), Box's M (test not possible), variables entered (58)*

2.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Southern Sudan, 97.2%, 91.7%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (test not possible), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 15.972, Southern Sudan/Mandinka: 34.998, Southern Sudan/Somalis: 46.187, Southern Sudan/Haya: 112.928, Chad/Mandinka: 40.757, Chad/Somalis: 51.702, Chad/Haya: 120.750, Mandinka/Somalis: 50.729, Mandinka/Haya: 113.442, Somalis/Haya: 69.783)*

2.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 97.2%, 92.6%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (test not possible), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 16.914, Southern Sudan/Mandinka: 37.749, Southern Sudan/Somalis: 47.260, Southern Sudan/Haya: 115.416, Chad/Mandinka: 41.572, Chad/Somalis: 52.112, Chad/Haya: 121.234, Mandinka/Somalis: 53.854, Mandinka/Haya: 120.248, Somalis/Haya: 72.972)*

2.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (Southern Sudan/Chad: 26.068, Southern Sudan/Mandinka: 56.608, Southern Sudan/Somalis: 55.154, Southern Sudan/Haya: 112.664, Chad/Mandinka: 76.413, Chad/Somalis: 72.067, Chad/Haya: 149.872, Mandinka/Somalis: 75.314, Mandinka/Haya: 98.125, Somalis/Haya: 74.110)*

2.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 88.9%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (97)*

3. Djabarona 96/120 - Handessi

3.A.I. Summary

3.A.I.1. Individual: *Djabarona 96/120 - Handessi (Mean individual)*

3.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

3.A.I.3. Data: *Cranial and dental measurements*

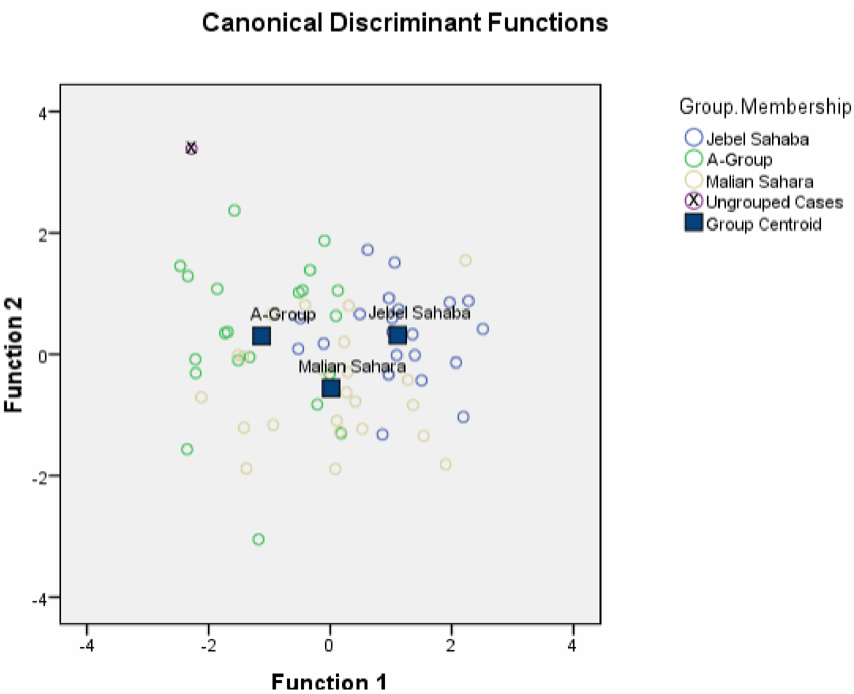
3.A.I.4. Classification: *A-Group*

3.A.II. Analysis overview

3.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.A.II.2.a. Variables in matrix:	*8*
3.A.II.2.b. Variables entered:	*7*
3.A.II.3. Best predictors:	*69. Height of the mandibular symphysis (.800), 69(2). 2nd molar mandibular body height (.637), 54. Nasal breadth (.568), 54. Nasal breadth (-.645 - Function 2)*
3.A.II.4.a. Wilks' Lambda:	*1 through 2: .459 (Sig. .000), 2: .848 (Sig. .136)*
3.A.II.4.b. Eigenvalues:	*1: .848 (r: .678), 2: .180 (r: .390)*
3.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
3.A.II.6. Remarks:	*Box's M (Sig. .219; Log determinants: A-Group - -.397, Jebel Sahaba/Tushka - -.036, Malian Sahara - -.508), no outliers detected, no variables failed tolerance test*

3.A.III. Results

3.A.III.1.a. Within-groups covariance matrix:	*A-Group, 70.8%, A-Group (D^2: 10.857), Malian Sahara (D^2: 20.845)*
3.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*56.9%*
3.A.III.1.c. Separate-groups covariance matrix:	*A-Group, 70.8%, A-Group (D^2: 7.461), Malian Sahara (D^2: 22.844)*
3.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group, 4 Malian Sahara), Malian Sahara (7 A-Group, 7 Jebel Sahaba/Tushka)*
3.A.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 3 Malian Sahara), Malian Sahara (6 A-Group, 4 Jebel Sahaba/Tushka)*
3.A.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



3.A.IV. Additional results

3.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 64.6%, 56.9%), separate-groups covariance matrix (A-Group, 69.2%), Box's M (Sig. .355), variables entered (8)*
3.A.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (A-Group, 58.5%, 56.9%), separate-groups covariance matrix (A-Group, 63.1%), Box's M (Sig. .283), variables entered (2), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 20.293, A-Group/Malian Sahara: 9.131, Jebel Sahaba/Tushka/Malian Sahara: 5.815)*
3.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 58.5%, 56.9%), separate-groups covariance matrix (A-Group, 63.1%), Box's M (Sig. .283), variables entered (2), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 20.293, A-Group/Malian Sahara: 9.131, Jebel Sahaba/Tushka/Malian Sahara: 5.815)*
3.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 44.6%, 43.4%; separate-groups covariance matrix - A-Group, 61.4%), Box's M (Sig. .000), variables entered (2), F values for pairwise distances (A-*

Group/Jebel Sahaba/Tushka: 23.536, A-Group/Malian Sahara: 11.305, A-Group/"Sudanese Hotchpotch": .451, Jebel Sahaba/Tushka/Malian Sahara: 6.306, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 19.737, Malian Sahara/"Sudanese Hotchpotch": 7.464)*

3.A.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - A-Group, 65.1%, 48.2%; separate-groups covariance matrix - A-Group, 68.7%), Box's M (test result not accepted; Sig. .099), variables entered (6)*

3.A.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 77.1%, 69.9%; separate-groups covariance matrix - A-Group, 75.9%), Box's M (test result not accepted; Sig. .098), variables entered (7), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 9.372, A-Group/Malian Sahara: 9.363, A-Group/"Sudanese Hotchpotch": 3.012, Jebel Sahaba/Tushka/Malian Sahara: 3.404, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 7.204, Malian Sahara/"Sudanese Hotchpotch": 8.136)*

3.A.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 78.3%, 62.7%; separate-groups covariance matrix - A-Group, 80.7%), Box's M (Sig. .000), variables entered (14)*

3.B.I. Summary

3.B.I.1. Individual: *Djabarona 96/120 - Handessi (Mean individual)*

3.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

3.B.I.3. Data: *Scaled cranial and dental measurements*

3.B.I.4. Classification: *Malian Sahara*

3.B.II. Analysis overview

3.B.II.1. Method: *Simultaneous entry*

3.B.II.2.a. Variables in matrix: *6*

3.B.II.2.b. Variables entered: *6*

3.B.II.3. Best predictors: *81(1). Crown width LM3 (-.656), 19a. Mastoid height (.554), 69(2). 2nd molar mandibular body height (-.297), 69. Height of the mandibular symphysis (.907 - Function 2)*

3.B.II.4.a. Wilks' Lambda: *1 through 2: .545 (Sig. .000), 2: .777 (Sig. .010)*

3.B.II.4.b. Eigenvalues: *1: .427 (r: .547), 2: .287 (r: .472)*

3.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

3.B.II.6. Remarks: *Box's M (Sig. .475; Log determinants: A-Group - -25.254, Jebel Sahaba/Tushka - -26.129, Malian Sahara - -26.061), no outliers detected, no variables failed tolerance test*

3.B.III. Results

3.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 64.6%, Malian Sahara (D^2: .138), Jebel Sahaba/Tushka (D^2: 1.981)*

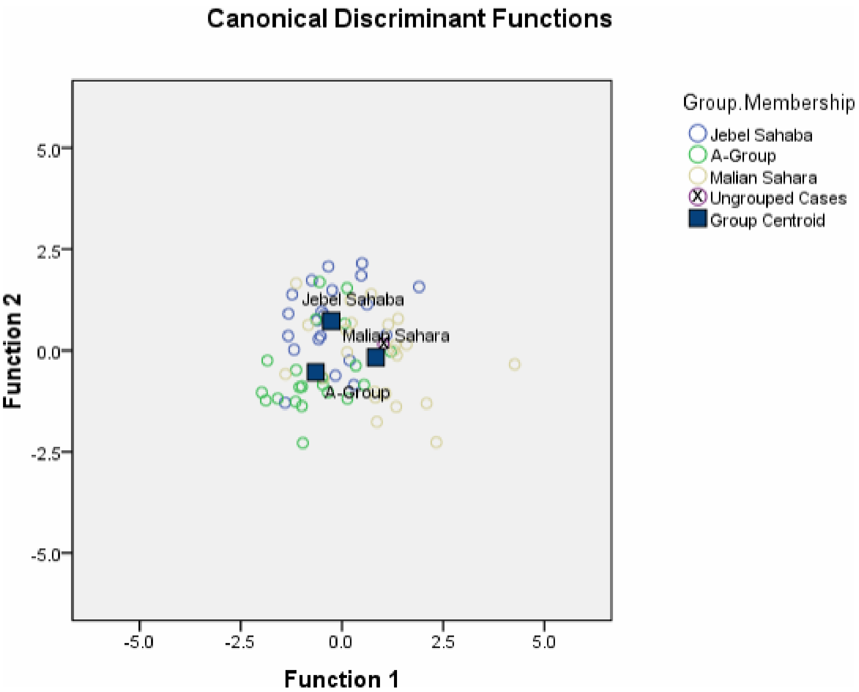
3.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *60.0%*

3.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 64.6%, Malian Sahara (D^2: .174), Jebel Sahaba/Tushka (D^2: 3.236)*

3.B.III.2.a. Misclassifications (leave-one-out): *A-Group (4 Jebel Sahaba/Tushka, 4 Malian Sahara), Jebel Sahaba/Tushka (5 A-Group, 4 Malian Sahara), Malian Sahara (2 A-Group, 7 Jebel Sahaba/Tushka)*

3.B.III.2.b. Misclassifications (separate-groups): *A-Group (4 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (4 A-Group, 3 Malian Sahara), Malian Sahara (3 A-Group, 6 Jebel Sahaba/Tushka)*

3.B.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



3.B.IV. Additional results

3.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 64.6%, 60.0%), separate-groups covariance matrix (Malian Sahara, 64.6%), Box's M (Sig. .475), variables entered (6)*

3.B.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 58.5%, 58.5%), separate-groups covariance matrix (Malian Sahara, 61.5%), Box's M (Sig. .421), variables entered (3), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 5.032, A-Group/Malian Sahara: 5.652, Jebel Sahaba/Tushka/Malian Sahara: 5.747)*

3.B.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 58.5%, 58.5%), separate-groups covariance matrix (Malian Sahara, 61.5%), Box's M (Sig. .421), variables entered (3), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 5.032, A-Group/Malian Sahara: 5.652, Jebel Sahaba/Tushka/Malian Sahara: 5.747)*

3.B.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 59.0%, 56.6%; separate-groups covariance matrix - A-Group, 44.6%), Box's M (Sig. .485), variables entered (2), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 22.800, A-Group/Malian Sahara: 9.328, A-Group/"Sudanese Hotchpotch": 3.198, Jebel Sahaba/Tushka/Malian Sahara: 6.173, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 17.399, Malian Sahara/"Sudanese Hotchpotch": 3.742)*

3.B.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - A-Group, 63.9%, 49.4%; separate-groups covariance matrix - A-Group, 67.5%), Box's M (Sig. .297), variables entered (5)*

3.B.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 73.5%, 68.7%; separate-groups covariance matrix - "Sudanese Hotchpotch", 72.3%), Box's M (Sig. .001), variables entered (7), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 5.318, A-Group/Malian Sahara: 8.003, A-Group/"Sudanese Hotchpotch": 4.784, Jebel Sahaba/Tushka/Malian Sahara: 6.259, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 5.382, Malian Sahara/"Sudanese Hotchpotch": 5.400)*

3.B.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 74.7%, 59.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 75.9%), Box's M (Sig. .000), variables entered (13)*

3.C.I. Summary

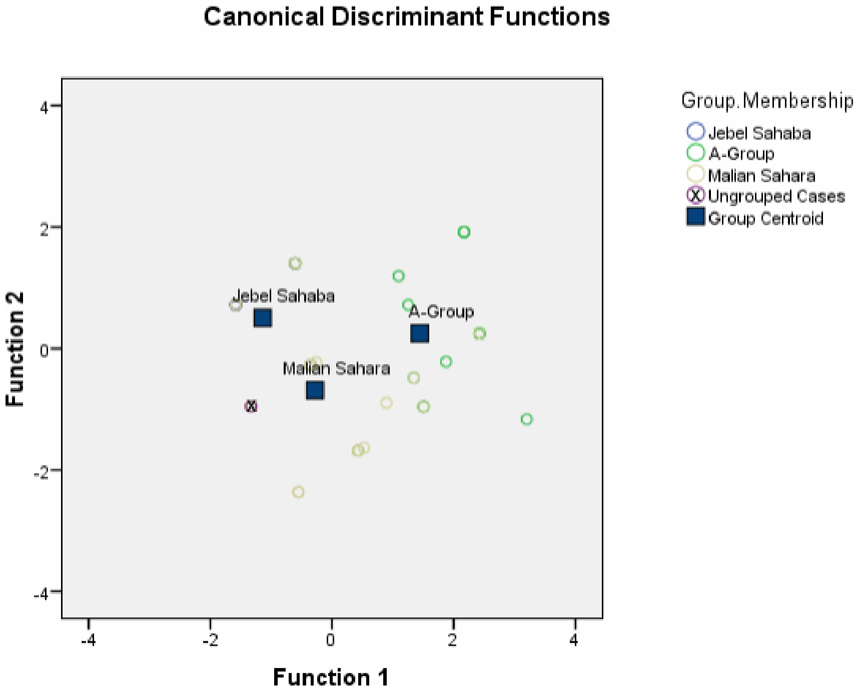
3.C.I.1. Individual: *Djabarona 96/120 - Handessi (Mean individual)*

3.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

3.C.I.3. Data: *Non-metric cranial and dental traits*
3.C.I.4. Classification: *Malian Sahara*

3.C.II. Analysis overview
3.C.II.1. Method: *Mahalanobis distance*
3.C.II.2.a. Variables in matrix: *11*
3.C.II.2.b. Variables entered: *5*
3.C.II.3. Best predictors: *Sella nasi (main) (.705), Margo infranasalis (main) (.664), Alveolar prognathism (-.540), Symphyseal height (.760 - Function 2)*
3.C.II.4.a. Wilks' Lambda: *1 through 2: .359 (Sig. .000), 2: .781 (Sig. .005)*
3.C.II.4.b. Eigenvalues: *1: 1.175 (r: .735), 2: .280 (r: .468)*
3.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
3.C.II.6. Remarks: *Box's M (test result not accepted; Sig. .147; Log determinants: A-Group - -9.444, Jebel Sahaba/Tushka - 'singular', Malian Sahara - -8.751), no outliers detected, no variables failed tolerance test*

3.C.III. Results
3.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 72.3%, Malian Sahara (D^2: 1.177), Jebel Sahaba/Tushka (D^2: 2.154)*
3.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *70.8%*
3.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 72.3%, Malian Sahara (D^2: 1.067), Jebel Sahaba/Tushka (D^2: 3.415)*
3.C.III.2.a. Misclassifications (leave-one-out): *A-Group (2 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (6 Malian Sahara), Malian Sahara (4 A-Group, 4 Jebel Sahaba/Tushka)*
3.C.III.2.b. Misclassifications (separate-groups): *A-Group (2 Jebel Sahaba/Tushka, 3 Malian Sahara), Jebel Sahaba/Tushka (6 Malian Sahara), Malian Sahara (3 A-Group, 4 Jebel Sahaba/Tushka)*
3.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.C.IV. Additional results
3.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 72.3%, 60.0%), separate-groups covariance matrix (Malian Sahara, 70.8%), Box's M (test not possible), variables entered (11)*
3.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 72.3%, 70.8%), separate-groups covariance matrix (Malian Sahara, 72.3%), Box's M (test result not accepted; Sig. .147), variables entered (5), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 13.234, A-Group/Malian Sahara: 7.909, Jebel Sahaba/Tushka/Malian Sahara: 4.402)*
3.C.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 69.2%, 67.7%), separate-groups covariance matrix (Malian Sahara, 69.2%), Box's M (Sig. .035), variables entered (4), F values for pairwise distances (A-Group/Jebel*

Sahaba/Tushka: 14.930, A-Group/Malian Sahara: 8.166, Jebel Sahaba/Tushka/Malian Sahara: 5.596)

3.C.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 68.7%, 66.3%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 61.4%), Box's M (test result not accepted; Sig. .124), variables entered (5), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 12.864, A-Group/Malian Sahara: 8.158, A-Group/"Sudanese Hotchpotch": 13.068, Jebel Sahaba/Tushka/Malian Sahara: 3.670, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 9.349, Malian Sahara/"Sudanese Hotchpotch": 13.840)*

3.C.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 72.3%, 59.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 69.9%), Box's M (test not possible), variables entered (11)*

3.C.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 63.9%, 61.4%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 73.5%), Box's M (Sig. .000), variables entered (5), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 17.244, A-Group/Malian Sahara: 9.734, A-Group/"Sudanese Hotchpotch": 9.360, Jebel Sahaba/Tushka/Malian Sahara: 7.824, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 11.002, Malian Sahara/"Sudanese Hotchpotch": 9.268)*

3.C.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 77.1%, 56.6%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 75.9%), Box's M (test not possible), variables entered (17)*

3.D.I. Summary

3.D.I.1. Individual: *Djabarona 96/120 - Handessi (Mean individual)*

3.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.D.I.3. Data: *Cranial measurements*

3.D.I.4. Classification: *Somalis*

3.D.II. Analysis overview

3.D.II.1. Method: *Simultaneous entry*

3.D.II.2.a. Variables in matrix: *8*

3.D.II.2.b. Variables entered: *8*

3.D.II.3. Best predictors: *54. Nasal breadth (-.562), 19a. Mastoid height (.363), 50(1). Interorbital breadth (-.278), 69c. Thickness of the mandibular symphysis (.705 - Function 2), 69. Height of the mandibular symphysis (.617 - Function 3), 69. Height of the mandibular symphysis (.597 - Function 4)*

3.D.II.4.a. Wilks' Lambda: *1 through 4: .332 (Sig. .000), 2 through 4: .568 (Sig. .000), 3 through 4: .760 (Sig. .006), 4: .881 (Sig. .026)*

3.D.II.4.b. Eigenvalues: *1: .713 (r: .645), 2: .338 (r: .502), 3: .159 (r: .371), 4: .135 (r: .345)*

3.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

3.D.II.6. Remarks: *Box's M (Sig. .078; Log determinants: Southern Sudan - 4.499, Chad - 4.404, Mandinka - 6.856, Somalis - 3.796, Haya - 6.471), no outliers detected, no variables failed tolerance test*

3.D.III. Results

3.D.III.1.a. Within-groups covariance matrix: *Somalis, 63.0%, Somalis (D^2: 7.299), Haya (D^2: 10.075)*

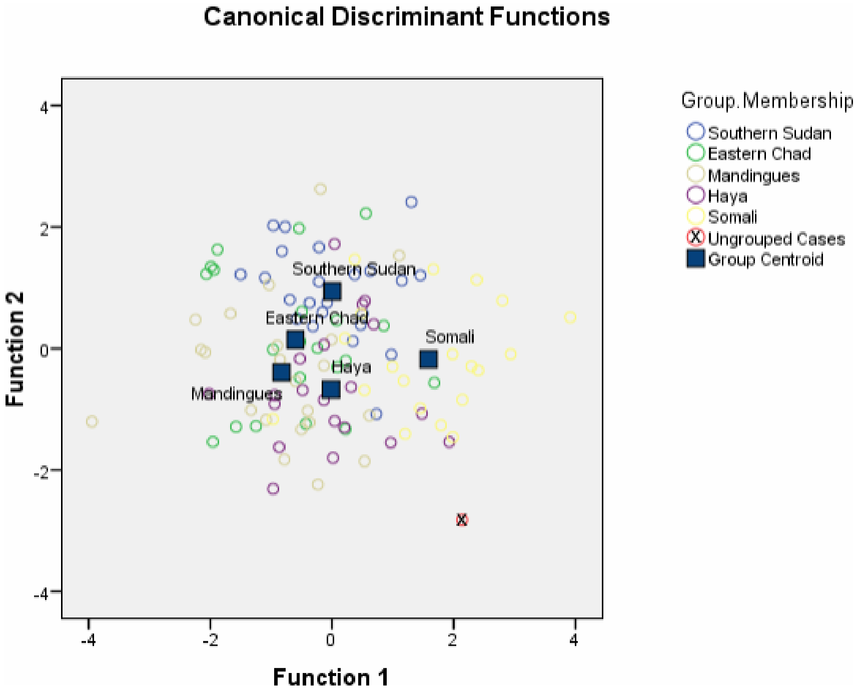
3.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *49.1%*

3.D.III.1.c. Separate-groups covariance matrix: *Somalis, 67.6%, Somalis (D^2: 10.521), Chad (D^2: 13.927)*

3.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (5 Chad, 1 Mandinka, 3 Somalis, 2 Haya), Chad (3 Southern Sudan, 4 Mandinka, 1 Somali, 6 Haya), Mandinka (4 Southern Sudan, 3 Chad, 1 Somali, 3 Haya), Somalis (3 Southern Sudan, 1 Chad, 2 Mandinka), Haya (4 Southern Sudan, 3 Chad, 4 Mandinka, 2 Somalis)*

3.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (2 Chad, 2 Somalis, 1 Haya), Chad (3 Southern Sudan, 2 Mandinka, 1 Somali, 3 Haya), Mandinka (2 Southern Sudan, 2 Chad, 1 Somali, 2 Haya), Somalis (3 Southern Sudan, 1 Mandinka), Haya (3 Southern Sudan, 6 Chad, 1 Mandinka)*

3.D.III.3. All groups scatter plot: *Simultaneous entry, within-groups covariance matrix*



3.D.IV. Additional results

3.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 63.0%, 49.1%), separate-groups covariance matrix (Somalis, 67.6%), Box's M (Sig. .078), variables entered (8)*

3.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Somalis, 61.1%, 51.9%), separate-groups covariance matrix (Somalis, 65.7%), Box's M (Sig. .055), variables entered (6), F values for pairwise distances (Southern Sudan/Chad: 3.045, Southern Sudan/Mandinka: 5.123, Southern Sudan/Somalis: 6.229, Southern Sudan/Haya: 4.834, Chad/Mandinka: 2.555, Chad/Somalis: 8.660, Chad/Haya: 3.188, Mandinka/Somalis: 9.836, Mandinka/Haya: 3.327, Somalis/Haya: 5.493)*

3.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 61.1%, 51.9%), separate-groups covariance matrix (Somalis, 65.7%), Box's M (Sig. .055), variables entered (6), F values for pairwise distances (Southern Sudan/Chad: 3.045, Southern Sudan/Mandinka: 5.123, Southern Sudan/Somalis: 6.229, Southern Sudan/Haya: 4.834, Chad/Mandinka: 2.555, Chad/Somalis: 8.660, Chad/Haya: 3.188, Mandinka/Somalis: 9.836, Mandinka/Haya: 3.327, Somalis/Haya: 5.493)*

3.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 61.1%, 51.9%; separate-groups covariance matrix - Haya, 64.8%), Box's M (Sig. .068), variables entered (7), F values for pairwise distances (Southern Sudan/Chad: 1.677, Southern Sudan/Mandinka: 4.485, Southern Sudan/Somalis: 8.909, Southern Sudan/Haya: 4.091, Chad/Mandinka: 2.654, Chad/Somalis: 10.027, Chad/Haya: 3.089, Mandinka/Somalis: 9.321, Mandinka/Haya: 3.726, Somalis/Haya: 7.375)*

3.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Somalis, 66.7%, 49.1%; separate-groups covariance matrix - Somalis, 68.5%), Box's M (Sig. .214), variables entered (14)*

3.E.I. Summary

3.E.I.1. Individual: *Djabarona 96/120 - Handessi (Mean individual)*
3.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.E.I.3. Data: *Scaled cranial measurements*
3.E.I.4. Classification: *Haya*

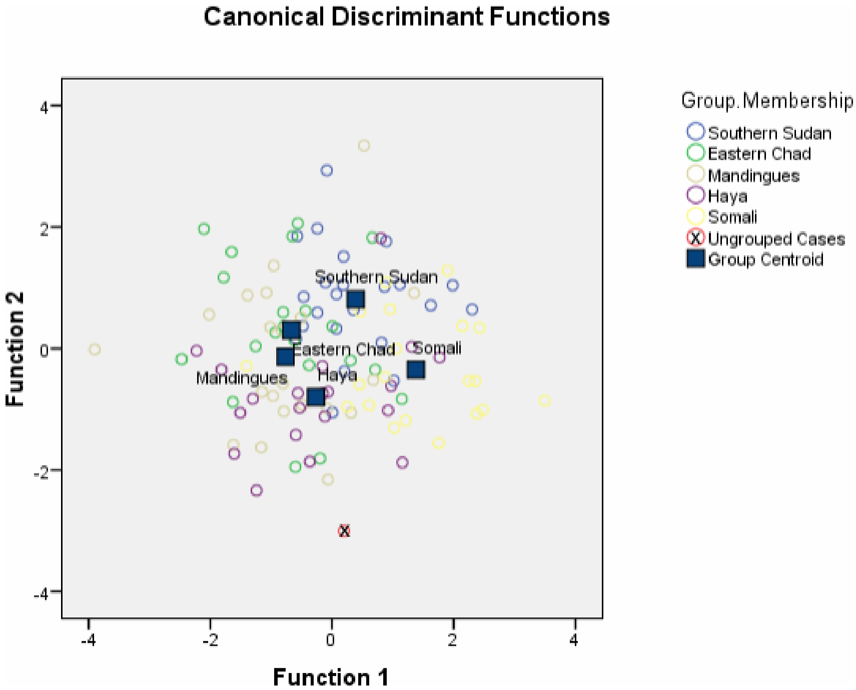
3.E.II. Analysis overview

3.E.II.1. Method: *Simultaneous entry*
3.E.II.2.a. Variables in matrix: *8*
3.E.II.2.b. Variables entered: *8*
3.E.II.3. Best predictors: *19a. Mastoid height (.589), 69c. Thickness of the mandibular symphysis (.551), 13a. Mastoid width (.386),*

	69c. Thickness of the mandibular symphysis (.669 - Function 2), 69. Height of the mandibular symphysis (.791 - Function 3), 13a. Mastoid width (.624 - Function 4)
3.E.II.4.a. Wilks' Lambda:	*1 through 4: .354 (Sig. .000), 2 through 4: .579 (Sig. .000), 3 through 4: .767 (Sig. .008), 4: .898 (Sig. .055)*
3.E.II.4.b. Eigenvalues:	*1: .637 (r: .624), 2: .324 (r: .495), 3: .171 (r: .382), 4: .114 (r: .320)*
3.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
3.E.II.6. Remarks:	*Box's M (Sig. .216; Log determinants: Southern Sudan - -28.963, Chad - -29.677, Mandinka - -28.007, Somalis - -29.681, Haya - -28.598), no outliers detected, no variables failed tolerance test*

3.E.III. Results

3.E.III.1.a. Within-groups covariance matrix:	*Haya, 60.2%, Haya (D^2: 5.427), Somalis (D^2: 8.546)*
3.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*50.0%*
3.E.III.1.c. Separate-groups covariance matrix:	*Chad, 63.9%, Chad (D^2: 8.867), Haya (D^2: 9.389)*
3.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (3 Chad, 2 Mandinka, 4 Somalis, 2 Haya), Chad (4 Southern Sudan, 4 Mandinka, 2 Somalis, 4 Haya), Mandinka (2 Southern Sudan, 3 Chad, 2 Somalis, 4 Haya), Somalis (4 Southern Sudan, 1 Chad, 3 Mandinka), Haya (1 Southern Sudan, 3 Chad, 3 Mandinka, 3 Somalis)*
3.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad, 1 Mandinka, 3 Somalis, 2 Haya), Chad (3 Southern Sudan, 2 Mandinka, 2 Somalis, 3 Haya), Mandinka (1 Southern Sudan, 2 Chad, 2 Somalis, 3 Haya), Somalis (4 Southern Sudan, 1 Chad, 1 Mandinka, 1 Haya), Haya (1 Southern Sudan, 1 Chad, 1 Mandinka, 4 Somalis)*
3.E.III.3. All groups scatter plot:	*Simultaneous entry, within-groups covariance matrix*



3.E.IV. Additional results

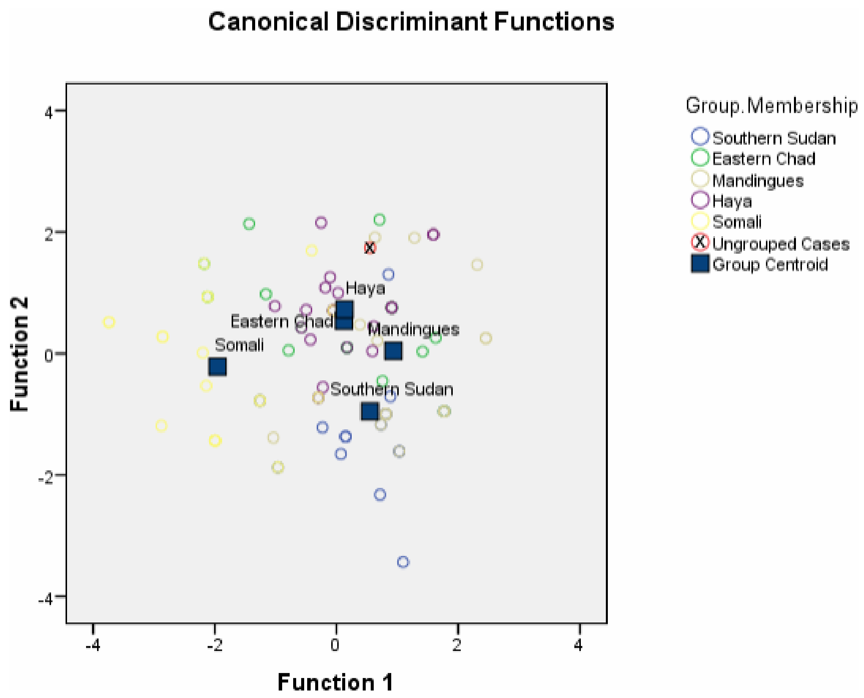
3.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Haya, 60.2%, 50.0%), separate-groups covariance matrix (Chad, 63.9%), Box's M (Sig. .216), variables entered (8)*
3.E.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Haya, 59.3%, 50.9%), separate-groups covariance matrix (Chad, 62.0%), Box's M (Sig. .102), variables entered (5), F values for pairwise distances (Southern Sudan/Chad: 3.371, Southern Sudan/Mandinka: 5.828, Southern Sudan/Somalis: 5.120, Southern Sudan/Haya: 6.368, Chad/Mandinka: 2.766, Chad/Somalis: 7.546, Chad/Haya: 3.762, Mandinka/Somalis: 8.495, Mandinka/Haya: 3.974, Somalis/Haya: 6.027)*
3.E.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Haya, 59.3%, 50.9%), separate-groups covariance matrix (Chad, 62.0%), Box's M (Sig. .102), variables entered (5), F values for pairwise*

	distances (Southern Sudan/Chad: 3.371, Southern Sudan/Mandinka: 5.828, Southern Sudan/Somalis: 5.120, Southern Sudan/Haya: 6.368, Chad/Mandinka: 2.766, Chad/Somalis: 7.546, Chad/Haya: 3.762, Mandinka/Somalis: 8.495, Mandinka/Haya: 3.974, Somalis/Haya: 6.027)
3.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Haya, 64.8%, 50.0%; separate-groups covariance matrix - Haya, 63.9%), Box's M (Sig. .060), variables entered (7), F values for pairwise distances (Southern Sudan/Chad: 2.932, Southern Sudan/Mandinka: 6.015, Southern Sudan/Somalis: 5.661, Southern Sudan/Haya: 4.638, Chad/Mandinka: 2.409, Chad/Somalis: 7.170, Chad/Haya: 3.181, Mandinka/Somalis: 6.903, Mandinka/Haya: 3.703, Somalis/Haya: 5.406)*
3.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Haya, 67.6%, 49.1%; separate-groups covariance matrix - Haya, 67.6%), Box's M (Sig. .066), variables entered (14)*

3.F.I. Summary	
3.F.I.1. Individual:	*Djabarona 96/120 - Handessi (Mean individual)*
3.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.F.I.3. Data:	*Non-metric cranial and dental traits*
3.F.I.4. Classification:	*Haya*

3.F.II. Analysis overview	
3.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.F.II.2.a. Variables in matrix:	*11*
3.F.II.2.b. Variables entered:	*9*
3.F.II.3. Best predictors:	*Sella nasi (main) (-.624), Sella nasi (additional tendency/superstructure) (.584), Alveolar prognathism (.498), Symphyseal height (-.701 - Function 2), Rocker jaw (.785 - Function 3), Ramus angle (.530 - Function 4)*
3.F.II.4.a. Wilks' Lambda:	*1 through 4: .301 (Sig. .000), 2 through 4: .604 (Sig. .001), 3 through 4: .837 (Sig. .215), 4: .933 (Sig. .323)*
3.F.II.4.b. Eigenvalues:	*1: 1.004 (r: .708), 2: .385 (r: .527), 3: .115 (r: .321), 4: .072 (r: .260)*
3.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
3.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -22.333, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

3.F.III. Results	
3.F.III.1.a. Within-groups covariance matrix:	*Haya, 54.6%, Haya (D^2: 1.315), Chad (D^2: 2.432)*
3.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*50.0%*
3.F.III.1.c. Separate-groups covariance matrix:	*Haya, 57.4%, Haya (D^2: 1.959), Chad (D^2: 4.079)*
3.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (5 Chad, 1 Mandinka, 3 Somalis), Chad (2 Southern Sudan, 4 Mandinka, 4 Somalis, 1 Haya), Mandinka (8 Southern Sudan, 4 Chad, 2 Somalis, 2 Haya), Somalis (2 Southern Sudan, 1 Chad, 1 Haya), Haya (1 Southern Sudan, 8 Chad, 5 Mandinka)*
3.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (3 Chad, 2 Somalis, 1 Haya), Chad (2 Southern Sudan, 2 Mandinka, 2 Somalis, 1 Haya), Mandinka (8 Southern Sudan, 3 Chad, 2 Somalis, 1 Haya), Somalis (2 Southern Sudan, 3 Chad), Haya (1 Southern Sudan, 10 Chad, 3 Mandinka)*
3.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.F.IV. Additional results

3.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Haya, 54.6%, 43.5%), separate-groups covariance matrix (Haya, 58.3%), Box's M (test not possible), variables entered (11)*

3.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Mandinka, 53.7%, 47.2%), separate-groups covariance matrix (Mandinka, 56.5%), Box's M (Sig. .000), variables entered (6), F values for pairwise distances (Southern Sudan/Chad: 3.645, Southern Sudan/Mandinka: 2.189, Southern Sudan/Somalis: 9.086, Southern Sudan/Haya: 4.473, Chad/Mandinka: 1.824, Chad/Somalis: 7.422, Chad/Haya: 1.523, Mandinka/Somalis: 11.275, Mandinka/Haya: 2.534, Somalis/Haya: 8.195)*

3.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Mandinka, 53.7%, 47.2%), separate-groups covariance matrix (Mandinka, 56.5%), Box's M (Sig. .000), variables entered (6), F values for pairwise distances (Southern Sudan/Chad: 3.645, Southern Sudan/Mandinka: 2.189, Southern Sudan/Somalis: 9.086, Southern Sudan/Haya: 4.473, Chad/Mandinka: 1.824, Chad/Somalis: 7.422, Chad/Haya: 1.523, Mandinka/Somalis: 11.275, Mandinka/Haya: 2.534, Somalis/Haya: 8.195)*

3.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Haya, 56.5%, 45.4%; separate-groups covariance matrix - Haya, 59.3%), Box's M (Sig. .000), variables entered (6), F values for pairwise distances (Southern Sudan/Chad: 3.856, Southern Sudan/Mandinka: 2.875, Southern Sudan/Somalis: 12.309, Southern Sudan/Haya: 6.906, Chad/Mandinka: .568, Chad/Somalis: 9.558, Chad/Haya: 1.236, Mandinka/Somalis: 11.691, Mandinka/Haya: 2.929, Somalis/Haya: 12.229)*

3.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Haya, 60.2%, 47.2%; separate-groups covariance matrix - Haya, 63.0%), Box's M (test not possible), variables entered (17)*

4. pre-Leiterband

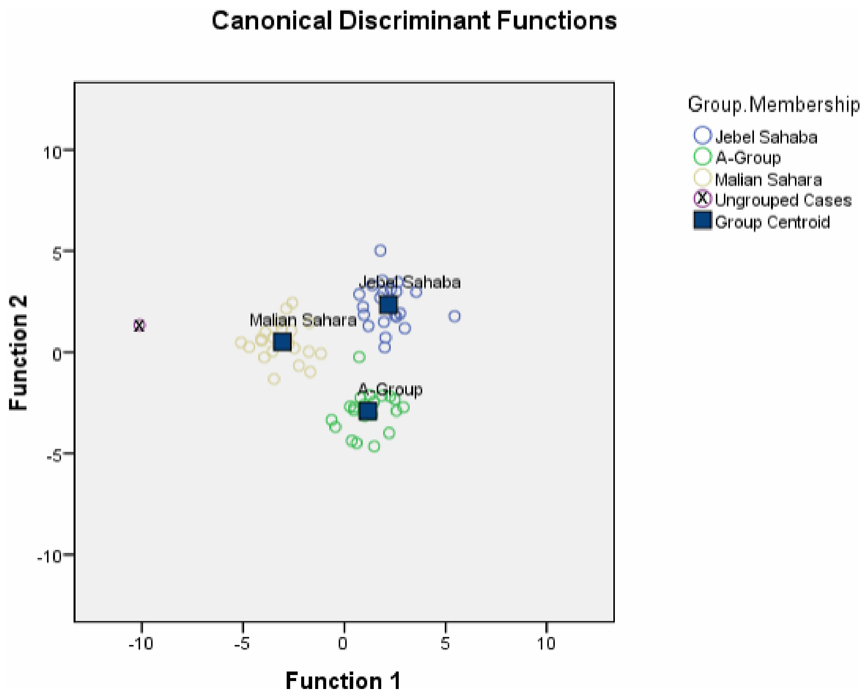
4.A.I. Summary
4.A.I.1. Individual: *pre-Leiterband (Mean individual)*
4.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
4.A.I.3. Data: *Cranial and dental measurements*
4.A.I.4. Classification: *Malian Sahara*

4.A.II. Analysis overview
4.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
4.A.II.2.a. Variables in matrix: *65*

4.A.II.2.b. Variables entered:	*14*
4.A.II.3. Best predictors:	*81. Crown length UI2 (.257), 81. Crown length LP1 (-.219), 80a. Dental arch length of the mandible (-.217), 81(1). Crown width LI2 (.617 - Function 2)*
4.A.II.4.a. Wilks' Lambda:	*1 through 2: .026 (Sig. .000), 2: .172 (Sig. .000)*
4.A.II.4.b. Eigenvalues:	*1: 5.558 (r: .921), 2: 4.816 (r: .910)*
4.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
4.A.II.6. Remarks:	*Box's M (Sig. .005; Log determinants: A-Group - -26.788, Jebel Sahaba/Tushka - -26.379, Malian Sahara - -23.301), no outliers detected (except ungrouped case - D^2: 50.687; critical value: 23.685 - p 0.95, df 14), no variables failed tolerance test*

4.A.III. Results

4.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 50.466), A-Group (D^2: 145.400)*
4.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
4.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 50.687), Jebel Sahaba/Tushka (D^2: 145.108)*
4.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka), Malian Sahara (1 A-Group)*
4.A.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
4.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



4.A.IV. Additional results

4.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 56.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (65)*
4.A.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 98.5%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 18.728, A-Group/Malian Sahara: 22.483, Jebel Sahaba/Tushka/Malian Sahara: 26.249)*
4.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.623, A-Group/Malian Sahara: 20.356, Jebel Sahaba/Tushka/Malian Sahara: 23.365)*
4.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (21), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 16.898, A-Group/Malian Sahara: 15.445, A-Group/"Sudanese Hotchpotch": 34.588, Jebel*

Sahaba/Tushka/Malian Sahara: 16.089, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 55.136, Malian Sahara/"Sudanese Hotchpotch": 49.192)

4.A.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 79.5%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (58)*

4.A.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (27), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 24.624, A-Group/Malian Sahara: 23.799, A-Group/"Sudanese Hotchpotch": 31.628, Jebel Sahaba/Tushka/Malian Sahara: 20.894, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 53.344, Malian Sahara/"Sudanese Hotchpotch": 57.988)*

4.A.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (114)*

4.B.I. Summary

4.B.I.1. Individual: *pre-Leiterband (Mean individual)*

4.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

4.B.I.3. Data: *Scaled cranial and dental measurements*

4.B.I.4. Classification: *Malian Sahara*

4.B.II. Analysis overview

4.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

4.B.II.2.a. Variables in matrix: *53*

4.B.II.2.b. Variables entered: *14*

4.B.II.3. Best predictors: *71a. Minimum ramus width (.248), 81(1). Crown width LI1 (.211), 69. Height of the mandibular symphysis (.188), 81(1), Crown width LI1 (-.390 - Function 2)*

4.B.II.4.a. Wilks' Lambda: *1 through 2: .030 (Sig. .000), 2: .245 (Sig. .000)*

4.B.II.4.b. Eigenvalues: *1: 7.204 (r: .937), 2: 3.077 (r: .869)*

4.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

4.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -81.773, Jebel Sahaba/Tushka - -81.918, Malian Sahara - -76.530), no outliers detected, no variables failed tolerance test*

4.B.III. Results

4.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: .652), A-Group (D^2: 12.971)*

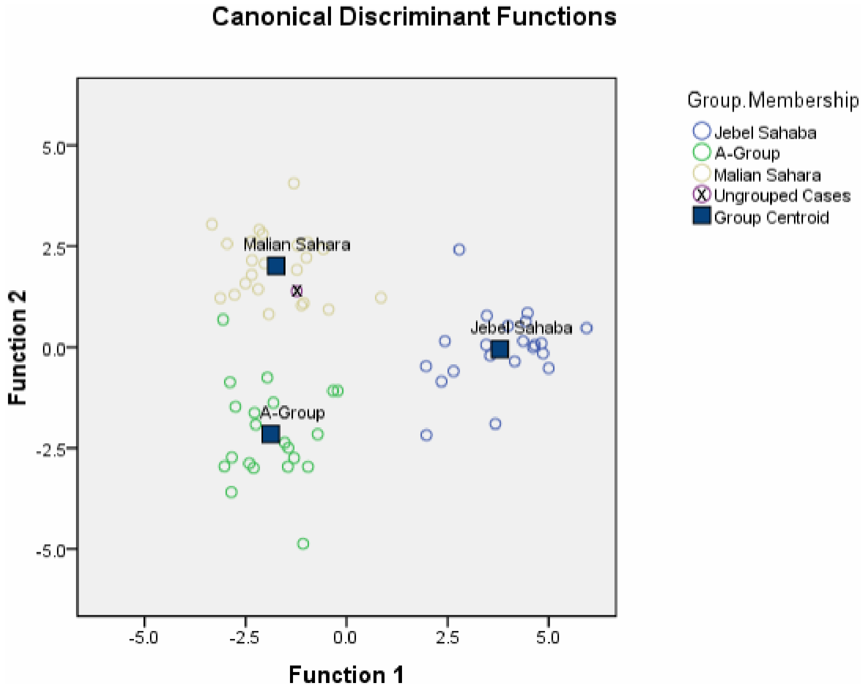
4.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*

4.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 98.5%, Malian Sahara (D^2: .726), A-Group (D^2: 9.822)*

4.B.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*

4.B.III.2.b. Misclassifications (separate-groups): *A-Group (1 Malian Sahara)*

4.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.B.IV. Additional results

4.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 83.1%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*
4.B.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.582, A-Group/Malian Sahara: 11.849, Jebel Sahaba/Tushka/Malian Sahara: 24.246)*
4.B.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (11), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 26.430, A-Group/Malian Sahara: 13.035, Jebel Sahaba/Tushka/Malian Sahara: 22.550)*
4.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 91.6%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 18.094, A-Group/Malian Sahara: 13.327, A-Group/"Sudanese Hotchpotch": 23.271, Jebel Sahaba/Tushka/Malian Sahara: 16.082, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 53.920, Malian Sahara/"Sudanese Hotchpotch": 35.183)*
4.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 83.1%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (49)*
4.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 98.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (25), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.754, A-Group/Malian Sahara: 19.097, A-Group/"Sudanese Hotchpotch": 31.687, Jebel Sahaba/Tushka/Malian Sahara: 20.537, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 54.601, Malian Sahara/"Sudanese Hotchpotch": 37.174)*
4.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (112)*

4.C.I. Summary

4.C.I.1. Individual:	*pre-Leiterband (Mean individual)*

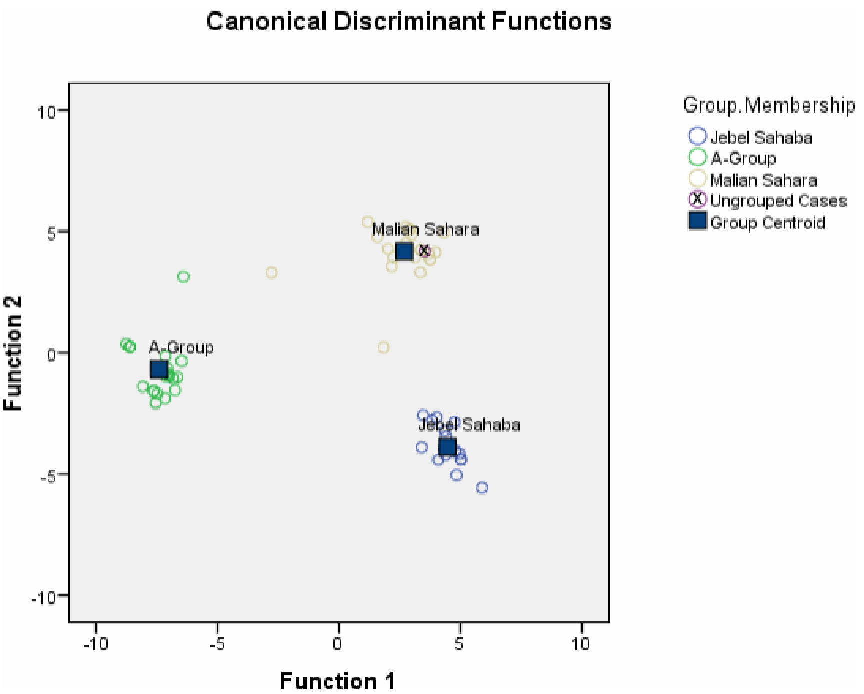
4.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
4.C.I.3. Data:	*Non-metric cranial and dental traits*
4.C.I.4. Classification:	*Malian Sahara*

4.C.II. Analysis overview

4.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.C.II.2.a. Variables in matrix:	*52*
4.C.II.2.b. Variables entered:	*14*
4.C.II.3. Best predictors:	*Distal accessory ridge UC (.504), Interruption groove UI2 (.240), Tuberculum dentale UI2 (.170), Tuberculum dentale UI2 (.714 - Function 2)*
4.C.II.4.a. Wilks' Lambda:	*1 through 2: .003 (Sig. .000), 2: .079 (Sig. .000)*
4.C.II.4.b. Eigenvalues:	*1: 27.950 (r: .983), 2: 11.727 (r: .960)*
4.C.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
4.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

4.C.III. Results

4.C.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: .723), Jebel Sahaba/Tushka (D^2: 65.806)*
4.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
4.C.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: .368), Jebel Sahaba/Tushka (D^2: 173.160)*
4.C.III.2.a. Misclassifications (leave-one-out):	*Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
4.C.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
4.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



4.C.IV. Additional results

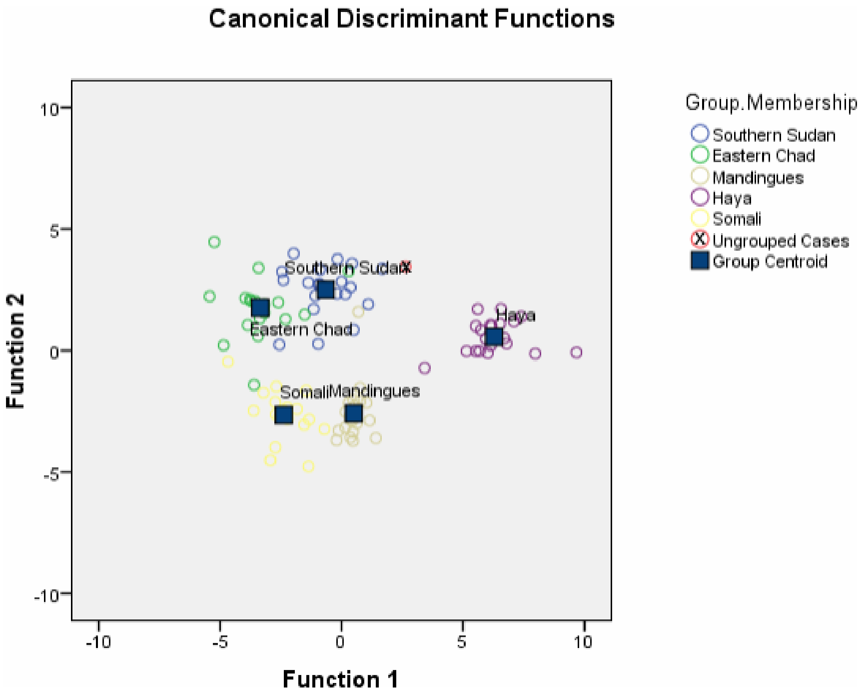
4.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 87.7%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*
4.C.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 109.426, A-Group/Malian Sahara: 89.734, Jebel Sahaba/Tushka/Malian Sahara: 71.297)*
4.C.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 115.387, A-Group/Malian Sahara: 95.348, Jebel Sahaba/Tushka/Malian Sahara: 65.129)*

4.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 83.820, A-Group/Malian Sahara: 80.165, A-Group/"Sudanese Hotchpotch": 64.570, Jebel Sahaba/Tushka/Malian Sahara: 49.941, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 29.877, Malian Sahara/"Sudanese Hotchpotch": 36.266)*
4.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 94.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*
4.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 144.692, A-Group/Malian Sahara: 89.050, A-Group/"Sudanese Hotchpotch": 61.899, Jebel Sahaba/Tushka/Malian Sahara: 57.544, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 38.454, Malian Sahara/"Sudanese Hotchpotch": 31.106)*
4.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahara, 100.0%, 81.9%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (94)*

4.D.I. Summary	
4.D.I.1. Individual:	*pre-Leiterband (Mean individual)*
4.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
4.D.I.3. Data:	*Cranial and dental measurements*
4.D.I.4. Classification:	*Southern Sudan*

4.D.II. Analysis overview	
4.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
4.D.II.2.a. Variables in matrix:	*50*
4.D.II.2.b. Variables entered:	*18*
4.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.546), 80(4)b. 1st premolar dental arch length (mx) (.531), 80a. Dental arch length of the mandible (.378), 81. Crown length LC (.406 - Function 2), 81. Crown length UI2 (.543 - Function 3), 81. Crown length LM1 (.328 - Function 4)*
4.D.II.4.a. Wilks' Lambda:	*1 through 4: .001 (Sig. .000), 2 through 4: .016 (Sig. .000), 3 through 4: .097 (Sig. .000), 4: .458 (Sig. .000)*
4.D.II.4.b. Eigenvalues:	*1: 11.321 (r: .959), 2: 4.969 (r: .912), 3: 3.739 (r: .888), 4: 1.184 (r: .736)*
4.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
4.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -30.183, Chad - -44.140, Mandinka - 'singular', Somalis - -36.871, Haya - -68.594), no outliers detected (except ungrouped case - D^2: 40.528; critical value: 28.869 - p 0.95, df 18), no variables failed tolerance test*

4.D.III. Results	
4.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 33.948), Mandinka (D^2: 47.282)*
4.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.7%*
4.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 40.528), Chad (D^2: 51.940)*
4.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali), Chad (1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Chad), Haya (1 Mandinka)*
4.D.III.2.b. Misclassifications (separate-groups):	*Mandinka (1 Southern Sudan)*
4.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



4.D.IV. Additional results

4.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 100.0%, 87.0%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (50)*

4.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Southern Sudan, 98.1%, 88.9%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.443, Southern Sudan/Mandinka: 18.512, Southern Sudan/Somalis: 22.818, Southern Sudan/Haya: 35.005, Chad/Mandinka: 25.711, Chad/Somalis: 15.419, Chad/Haya: 50.460, Mandinka/Somalis: 20.219, Mandinka/Haya: 34.971, Somalis/Haya: 42.420)*

4.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 98.1%, 90.7%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.949, Southern Sudan/Mandinka: 18.583, Southern Sudan/Somalis: 23.858, Southern Sudan/Haya: 34.608, Chad/Mandinka: 25.525, Chad/Somalis: 15.521, Chad/Haya: 50.971, Mandinka/Somalis: 20.257, Mandinka/Haya: 34.358, Somalis/Haya: 43.601)*

4.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Mandinka, 100.0%, 98.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (41), F values for pairwise distances (Southern Sudan/Chad: 35.861, Southern Sudan/Mandinka: 52.678, Southern Sudan/Somalis: 49.474, Southern Sudan/Haya: 95.701, Chad/Mandinka: 55.195, Chad/Somalis: 38.490, Chad/Haya: 51.035, Mandinka/Somalis: 58.546, Mandinka/Haya: 87.475, Somalis/Haya: 63.459)*

4.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 57.4%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (114)*

4.E.I. Summary

4.E.I.1. Individual: *pre-Leiterband (Mean individual)*

4.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

4.E.I.3. Data: *Scaled cranial and dental measurements*

4.E.I.4. Classification: *Chad*

4.E.II. Analysis overview

4.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

4.E.II.2.a. Variables in matrix: *42*

4.E.II.2.b. Variables entered: *17*

4.E.II.3. Best predictors: *80a. Dental arch length of the mandible (.703), 81. Crown length UI2 (-.321), 80(1)c. 2nd premolar dental arch breadth (md) (.286), 81. Crown length UI2 (.509 - Function 2), 69c. Thickness of the mandibular symphysis (-.437 - Function 3), 81(1). Crown width (.315 - Function 4)*

4.E.II.4.a. Wilks' Lambda: *1 through 4: .012 (Sig. .000), 2 through 4: .054 (Sig. .000), 3 through 4: .216 (Sig. .000), 4: .555 (Sig. .000)*

4.E.II.4.b. Eigenvalues: *1: 3.349 (r: .878), 2: 3.024 (r: .867), 3: 1.569 (r: .782), 4: .803 (r: .667)*

4.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

4.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -84.189, Chad - -95.198, Mandinka - -114.933, Somalis - -90.090, Haya - -89.477), no outliers detected, no variables failed tolerance test*

4.E.III. Results

4.E.III.1.a. Within-groups covariance matrix: *Chad, 98.1%, Chad (D^2: 7.005), Mandinka (D^2: 11.984)*

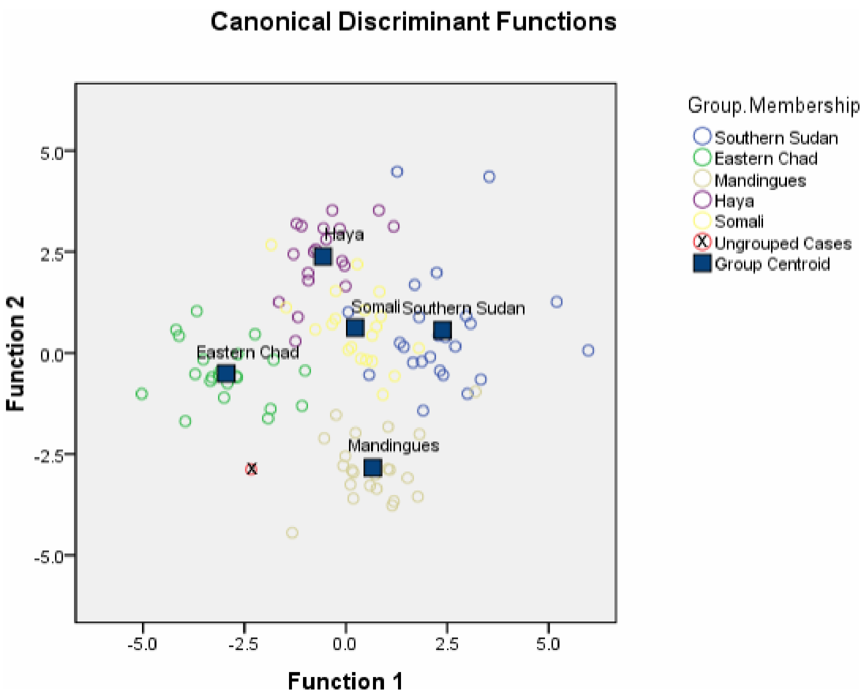
4.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*

4.E.III.1.c. Separate-groups covariance matrix: *Chad, 98.1%, Chad (D^2: 16.242), Mandinka (D^2: 16.314)*

4.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 1 Mandinka, 2 Somalis, 1 Haya), Chad (1 Mandinka, 1 Somali), Mandinka (2 Southern Sudan, 1 Somali), Somalis (1 Haya), Haya (1 Southern Sudan)*

4.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Somali), Mandinka (1 Southern Sudan)*

4.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.E.IV. Additional results

4.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 80.6%), separate-groups covariance matrix (Chad, 99.1%), Box's M (test not possible), variables entered (42)*

4.E.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Chad, 94.4%, 88.0%), separate-groups covariance matrix (Chad, 96.3%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 16.864, Southern Sudan/Mandinka: 18.565, Southern Sudan/Somalis: 7.570, Southern Sudan/Haya: 11.016, Chad/Mandinka: 19.960, Chad/Somalis: 9.931, Chad/Haya: 11.748, Mandinka/Somalis: 17.660, Mandinka/Haya: 18.604, Somalis/Haya: 8.401)*

4.E.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Chad, 94.4%, 88.0%), separate-groups covariance matrix (Chad, 96.3%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 16.864, Southern Sudan/Mandinka: 18.565, Southern*

Sudan/Somalis: 7.570, Southern Sudan/Haya: 11.016, Chad/Mandinka: 19.960, Chad/Somalis: 9.931, Chad/Haya: 11.748, Mandinka/Somalis: 17.660, Mandinka/Haya: 18.604, Somalis/Haya: 8.401)

4.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 99.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (41), F values for pairwise distances (Southern Sudan/Chad: 40.202, Southern Sudan/Mandinka: 52.548, Southern Sudan/Somalis: 21.980, Southern Sudan/Haya: 140.904, Chad/Mandinka: 30.111, Chad/Somalis: 34.954, Chad/Haya: 69.296, Mandinka/Somalis: 48.893, Mandinka/Haya: 68.250, Somalis/Haya: 93.447)*

4.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 52.8%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (112)*

4.F.I. Summary

4.F.I.1. Individual: *pre-Leiterband (Mean individual)*

4.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

4.F.I.3. Data: *Non-metric cranial and dental traits*

4.F.I.4. Classification: *Southern Sudan*

4.F.II. Analysis overview

4.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

4.F.II.2.a. Variables in matrix: *50*

4.F.II.2.b. Variables entered: *18*

4.F.II.3. Best predictors: *Midline diastema (.673), Premolar mesial and distal accessory cusps (.400), Shovel UI1 (-.316), Tuberculum dentale (.696 - Function 2), Midline diastema (.508 - Function 3), Interruption groove UI2 (-.494 - Function 4)*

4.F.II.4.a. Wilks' Lambda: *1 through 4: .000 (Sig. .000), 2 through 4: .004 (Sig. .000), 3 through 4: .037 (Sig. .000), 4: .263 (Sig. .000)*

4.F.II.4.b. Eigenvalues: *1: 29.638 (r: .984), 2: 8.200 (r: .944), 3: 6.051 (r: .926), 4: 2.802 (r: .858)*

4.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

4.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected (except ungrouped case - D^2: 29.298; critical value: 28.869 - p 0.95, df 18), no variables failed tolerance test*

4.F.III. Results

4.F.III.1.a. Within-groups covariance matrix: *Mandinka, 98.1%, Mandinka (D^2: 7.982), Somalis (D^2: 40.455)*

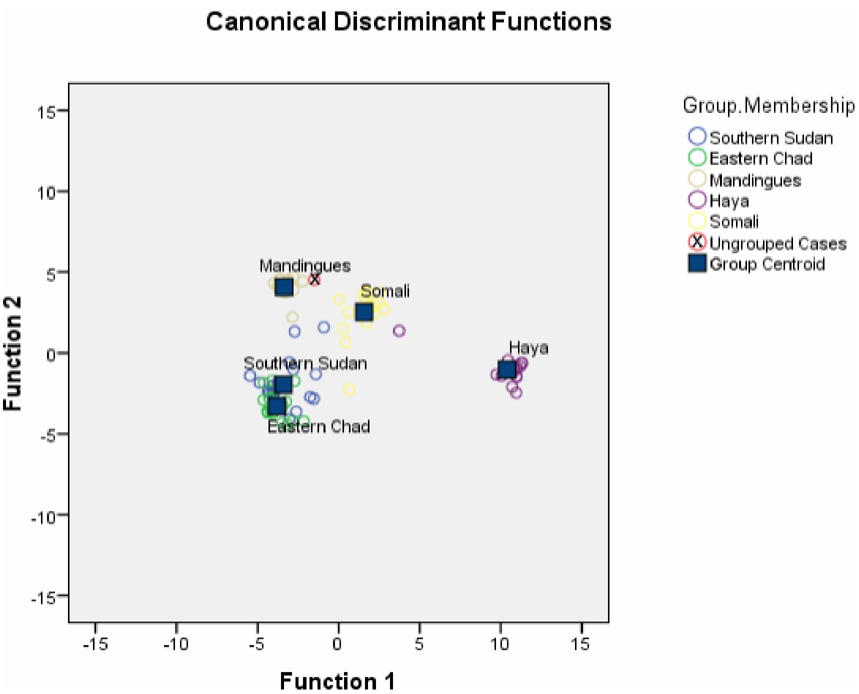
4.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.5%*

4.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 100.0%, Southern Sudan (D^2: 29.298), Somalis (D^2: 33.143)*

4.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 1 Mandinka, 1 Somali), Chad (1 Southern Sudan), Somalis (1 Southern Sudan), Haya (1 Somali)*

4.F.III.2.b. Misclassifications (separate-groups): *No misclassifications*

4.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.F.IV. Additional results

4.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 100.0%, 88.9%), separate-groups covariance matrix (Mandinka, 100.0%), Box's M (test not possible), variables entered (50)*

4.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Somalis, 96.3%, 91.7%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (test not possible), variables entered (15), F values for pairwise distances (Southern Sudan/Chad: 17.504, Southern Sudan/Mandinka: 35.242, Southern Sudan/Somalis: 49.689, Southern Sudan/Haya: 122.242, Chad/Mandinka: 45.561, Chad/Somalis: 61.392, Chad/Haya: 132.822, Mandinka/Somalis: 63.050, Mandinka/Haya: 127.321, Somalis/Haya: 75.804)*

4.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 96.3%, 91.7%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (test not possible), variables entered (15), F values for pairwise distances (Southern Sudan/Chad: 17.504, Southern Sudan/Mandinka: 35.242, Southern Sudan/Somalis: 49.689, Southern Sudan/Haya: 122.242, Chad/Mandinka: 45.561, Chad/Somalis: 61.392, Chad/Haya: 132.822, Mandinka/Somalis: 63.050, Mandinka/Haya: 127.321, Somalis/Haya: 75.804)*

4.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 93.5%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (16), F values for pairwise distances (Southern Sudan/Chad: 30.451, Southern Sudan/Mandinka: 68.106, Southern Sudan/Somalis: 46.979, Southern Sudan/Haya: 124.151, Chad/Mandinka: 88.130, Chad/Somalis: 53.791, Chad/Haya: 155.227, Mandinka/Somalis: 82.448, Mandinka/Haya: 106.041, Somalis/Haya: 87.633)*

4.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 88.9%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (84)*

5. Leiterband

5.A.I. Summary

5.A.I.1. Individual: *Leiterband (Mean individual)*

5.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

5.A.I.3. Data: *Cranial and dental measurements*

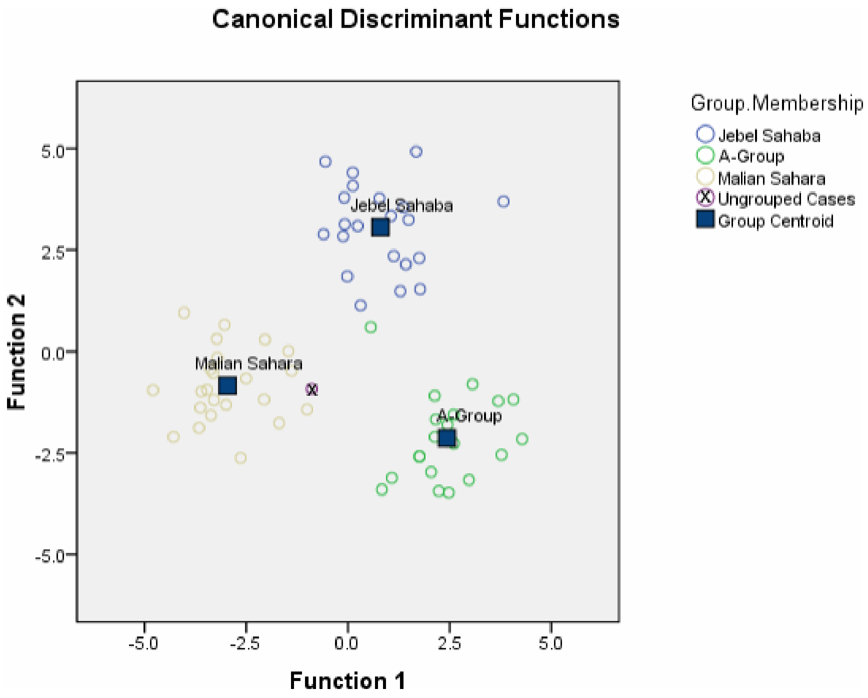
5.A.I.4. Classification: *Malian Sahara*

5.A.II. Analysis overview

5.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
5.A.II.2.a. Variables in matrix:	*69*
5.A.II.2.b. Variables entered:	*14*
5.A.II.3. Best predictors:	*80a. Dental arch length of the mandible (-.379), 81. Crown length UI2 (.316), 81. Crown length LI1 (-.304), 81. Crown length LI1 (.558 - Function 2)*
5.A.II.4.a. Wilks' Lambda:	*1 through 2: .026 (Sig. .000), 2: .167 (Sig. .000)*
5.A.II.4.b. Eigenvalues:	*1: 5.480 (r: .920), 2: 4.976 (r: .913)*
5.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
5.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -31.426, Jebel Sahaba/Tushka - -27.769, Malian Sahara - -27.069), no outliers detected, no variables failed tolerance test*

5.A.III. Results

5.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 4.295), A-Group (D^2: 12.527)*
5.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*98.5%*
5.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: 4.574), A-Group (D^2: 13.329)*
5.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka)*
5.A.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka)*
5.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



5.A.IV. Additional results

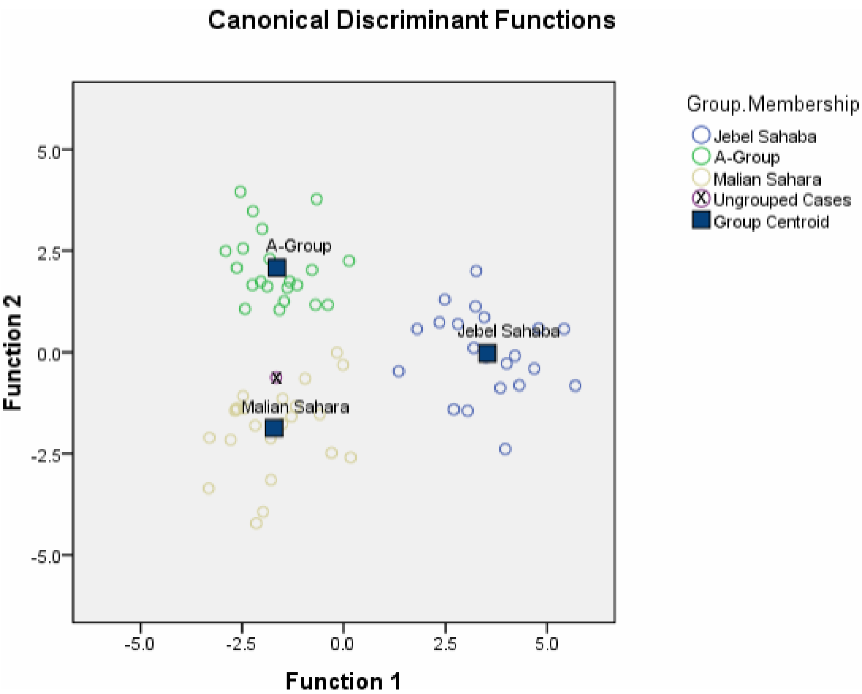
5.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 46.2%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (test not possible), variables entered (69)*
5.A.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 98.5%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 18.728, A-Group/Malian Sahara: 22.483, Jebel Sahaba/Tushka/Malian Sahara: 26.249)*
5.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.623, A-Group/Malian Sahara: 20.356, Jebel Sahaba/Tushka/Malian Sahara: 23.365)*
5.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 95.2%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 17.431, A-Group/Malian Sahara: 15.074, A-*

	Group/"Sudanese Hotchpotch": 30.759, Jebel Sahaba/Tushka/Malian Sahara: 12.846, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 48.565, Malian Sahara/"Sudanese Hotchpotch": 47.305)
5.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 73.5%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (60)*
5.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (25), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 23.553, A-Group/Malian Sahara: 17.764, A-Group/"Sudanese Hotchpotch": 34.155, Jebel Sahaba/Tushka/Malian Sahara: 24.935, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 35.971, Malian Sahara/"Sudanese Hotchpotch": 46.049)*
5.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (118)*

5.B.I. Summary	
5.B.I.1. Individual:	*Leiterband (Mean individual)*
5.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
5.B.I.3. Data:	*Scaled cranial and dental measurements*
5.B.I.4. Classification:	*Malian Sahara*

5.B.II. Analysis overview	
5.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
5.B.II.2.a. Variables in matrix:	*56*
5.B.II.2.b. Variables entered:	*14*
5.B.II.3. Best predictors:	*71a. Minimum ramus width (.264), 81(1), Crown width LI1 (.236), 48(1). Nasospinale-Prosthion height (.206), 81(1). Crown width LI1 (.400 - Function 2)*
5.B.II.4.a. Wilks' Lambda:	*1 through 2: .037 (Sig. .000), 2: .266 (Sig. .000)*
5.B.II.4.b. Eigenvalues:	*1: 6.232 (r: .928), 2: 2.763 (r: .857)*
5.B.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
5.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -80.771, Jebel Sahaba/Tushka - -75.732, Malian Sahara - -74.697), no outliers detected, no variables failed tolerance test*

5.B.III. Results	
5.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 1.558), A-Group (D^2: 7.307)*
5.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*96.9%*
5.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 1.501), A-Group (D^2: 10.126)*
5.B.III.2.a. Misclassifications (leave-one-out):	*Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
5.B.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
5.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



5.B.IV. Additional results

5.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 72.3%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (56)*

5.B.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.582, A-Group/Malian Sahara: 11.849, Jebel Sahaba/Tushka/Malian Sahara: 24.246)*

5.B.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (11), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 26.430, A-Group/Malian Sahara: 13.035, Jebel Sahaba/Tushka/Malian Sahara: 22.550)*

5.B.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 92.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (Sig. .000), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.017, A-Group/Malian Sahara: 11.049, A-Group/"Sudanese Hotchpotch": 25.743, Jebel Sahaba/Tushka/Malian Sahara: 18.616, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.921, Malian Sahara/"Sudanese Hotchpotch": 29.345)*

5.B.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 81.9%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*

5.B.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (24), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.285, A-Group/Malian Sahara: 20.082, A-Group/"Sudanese Hotchpotch": 26.401, Jebel Sahaba/Tushka/Malian Sahara: 23.389, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.329, Malian Sahara/"Sudanese Hotchpotch": 41.323)*

5.B.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 53.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (116)*

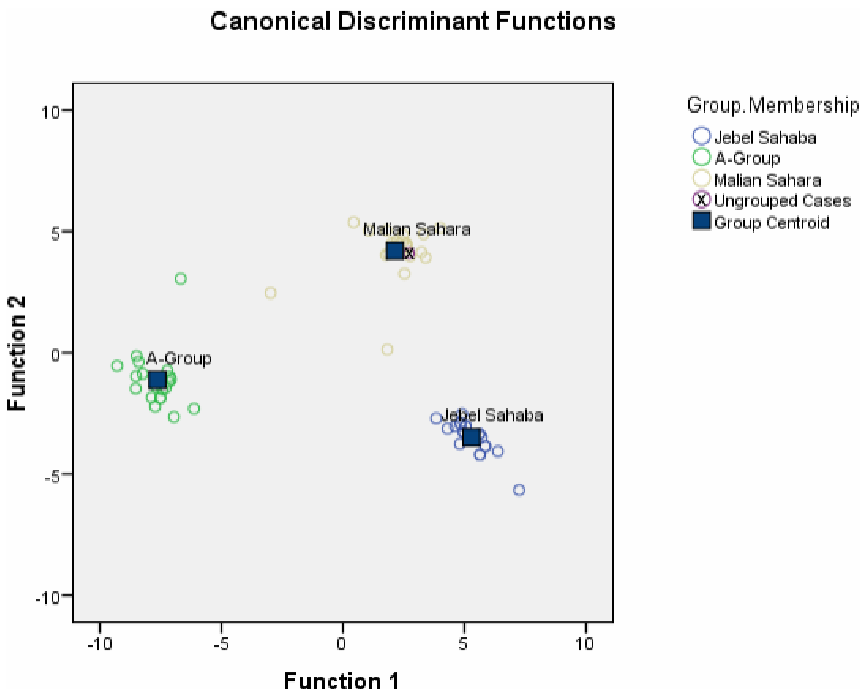
5.C.I. Summary

5.C.I.1. Individual: *Leiterband (Mean individual)*

5.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
5.C.I.3. Data: *Non-metric cranial and dental traits*
5.C.I.4. Classification: *Malian Sahara*

5.C.II. Analysis overview
5.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
5.C.II.2.a. Variables in matrix: *53*
5.C.II.2.b. Variables entered: *14*
5.C.II.3. Best predictors: *Distal accessory ridge UC (.475), Interruption groove UI2 (.220), Margo infranasalis (main) (-.130), Tuberculum dentale UI2 (.757 - Function 2)*
5.C.II.4.a. Wilks' Lambda: *1 through 2: .003 (Sig. .000), 2: .083 (Sig. .000)*
5.C.II.4.b. Eigenvalues: *1: 30.880 (r: .984), 2: 11.081 (r: .958)*
5.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
5.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

5.C.III. Results
5.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .339), Jebel Sahaba/Tushka (D^2: 64.093)*
5.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*
5.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .234), A-Group (D^2: 225.225)*
5.C.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
5.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
5.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



5.C.IV. Additional results
5.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 86.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*
5.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 109.426, A-Group/Malian Sahara: 89.734, Jebel Sahaba/Tushka/Malian Sahara: 71.297)*
5.C.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 115.387, A-Group/Malian Sahara: 95.348, Jebel Sahaba/Tushka/Malian Sahara: 65.129)*

5.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 83.820, A-Group/Malian Sahara: 80.165, A-Group/"Sudanese Hotchpotch": 64.570, Jebel Sahaba/Tushka/Malian Sahara: 49.941, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 29.877, Malian Sahara/"Sudanese Hotchpotch": 36.266)*
5.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 90.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*
5.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 144.692, A-Group/Malian Sahara: 89.050, A-Group/"Sudanese Hotchpotch": 61.899, Jebel Sahaba/Tushka/Malian Sahara: 57.544, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 38.454, Malian Sahara/"Sudanese Hotchpotch": 31.106)*
5.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 85.5%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (97)*

5.D.I. Summary

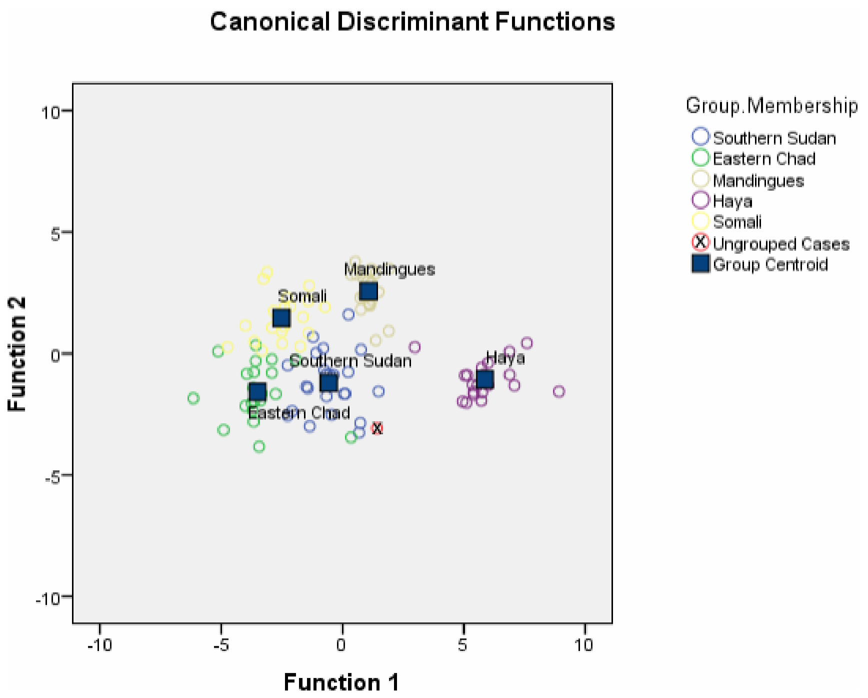
5.D.I.1. Individual:	*Leiterband (Mean individual)*
5.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
5.D.I.3. Data:	*Cranial and dental measurements*
5.D.I.4. Classification:	*Southern Sudan*

5.D.II. Analysis overview

5.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
5.D.II.2.a. Variables in matrix:	*52*
5.D.II.2.b. Variables entered:	*18*
5.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.578), 80(4)b. 1st premolar dental arch length (mx) (.542), 81(1). Crown width UI2 (.319), 81. Crown length LC (-.546 - Function 2), 81(1). Crown width UI2 (.345 - Function 3), 63(2)d. 4th internal dental arch breadth (md) (-.297 - Function 4)*
5.D.II.4.a. Wilks' Lambda:	*1 through 4: .003 (Sig. .000), 2 through 4: .032 (Sig. .000), 3 through 4: .127 (Sig. .000), 4: .471 (Sig. .000)*
5.D.II.4.b. Eigenvalues:	*1: 10.854 (r: .957), 2: 2.907 (r: .863), 3: 2.719 (r: .855), 4: 1.122 (r: .727)*
5.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
5.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -38.464, Chad - -54.497, Mandinka - 'singular', Somalis - -44.187, Haya - -77.736), no outliers detected, no variables failed tolerance test*

5.D.III. Results

5.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 18.330), Chad (D^2: 29.545)*
5.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.0%*
5.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 100.0%, Southern Sudan (D^2: 19.313), Chad (D^2: 20.952)*
5.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad, 1 Mandinka), Haya (1 Mandinka)*
5.D.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
5.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



5.D.IV. Additional results

5.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 100.0%, 83.3%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (52)*

5.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Southern Sudan, 97.2%, 86.1%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.637, Southern Sudan/Mandinka: 11.571, Southern Sudan/Somalis: 15.160, Southern Sudan/Haya: 33.965, Chad/Mandinka: 21.994, Chad/Somalis: 11.346, Chad/Haya: 51.078, Mandinka/Somalis: 19.335, Mandinka/Haya: 31.633, Somalis/Haya: 40.034)*

5.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 97.2%, 88.0%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (Sig. .000), variables entered (13), F values for pairwise distances (Southern Sudan/Chad: 11.713, Southern Sudan/Mandinka: 14.432, Southern Sudan/Somalis: 20.655, Southern Sudan/Haya: 42.126, Chad/Mandinka: 29.769, Chad/Somalis: 11.613, Chad/Haya: 63.131, Mandinka/Somalis: 24.538, Mandinka/Haya: 36.912, Somalis/Haya: 53.833)*

5.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 97.2%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (35), F values for pairwise distances (Southern Sudan/Chad: 40.373, Southern Sudan/Mandinka: 48.365, Southern Sudan/Somalis: 48.480, Southern Sudan/Haya: 92.816, Chad/Mandinka: 51.927, Chad/Somalis: 37.503, Chad/Haya: 47.372, Mandinka/Somalis: 58.878, Mandinka/Haya: 85.834, Somalis/Haya: 79.765)*

5.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Chad, 100.0%, 60.2%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (117)*

5.E.I. Summary

5.E.I.1. Individual: *Leiterband (Mean individual)*

5.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

5.E.I.3. Data: *Scaled cranial and dental measurements*

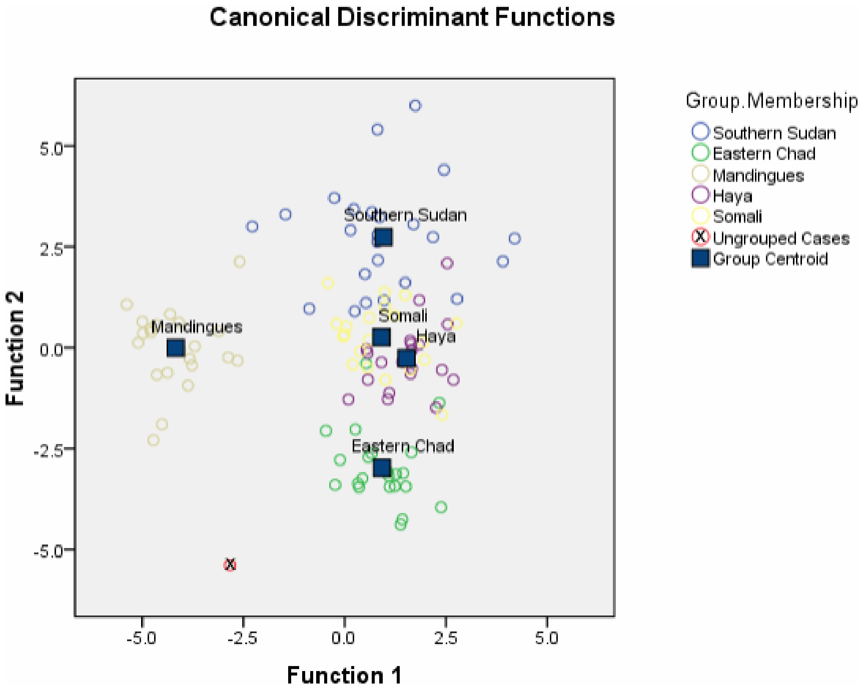
5.E.I.4. Classification: *Chad*

5.E.II. Analysis overview

5.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

5.E.II.2.a. Variables in matrix:	*45*
5.E.II.2.b. Variables entered:	*18*
5.E.II.3. Best predictors:	*81. Crown length UI2 (.437), 80(4)a. Canine dental arch length (md) (-.332), 81(1). Crown width UC (.217), 80a. Dental arch length of the mandible (.700 - Function 2), 69c. Thickness of the mandibular symphysis (-.327 - Function 3), 1. Maximum cranial length (.435 - Function 4)*
5.E.II.4.a. Wilks' Lambda:	*1 through 4: .007 (Sig. .000), 2 through 4: .038 (Sig. .000), 3 through 4: .180 (Sig. .000), 4: .557 (Sig. .000)*
5.E.II.4.b. Eigenvalues:	*1: 4.732 (r: .909), 2: 3.666 (r: .886), 3: 2.106 (r: .823), 4: .794 (r: .665)*
5.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
5.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -83.008, Chad - -99.435, Mandinka - -133.840, Somalis - -93.251, Haya - -97.012), no outliers detected (except ungrouped case - D^2: 42.504; critical value: 28.869 - p 0.95, df 18), no variables failed tolerance test*

5.E.III. Results	
5.E.III.1.a. Within-groups covariance matrix:	*Chad, 98.1%, Chad (D^2: 22.165), Mandinka (D^2: 35.630)*
5.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*87.0%*
5.E.III.1.c. Separate-groups covariance matrix:	*Chad, 100.0%, Chad (D^2: 42.504), Mandinka (D^2: 46.914)*
5.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Mandinka, 4 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali, 1 Haya), Somalis (1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Somali)*
5.E.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
5.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



5.E.IV. Additional results	
5.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 99.1%, 77.8%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (45)*
5.E.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Chad, 97.2%, 88.9%), separate-groups covariance matrix (Chad, 97.2%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 16.318, Southern Sudan/Mandinka: 18.635, Southern Sudan/Somalis: 7.910, Southern Sudan/Haya: 10.673, Chad/Mandinka: 18.417, Chad/Somalis: 10.016, Chad/Haya: 10.982, Mandinka/Somalis: 17.228, Mandinka/Haya: 17.343, Somalis/Haya: 8.431)*
5.E.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Chad, 96.3%, 89.8%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 17.418, Southern Sudan/Mandinka: 19.922, Southern*

Sudan/Somalis: 7.411, Southern Sudan/Haya: 11.375, Chad/Mandinka: 19.724, Chad/Somalis: 10.129, Chad/Haya: 11.763, Mandinka/Somalis: 17.778, Mandinka/Haya: 18.574, Somalis/Haya: 8.457)

5.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 99.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (44), F values for pairwise distances (Southern Sudan/Chad: 37.088, Southern Sudan/Mandinka: 57.927, Southern Sudan/Somalis: 18.695, Southern Sudan/Haya: 130.630, Chad/Mandinka: 35.221, Chad/Somalis: 32.417, Chad/Haya: 66.656, Mandinka/Somalis: 55.187, Mandinka/Haya: 91.125, Somalis/Haya: 100.055)*

5.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 46.3%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (116)*

5.F.I. Summary

5.F.I.1. Individual: *Leiterband (Mean individual)*

5.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

5.F.I.3. Data: *Non-metric cranial and dental traits*

5.F.I.4. Classification: *Southern Sudan*

5.F.II. Analysis overview

5.F.II.1. Method: *Mahalanobis distance, simultaneous entry*

5.F.II.2.a. Variables in matrix: *58*

5.F.II.2.b. Variables entered: *18*

5.F.II.3. Best predictors: *Premolar mesial and distal accessory cusps UP1 (.581), Tuberculum dentale UI2 (.492), Shovel UI1 (-.448), Tuberculum dentale UI2 (.492 - Function 2), Canine mesial ridge UC (.507 - Function 3), Interruption groove UI2 (-.577 - Function 4)*

5.F.II.4.a. Wilks' Lambda: *1 through 4: .000 (Sig. .000), 2 through 4: .004 (Sig. .000), 3 through 4: .044 (Sig. .000), 4: .258 (Sig. .000)*

5.F.II.4.b. Eigenvalues: *1: 16.574 (r: .971), 2: 9.283 (r: .950), 3: 4.856 (r: .911), 4: 2.881 (r: .862)*

5.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

5.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - -49.815, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

5.F.III. Results

5.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 98.1%, Southern Sudan (D^2: 35.073), Haya (D^2: 37.058)*

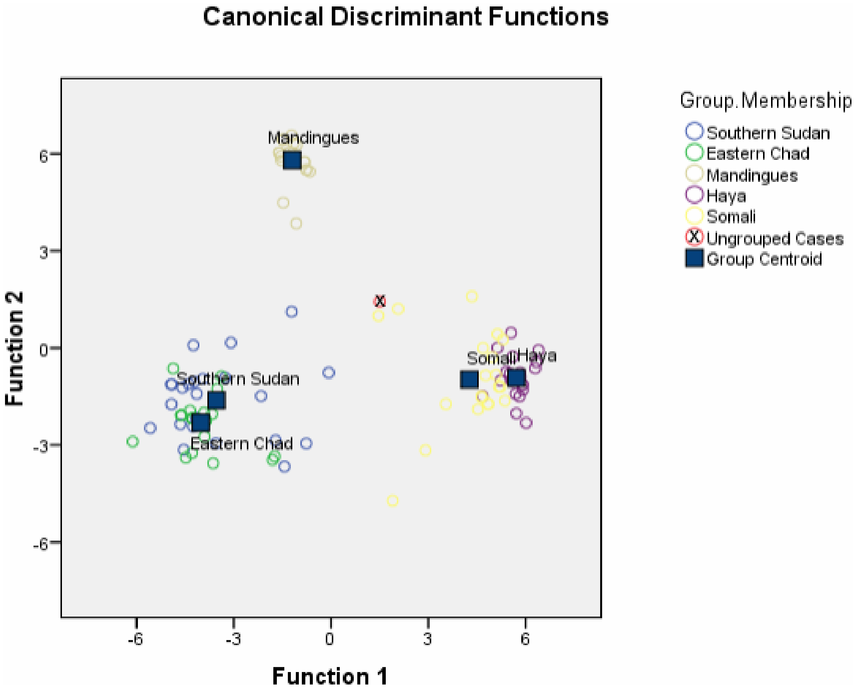
5.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *94.4%*

5.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 99.1%, Southern Sudan (D^2: 18.160), Somalis (D^2: 41.393)*

5.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 1 Mandinka, 1 Haya), Chad (1 Southern Sudan), Somalis (1 Haya)*

5.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad)*

5.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



5.F.IV. Additional results

5.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 100.0%, 88.0%), separate-groups covariance matrix (Mandinka, 100.0%), Box's M (test not possible), variables entered (58)*

5.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Southern Sudan, 97.2%, 91.7%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (test not possible), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 15.972, Southern Sudan/Mandinka: 34.998, Southern Sudan/Somalis: 46.187, Southern Sudan/Haya: 112.928, Chad/Mandinka: 40.757, Chad/Somalis: 51.702, Chad/Haya: 120.750, Mandinka/Somalis: 50.729, Mandinka/Haya: 113.442, Somalis/Haya: 69.783)*

5.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 97.2%, 92.6%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (test not possible), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 16.914, Southern Sudan/Mandinka: 37.749, Southern Sudan/Somalis: 47.260, Southern Sudan/Haya: 115.416, Chad/Mandinka: 41.572, Chad/Somalis: 52.112, Chad/Haya: 121.234, Mandinka/Somalis: 53.854, Mandinka/Haya: 120.248, Somalis/Haya: 72.972)*

5.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (Southern Sudan/Chad: 26.068, Southern Sudan/Mandinka: 56.608, Southern Sudan/Somalis: 55.154, Southern Sudan/Haya: 112.664, Chad/Mandinka: 76.413, Chad/Somalis: 72.067, Chad/Haya: 149.872, Mandinka/Somalis: 75.314, Mandinka/Haya: 98.125, Somalis/Haya: 74.110)*

5.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 88.9%; separate-groups covariance matrix - Haya, 100.0%), Box's M (test not possible), variables entered (97)*

6. Wadi Howar

6.A.I. Summary

6.A.I.1. Individual: *Wadi Howar (Mean individual)*

6.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.A.I.3. Data: *Cranial and dental measurements*

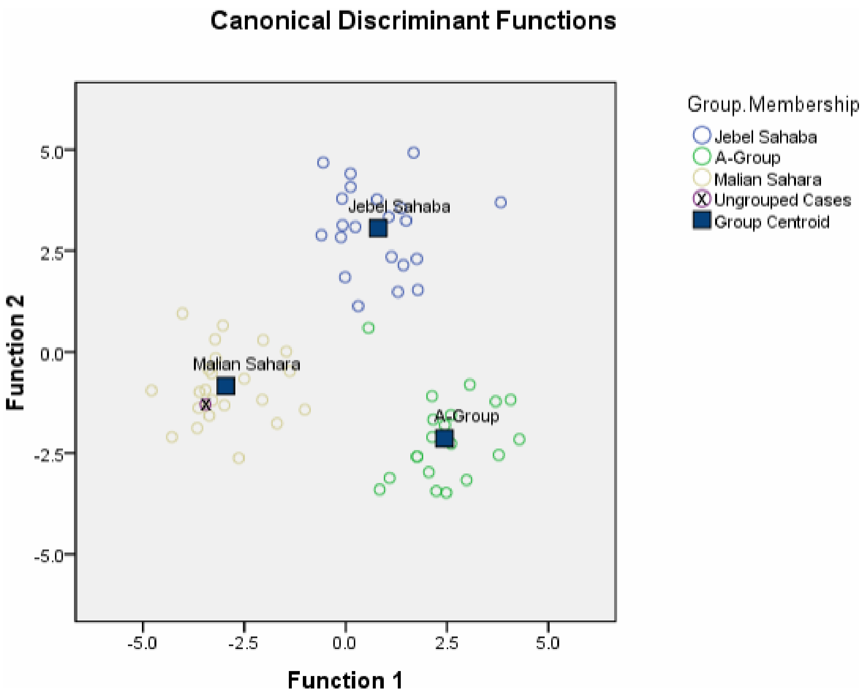
6.A.I.4. Classification: *Malian Sahara*

6.A.II. Analysis overview

6.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
6.A.II.2.a. Variables in matrix:	*69*
6.A.II.2.b. Variables entered:	*14*
6.A.II.3. Best predictors:	*80a. Dental arch length of the mandible (-.379), 81. Crown length UI2 (.316), 81. Crown length LI1 (-.304), 81(1). Crown width LI2 (.558 - Function 2)*
6.A.II.4.a. Wilks' Lambda:	*1 through 2: .026 (Sig. .000), 2: .167 (Sig. .000)*
6.A.II.4.b. Eigenvalues:	*1: 5.480 (r: .920), 2: 4.976 (r: .913)*
6.A.II.5. Prior classification probability:	*33.4% (prior prob. + 25%: 41.8%)*
6.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -31.426, Jebel Sahaba/Tushka - -27.769, Malian Sahara - -27.069), no outliers detected, no variables failed tolerance test*

6.A.III. Results

6.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: .453), A-Group (D^2: 35.481)*
6.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*98.5%*
6.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.5%, Malian Sahara (D^2: .498), Jebel Sahaba/Tushka (D^2: 36.538)*
6.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka)*
6.A.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka)*
6.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



6.A.IV. Additional results

6.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 46.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (69)*
6.A.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 98.5%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 18.728, A-Group/Malian Sahara: 22.483, Jebel Sahaba/Tushka/Malian Sahara: 26.249)*
6.A.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.623, A-Group/Malian Sahara: 20.356, Jebel Sahaba/Tushka/Malian Sahara: 23.365)*
6.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (21), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 16.898, A-Group/Malian Sahara: 15.445, A-Group/"Sudanese*

Hotchpotch": 34.588, Jebel Sahaba/Tushka/Malian Sahara: 16.089, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 55.136, Malian Sahara/"Sudanese Hotchpotch": 49.192)

6.A.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 73.5%; separate-groups covariance matrix - A- Malian Sahara, 100.0%), Box's M (test not possible), variables entered (61)*

6.A.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (25), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 23.553, A-Group/Malian Sahara: 17.764, A-Group/"Sudanese Hotchpotch": 34.155, Jebel Sahaba/Tushka/Malian Sahara: 24.935, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 35.917, Malian Sahara/"Sudanese Hotchpotch": 46.049)*

6.A.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 47.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (118)*

6.B.I. Summary

6.B.I.1. Individual: *Wadi Howar (Mean individual)*

6.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

6.B.I.3. Data: *Scaled cranial and dental measurements*

6.B.I.4. Classification: *Malian Sahara*

6.B.II. Analysis overview

6.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.B.II.2.a. Variables in matrix: *56*

6.B.II.2.b. Variables entered: *14*

6.B.II.3. Best predictors: *71a. Minimum ramus width (.264), 81(1), Crown width LI1 (.236), 48(1). Nasospinale-Prosthion height (.206), 81(1). Crown width LI1 (.400 - Function 2)*

6.B.II.4.a. Wilks' Lambda: *1 through 2: .037 (Sig. .000), 2: .266 (Sig. .000)*

6.B.II.4.b. Eigenvalues: *1: 6.232 (r: .928), 2: 2.763 (r: .857)*

6.B.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*

6.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -80.771, Jebel Sahaba/Tushka - -75.732, Malian Sahara - -74.697), no outliers detected, no variables failed tolerance test*

6.B.III. Results

6.B.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 1.907), A-Group (D^2: 6.609)*

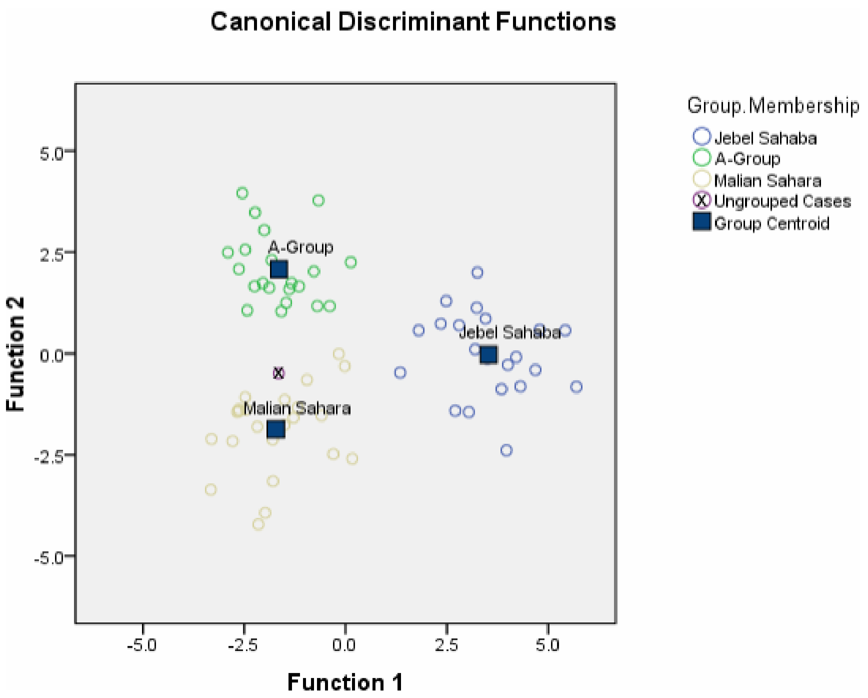
6.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*

6.B.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: 1.831), A-Group (D^2: 9.137)*

6.B.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*

6.B.III.2.b. Misclassifications (separate-groups): *No misclassifications*

6.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.B.IV. Additional results

6.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 72.3%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (56)*

6.B.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 98.5%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (12), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 25.582, A-Group/Malian Sahara: 11.849, Jebel Sahaba/Tushka/Malian Sahara: 24.246)*

6.B.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 96.9%, 95.4%), separate-groups covariance matrix (Malian Sahara, 98.5%), Box's M (Sig. .000), variables entered (11), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 26.430, A-Group/Malian Sahara: 13.035, Jebel Sahaba/Tushka/Malian Sahara: 22.550)*

6.B.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 92.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (Sig. .000), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.017, A-Group/Malian Sahara: 11.049, A-Group/"Sudanese Hotchpotch": 25.743, Jebel Sahaba/Tushka/Malian Sahara: 18.616, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.921, Malian Sahara/"Sudanese Hotchpotch": 29.345)*

6.B.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 81.9%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (52)*

6.B.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.4%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (24), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 19.285, A-Group/Malian Sahara: 20.082, A-Group/"Sudanese Hotchpotch": 26.401, Jebel Sahaba/Tushka/Malian Sahara: 23.389, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 56.329, Malian Sahara/"Sudanese Hotchpotch": 41.323)*

6.B.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 53.0%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (116)*

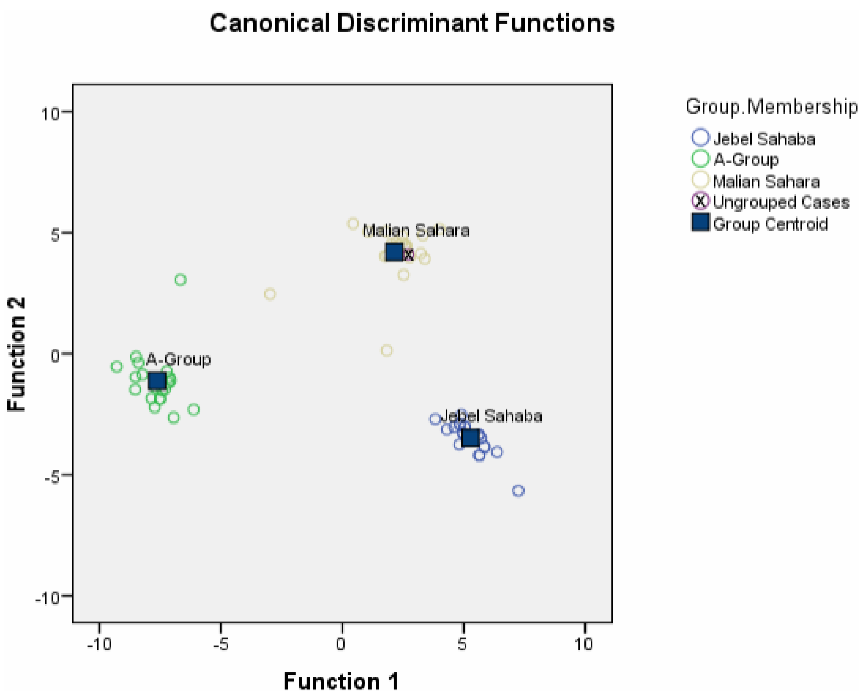
6.C.I. Summary

6.C.I.1. Individual: *Wadi Howar (Mean individual)*

6.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
6.C.I.3. Data: *Non-metric cranial and dental traits*
6.C.I.4. Classification: *Malian Sahara*

6.C.II. Analysis overview
6.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
6.C.II.2.a. Variables in matrix: *53*
6.C.II.2.b. Variables entered: *14*
6.C.II.3. Best predictors: *Distal accessory ridge UC (.475), Interruption groove UI2 (.220), Margo infranasalis (main) (-.130), Tuberculum dentale UI2 (.757 - Function 2)*
6.C.II.4.a. Wilks' Lambda: *1 through 2: .003 (Sig. .000), 2: .083 (Sig. .000)*
6.C.II.4.b. Eigenvalues: *1: 30.880 (r: .984), 2: 11.081 (r: .958)*
6.C.II.5. Prior classification probability: *33.4% (prior prob. + 25%: 41.8%)*
6.C.II.6. Remarks: *Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

6.C.III. Results
6.C.III.1.a. Within-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .339), Jebel Sahaba/Tushka (D^2: 64.093)*
6.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *96.9%*
6.C.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 100.0%, Malian Sahara (D^2: .234), A-Group (D^2: 225.225)*
6.C.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (1 A-Group, 1 Jebel Sahaba/Tushka)*
6.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
6.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.C.IV. Additional results
6.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 86.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*
6.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 109.426, A-Group/Malian Sahara: 89.734, Jebel Sahaba/Tushka/Malian Sahara: 71.297)*
6.C.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 100.0%, 96.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (13), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 115.387, A-Group/Malian Sahara: 95.348, Jebel Sahaba/Tushka/Malian Sahara: 65.129)*

6.C.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.8%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (19), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 83.820, A-Group/Malian Sahara: 80.165, A-Group/"Sudanese Hotchpotch": 64.570, Jebel Sahaba/Tushka/Malian Sahara: 49.941, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 29.877, Malian Sahara/"Sudanese Hotchpotch": 36.266)*

6.C.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 90.4%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (53)*

6.C.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 97.6%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (A-Group/Jebel Sahaba/Tushka: 144.692, A-Group/Malian Sahara: 89.050, A-Group/"Sudanese Hotchpotch": 61.899, Jebel Sahaba/Tushka/Malian Sahara: 57.544, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 38.454, Malian Sahara/"Sudanese Hotchpotch": 31.106)*

6.C.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 85.5%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (97)*

6.D.I. Summary

6.D.I.1. Individual: *Wadi Howar (Mean individual)*

6.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

6.D.I.3. Data: *Cranial and dental measurements*

6.D.I.4. Classification: *Southern Sudan*

6.D.II. Analysis overview

6.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

6.D.II.2.a. Variables in matrix: *52*

6.D.II.2.b. Variables entered: *18*

6.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.578), 80(4)b. 1st premolar dental arch length (mx) (.542), 81(1). Crown width UI2 (.319), 81. Crown length LC (-.546 - Function 2), 81(1). Crown width UI2 (.345 - Function 3), 63(2)d. 4th internal dental arch breadth (md) (-.297 - Function 4)*

6.D.II.4.a. Wilks' Lambda: *1 through 4: .003 (Sig. .000), 2 through 4: .032 (Sig. .000), 3 through 4: .127 (Sig. .000), 4: .471 (Sig. .000)*

6.D.II.4.b. Eigenvalues: *1: 10.854 (r: .957), 2: 2.907 (r: .863), 3: 2.719 (r: .855), 4: 1.122 (r: .727)*

6.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

6.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -38.464, Chad - -54.497, Mandinka - 'singular', Somalis - -44.187, Haya - -77.736), no outliers detected, no variables failed tolerance test*

6.D.III. Results

6.D.III.1.a. Within-groups covariance matrix: *Southern Sudan, 99.1%, Southern Sudan (D^2: 24.244), Haya (D^2: 29.146)*

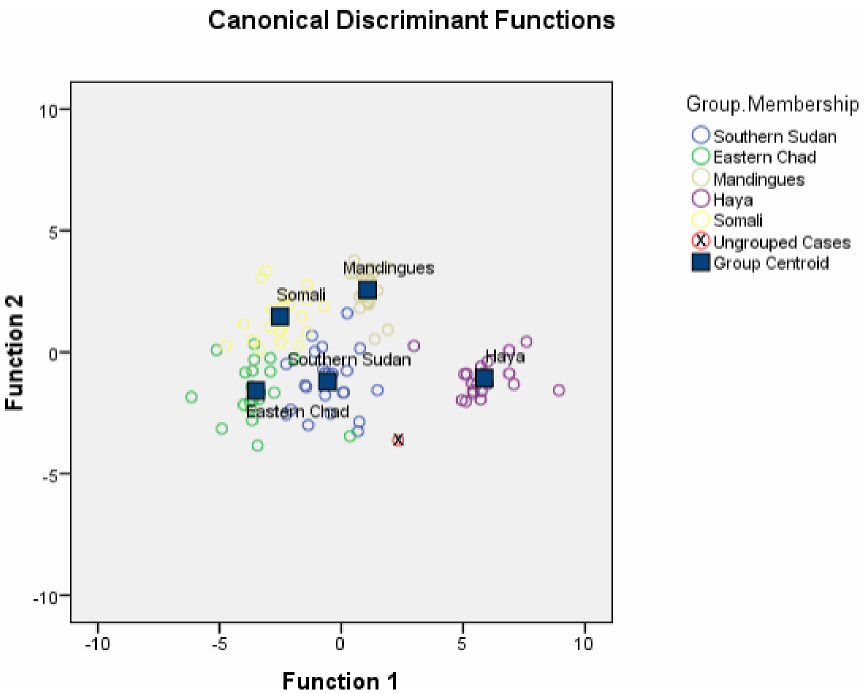
6.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.0%*

6.D.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 100.0%, Southern Sudan (D^2: 24.297), Haya (D^2: 24.342)*

6.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Somali, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad, 1 Mandinka), Haya (1 Mandinka)*

6.D.III.2.b. Misclassifications (separate-groups): *No misclassificatons*

6.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.D.IV. Additional results

6.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 100.0%, 83.3%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (52)*
6.D.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (Southern Sudan, 97.2%, 86.1%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 11.637, Southern Sudan/Mandinka: 11.571, Southern Sudan/Somalis: 15.160, Southern Sudan/Haya: 33.965, Chad/Mandinka: 21.994, Chad/Somalis: 11.346, Chad/Haya: 51.078, Mandinka/Somalis: 19.335, Mandinka/Haya: 31.633, Somalis/Haya: 40.034)*
6.D.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 97.2%, 88.0%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (Sig. .000), variables entered (13), F values for pairwise distances (Southern Sudan/Chad: 11.713, Southern Sudan/Mandinka: 14.432, Southern Sudan/Somalis: 20.655, Southern Sudan/Haya: 42.126, Chad/Mandinka: 29.769, Chad/Somalis: 11.613, Chad/Haya: 63.131, Mandinka/Somalis: 24.538, Mandinka/Haya: 36.912, Somalis/Haya: 53.833)*
6.D.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 97.2%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (35), F values for pairwise distances (Southern Sudan/Chad: 40.373, Southern Sudan/Mandinka: 48.365, Southern Sudan/Somalis: 48.480, Southern Sudan/Haya: 92.816, Chad/Mandinka: 51.927, Chad/Somalis: 37.503, Chad/Haya: 47.372, Mandinka/Somalis: 58.878, Mandinka/Haya: 85.834, Somalis/Haya: 79.765)*
6.D.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Chad, 100.0%, 60.2%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (117)*

6.E.I. Summary

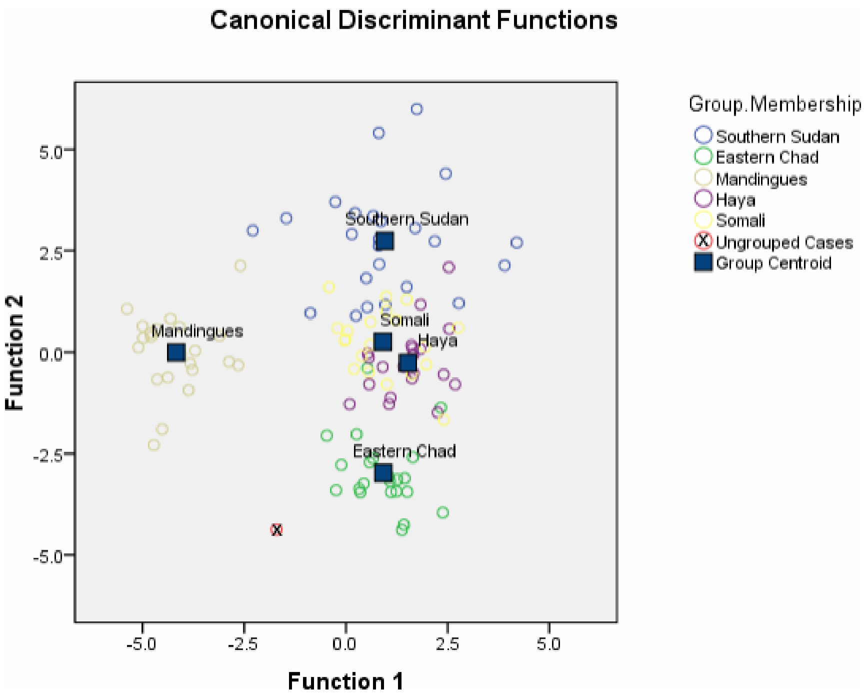
6.E.I.1. Individual:	*Wadi Howar (Mean individual)*
6.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
6.E.I.3. Data:	*Scaled cranial and dental measurements*
6.E.I.4. Classification:	*Chad*

6.E.II. Analysis overview

6.E.II.1. Method:	*Mahalanobis distance, simultaneous entry*

6.E.II.2.a. Variables in matrix: *45*
6.E.II.2.b. Variables entered: *18*
6.E.II.3. Best predictors: *81. Crown length UI2 (.437), 80(4)a. Canine dental arch length (md) (-.332), 81(1). Crown width UC (.217), 80a. Dental arch length of the mandible (.700 - Function 2), 69c. Thickness of the mandibular symphysis (-.327 - Function 3), 1. Maximum cranial length (.435 - Function 4)*
6.E.II.4.a. Wilks' Lambda: *1 through 4: .007 (Sig. .000), 2 through 4: .038 (Sig. .000), 3 through 4: .180 (Sig. .000), 4: .557 (Sig. .000)*
6.E.II.4.b. Eigenvalues: *1: 4.732 (r: .909), 2: 3.666 (r: .886), 3: 2.106 (r: .823), 4: .794 (r: .665)*
6.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
6.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -83.008, Chad - -99.435, Mandinka - -133.840, Somalis - -93.251, Haya - -97.012), no outliers detected, no variables failed tolerance test*

6.E.III. Results
6.E.III.1.a. Within-groups covariance matrix: *Chad, 98.1%, Chad (D^2: 9.324), Mandinka (D^2: 28.845)*
6.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *87.0%*
6.E.III.1.c. Separate-groups covariance matrix: *Chad, 100.0%, Chad (D^2: 18.055), Southern Sudan (D^2: 32.504)*
6.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Mandinka, 4 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali, 1 Haya), Somalis (1 Chad, 2 Haya), Haya (1 Southern Sudan, 1 Somali)*
6.E.III.2.b. Misclassifications (separate-groups): *No misclassifications*
6.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



6.E.IV. Additional results
6.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 77.8%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (45)*
6.E.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Chad, 97.2%, 88.9%), separate-groups covariance matrix (Chad, 97.2%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 16.318, Southern Sudan/Mandinka: 18.635, Southern Sudan/Somalis: 7.910, Southern Sudan/Haya: 10.673, Chad/Mandinka: 18.417, Chad/Somalis: 10.016, Chad/Haya: 10.982, Mandinka/Somalis: 17.228, Mandinka/Haya: 17.343, Somalis/Haya: 8.431)*
6.E.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Chad, 96.3%, 89.8%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 17.418, Southern Sudan/Mandinka: 19.922, Southern Sudan/Somalis: 7.411, Southern Sudan/Haya: 11.375,*

	Chad/Mandinka: 19.724, Chad/Somalis: 10.129, Chad/Haya: 11.763, Mandinka/Somalis: 17.778, Mandinka/Haya: 18.574, Somalis/Haya: 8.457)
6.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 99.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (44), F values for pairwise distances (Southern Sudan/Chad: 37.088, Southern Sudan/Mandinka: 57.927, Southern Sudan/Somalis: 18.695, Southern Sudan/Haya: 130.630, Chad/Mandinka: 35.221, Chad/Somalis: 32.417, Chad/Haya: 66.656, Mandinka/Somalis: 55.187, Mandinka/Haya: 91.125, Somalis/Haya: 100.055)*
6.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 46.3%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (116)*

6.F.I. Summary

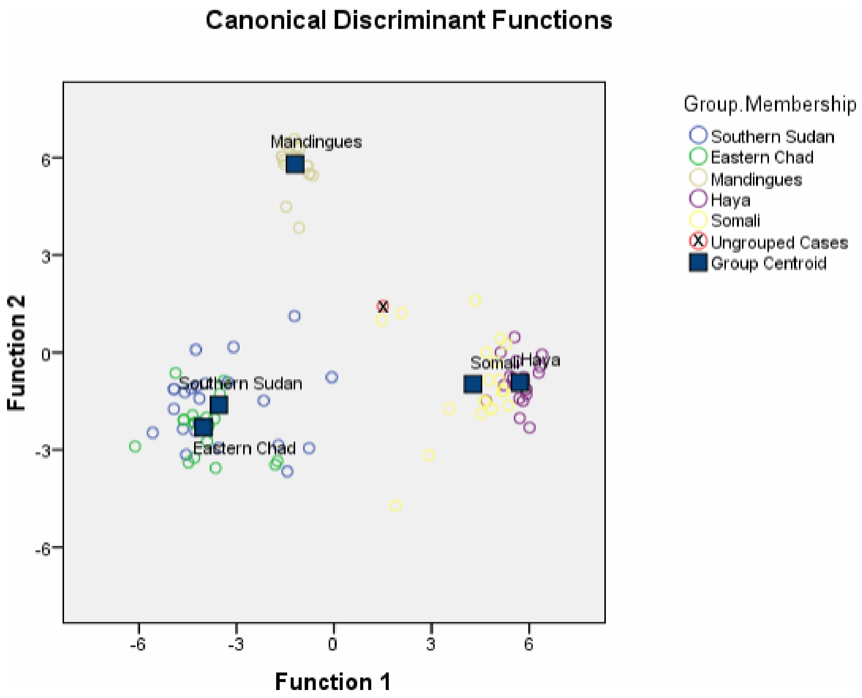
6.F.I.1. Individual:	*Wadi Howar (Mean individual)*
6.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
6.F.I.3. Data:	*Non-metric cranial and dental traits*
6.F.I.4. Classification:	*Southern Sudan*

6.F.II. Analysis overview

6.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
6.F.II.2.a. Variables in matrix:	*58*
6.F.II.2.b. Variables entered:	*18*
6.F.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.581), Tuberculum dentale UI2 (.492), Shovel UI1 (-.448), Tuberculum dentale UI2 (.492 - Function 2), Canine mesial ridge UC (.507 - Function 3), Interruption groove UI2 (-.577 - Function 4)*
6.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .004 (Sig. .000), 3 through 4: .044 (Sig. .000), 4: .258 (Sig. .000)*
6.F.II.4.b. Eigenvalues:	*1: 16.574 (r: .971), 2: 9.283 (r: .950), 3: 4.856 (r: .911), 4: 2.881 (r: .862)*
6.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
6.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - -49.815, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

6.F.III. Results

6.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 35.073), Haya (D^2: 37.058)*
6.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*94.4%*
6.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 99.1%, Southern Sudan (D^2: 18.160), Somalis (D^2: 41.393)*
6.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 1 Haya), Chad (1 Southern Sudan), Somalis (1 Haya)*
6.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad)*
6.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



6.F.IV. Additional results

6.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Mandinka, 100.0%, 88.0%), separate-groups covariance matrix (Mandinka, 100.0%), Box's M (test not possible), variables entered (58)*

6.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (Southern Sudan, 97.2%, 91.7%), separate-groups covariance matrix (Southern Sudan, 98.1%), Box's M (test not possible), variables entered (18), F values for pairwise distances (Southern Sudan/Chad: 15.972, Southern Sudan/Mandinka: 34.998, Southern Sudan/Somalis: 46.187, Southern Sudan/Haya: 112.928, Chad/Mandinka: 40.757, Chad/Somalis: 51.702, Chad/Haya: 120.750, Mandinka/Somalis: 50.729, Mandinka/Haya: 113.442, Somalis/Haya: 69.783)*

6.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 97.2%, 92.6%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (test not possible), variables entered (17), F values for pairwise distances (Southern Sudan/Chad: 16.914, Southern Sudan/Mandinka: 37.749, Southern Sudan/Somalis: 47.260, Southern Sudan/Haya: 115.416, Chad/Mandinka: 41.572, Chad/Somalis: 52.112, Chad/Haya: 121.234, Mandinka/Somalis: 53.854, Mandinka/Haya: 120.248, Somalis/Haya: 72.972)*

6.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (Southern Sudan/Chad: 26.068, Southern Sudan/Mandinka: 56.608, Southern Sudan/Somalis: 55.154, Southern Sudan/Haya: 112.664, Chad/Mandinka: 76.413, Chad/Somalis: 72.067, Chad/Haya: 149.872, Mandinka/Somalis: 75.314, Mandinka/Haya: 98.125, Somalis/Haya: 74.110)*

6.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 88.9%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (97)*

Appendix XXV.A.1.b.2. Prehistoric comparative samples

1. Jebel Sahaba/Tushka

1.A.I. Summary

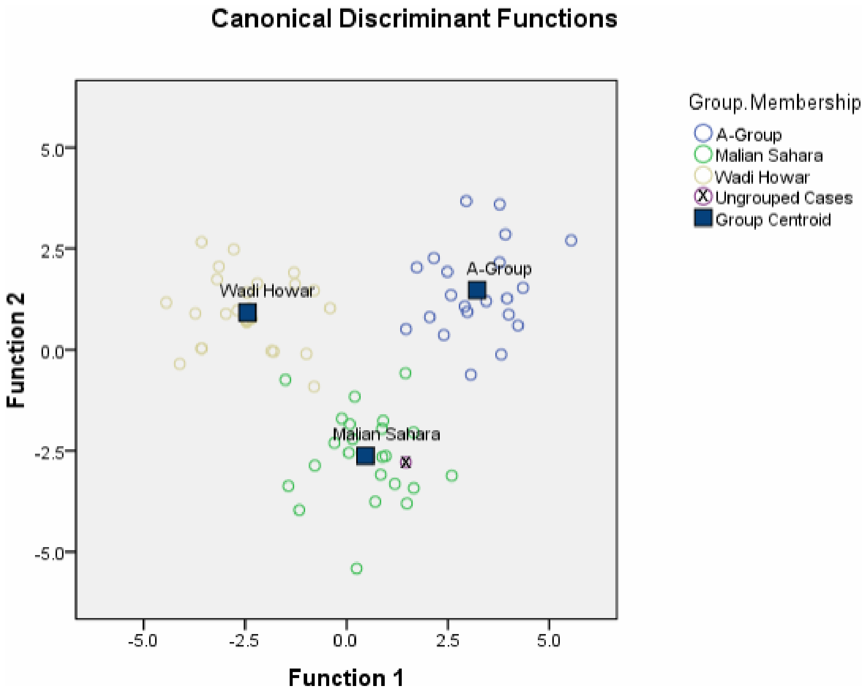
1.A.I.1. Individual:	*Jebel Sahaba/Tushka (Mean individual)*
1.A.I.2. Comparative samples:	*A-Group, Malian Sahara, Wadi Howar*
1.A.I.3. Data:	*Cranial and dental measurements*
1.A.I.4. Classification:	*Malian Sahara*

1.A.II. Analysis overview

1.A.II.1. Method:	*Mahalanobis distance*
1.A.II.2.a. Variables in matrix:	*37*
1.A.II.2.b. Variables entered:	*13*
1.A.II.3. Best predictors:	*81. Crown length UI2 (-.504), 62(a)4. 4th internal dental arch length (md) (-.302), 81(1). Crown length UI2 (-.290), 71a. Minimum ramus width (-.341 - Function 2)*
1.A.II.4.a. Wilks' Lambda:	*1 through 2: .036 (Sig. .000), 2: .240 (Sig. .000)*
1.A.II.4.b. Eigenvalues:	*1: 5.665 (r: .922), 2: 3.161 (r: .872)*
1.A.II.5. Prior classification probability:	*34.5% (prior prob. + 25%: 43.2%)*
1.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -28.901, Malian Sahara - -24.615, Wadi Howar - -30.598), no outliers detected, no variables failed tolerance test*

1.A.III. Results

1.A.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 97.4%, Malian Sahara (D^2: 1.030), A-Group (D^2: 21.206)*
1.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.4%*
1.A.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 97.4%, Malian Sahara (D^2: .926), A-Group (D^2: 15.249)*
1.A.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Malian Sahara), Malian Sahara (1 A-Group, 1 Wadi Howar), Wadi Howar (1 A-Group, 1 Malian Sahara)*
1.A.III.2.b. Misclassifications (separate-groups):	*Malian Sahara (1 Wadi Howar), Wadi Howar (1 Malian Sahara)*
1.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.A.IV. Additional results

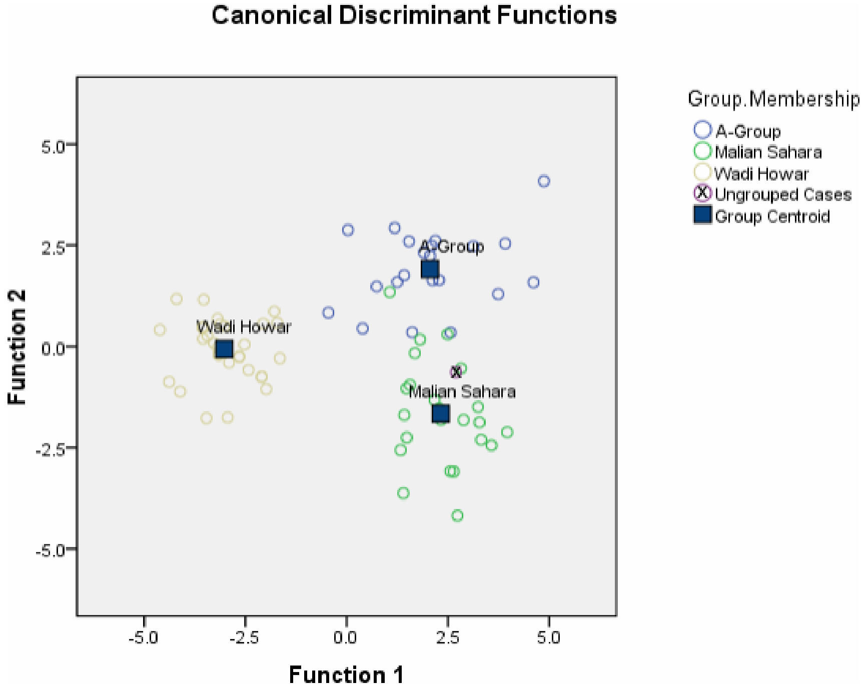
1.A.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 84.2%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (37)*
1.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 93.4%, 89.5%), separate-groups covariance matrix (Malian Sahara, 94.7%), Box's M (Sig. .000), variables entered (9)*

1.A.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 96.8%, 90.4%; separate-groups covariance matrix - Malian Sahara, 96.8%), Box's M (Sig. .000), variables entered (16)*
1.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 84.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (37)*
1.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Wadi Howar, 100.0%, 100.0%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (56)*
1.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 68.1%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (118)*

1.B.I. Summary	
1.B.I.1. Individual:	*Jebel Sahaba/Tushka (Mean individual)*
1.B.I.2. Comparative samples:	*A-Group, Malian Sahara, Wadi Howar*
1.B.I.3. Data:	*Scaled cranial and dental measurements*
1.B.I.4. Classification:	*Malian Sahara*

1.B.II. Analysis overview	
1.B.II.1. Method:	*Mahalanobis distance*
1.B.II.2.a. Variables in matrix:	*26*
1.B.II.2.b. Variables entered:	*14*
1.B.II.3. Best predictors:	*9. Least frontal breadth (.336), 19a. Mastoid height (.330), 80(1)a. Canine dental arch breadth (mx) (-.270), 81(1). Crown width UM1 (.475 - Function 2)*
1.B.II.4.a. Wilks' Lambda:	*1 through 2: .043 (Sig. .000), 2: .343 (Sig. .000)*
1.B.II.4.b. Eigenvalues:	*1: 6.933 (r: .935), 2: 1.917 (r: .811)*
1.B.II.5. Prior classification probability:	*34.5% (prior prob. + 25%: 43.2%)*
1.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -76.503, Malian Sahara - -74.513, Wadi Howar - -86.363), no outliers detected, no variables failed tolerance test*

1.B.III. Results	
1.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 94.7%, Malian Sahara (D^2: 1.184), A-Group (D^2: 6.893)*
1.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.2%*
1.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 96.1%, Malian Sahara (D^2: 1.129), A-Group (D^2: 9.115)*
1.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (4 Malian Sahara, 1 Wadi Howar), Malian Sahara (4 A-Group)*
1.B.III.2.b. Misclassifications (separate-groups):	*A-Group (2 Malian Sahara), Malian Sahara (1 A-Group)*
1.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

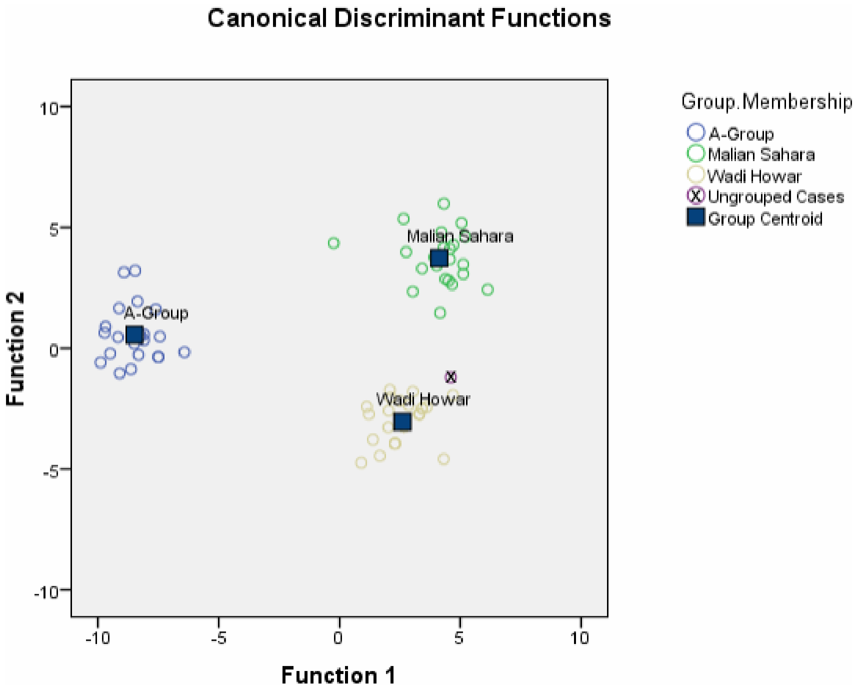


1.B.IV. Additional results	
1.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 94.7%, 88.2%), separate-groups covariance matrix (Malian Sahara, 94.7%), Box's M (test not possible), variables entered (26)*
1.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 96.1%, 89.5%), separate-groups covariance matrix (Malian Sahara, 94.7%), Box's M (Sig. .000), variables entered (11)*
1.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 98.9%, 87.2%; separate-groups covariance matrix - Malian Sahara, 97.9%), Box's M (Sig. .000), variables entered (22)*
1.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 98.9%, 85.1%; separate-groups covariance matrix - Malian Sahara, 98.9%), Box's M (test not possible), variables entered (34)*
1.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 100.0%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (47)*
1.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 69.1%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (116)*

1.C.I. Summary	
1.C.I.1. Individual:	*Jebel Sahaba/Tushka (Mean individual)*
1.C.I.2. Comparative samples:	*A-Group, Malian Sahara, Wadi Howar*
1.C.I.3. Data:	*Non-metric cranial and dental traits*
1.C.I.4. Classification:	*Wadi Howar*

1.C.II. Analysis overview	
1.C.II.1. Method:	*Mahalanobis distance*
1.C.II.2.a. Variables in matrix:	*56*
1.C.II.2.b. Variables entered:	*17*
1.C.II.3. Best predictors:	*Distal accessory ridge UC (.506), Shovel UI1 (.166), Sella nasi (main) (-.143), Margo infranasalis (additional tendency/superstructure) (.231 - Function 2)*
1.C.II.4.a. Wilks' Lambda:	*1 through 2: .003 (Sig. .000), 2: .105 (Sig. .000)*
1.C.II.4.b. Eigenvalues:	*1: 29.081 (r: .983), 2: 8.518 (r: .946)*
1.C.II.5. Prior classification probability:	*34.5% (prior prob. + 25%: 43.2%)*
1.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Malian Sahara - 'singular', Wadi Howar - 'singular'), no outliers detected, no variables failed tolerance test*

1.C.III. Results	
1.C.III.1.a. Within-groups covariance matrix:	*Wadi Howar, 100.0%, Wadi Howar (D^2: 7.345), Malian Sahara (D^2: 24.577)*
1.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*98.7%*
1.C.III.1.c. Separate-groups covariance matrix:	*Wadi Howar, 100.0%, Wadi Howar (D^2: 8.222), Malian Sahara (D^2: 21.415)*
1.C.III.2.a. Misclassifications (leave-one-out):	*Malian Sahara (1 A-Group)*
1.C.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
1.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.C.IV. Additional results

1.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 81.6%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (56)*

1.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Wadi Howar, 98.7%, 97.4%), separate-groups covariance matrix (Wadi Howar, 100.0%), Box's M (test not possible), variables entered (14)*

1.C.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Wadi Howar, 100.0%, 95.7%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (26)*

1.C.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Wadi Howar, 100.0%, 88.3%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (56)*

1.C.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 97.9%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (23)*

1.C.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 79.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (97)*

1.D.I. Summary

1.D.I.1. Individual: *Jebel Sahaba/Tushka (Mean individual)*

1.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

1.D.I.3. Data: *Cranial and dental measurements*

1.D.I.4. Classification: *Southern Sudan*

1.D.II. Analysis overview

1.D.II.1. Method: *Mahalanobis distance*

1.D.II.2.a. Variables in matrix: *53*

1.D.II.2.b. Variables entered: *17*

1.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.534), 80(4)b. 1st premolar dental arch length (mx) (.534), 80a. Dental arch length of the mandible (.373), 81. Crown length LC (.405 - Function 2), 81. Crown length UI2 (.503 - Function 3), 81. Crown length LM1 (.341 - Function 4)*

1.D.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .015 (Sig. .000), 3 through 4: .088 (Sig. .000), 4: .451 (Sig. .000)*

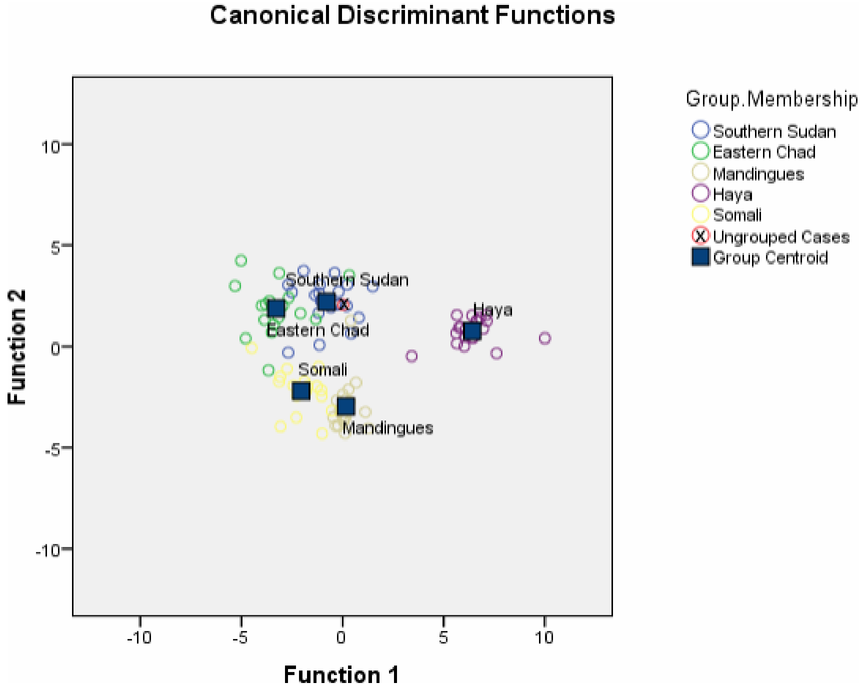
1.D.II.4.b. Eigenvalues: *1: 11.257 (r: .958), 2: 4.819 (r: .910), 3: 4.117 (r: .897), 4: 1.219 (r: .741)*

1.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

1.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -24.185, Chad - -29.059, Mandinka - 'singular', Somalis - -29.892, Haya - -62.555), no outliers detected, no variables failed tolerance test*

1.D.III. Results

1.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 5.338), Chad (D^2: 17.444)*
1.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
1.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 8.225), Chad (D^2: 14.018)*
1.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad), Haya (1 Somali)*
1.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Mandinka (1 Southern Sudan)*
1.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.D.IV. Additional results

1.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 100.0%, 87.0%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (53)*
1.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 98.1%, 90.7%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (Sig. .000), variables entered (17)*
1.D.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 100.0%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (43)*
1.D.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 63.9%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (118)*

1.E.I. Summary

1.E.I.1. Individual:	*Jebel Sahaba/Tushka (Mean individual)*
1.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.E.I.3. Data:	*Scaled cranial and dental measurements*
1.E.I.4. Classification:	*Chad*

1.E.II. Analysis overview

1.E.II.1. Method:	*Mahalanobis distance*
1.E.II.2.a. Variables in matrix:	*45*
1.E.II.2.b. Variables entered:	*18*
1.E.II.3. Best predictors:	*81. Crown length UI2 (.413), 80(4)a. Canine dental arch length (md) (-.313), 81(1). Crown width UC (.215), 80a.*

Dental arch length of the mandible (.720 - Function 2), 69c. Thickness of the mandibular symphysis (-.335 - Function 3), 1. Maximum cranial length (.303 - Function 4)

1.E.II.4.a. Wilks' Lambda: *1 through 4: .006 (Sig. .000), 2 through 4: .032 (Sig. .000), 3 through 4: .143 (Sig. .000), 4: .424 (Sig. .000)*

1.E.II.4.b. Eigenvalues: *1: 4.693 (r: .908), 2: 3.434 (r: .880), 3: 1.962 (r: .814), 4: 1.358 (r: .759)*

1.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

1.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -86.182, Chad - -102.165, Mandinka - -135.828, Somalis - -95.860, Haya - -100.508), no outliers detected, no variables failed tolerance test*

1.E.III. Results

1.E.III.1.a. Within-groups covariance matrix: *Chad, 97.2%, Chad (D^2: 3.567), Somalis (D^2: 8.917)*

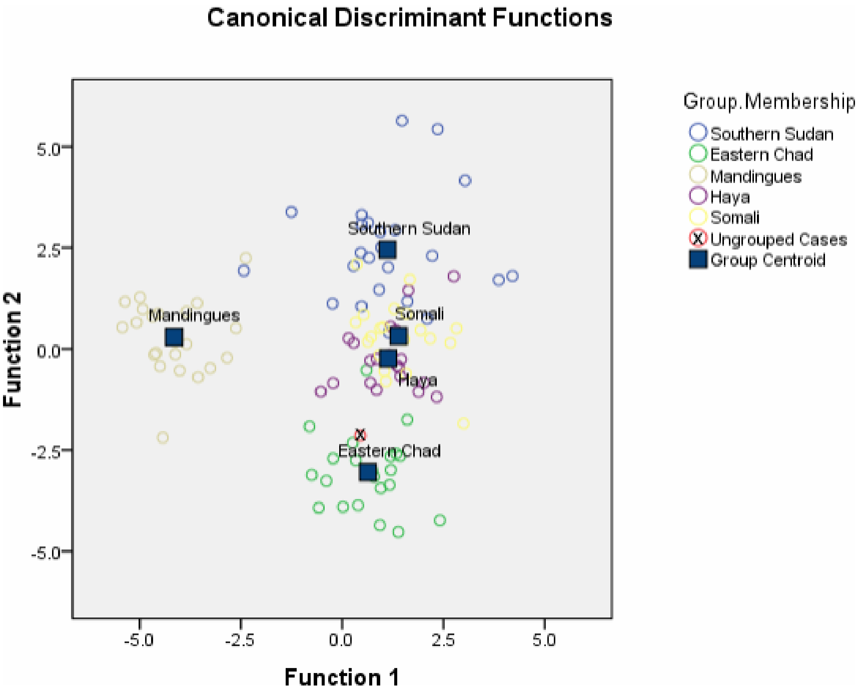
1.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*

1.E.III.1.c. Separate-groups covariance matrix: *Chad, 97.2%, Chad (D^2: 4.981), Somalis (D^2: 15.310)*

1.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 2 Mandinka, 2 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 1 Haya), Haya (2 Southern Sudan)*

1.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka, 1 Somali), Somalis (1 Southern Sudan)*

1.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



1.E.IV. Additional results

1.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 77.8%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (45)*

1.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 96.3%, 89.8%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17)*

1.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 100.0%, 99.1%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (44)*

1.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Somalis, 100.0%, 46.3%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (116)*

1.F.I. Summary

1.F.I.1. Individual: *Jebel Sahaba/Tushka (Mean individual)*

1.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

1.F.I.3. Data: *Non-metric cranial and dental traits*

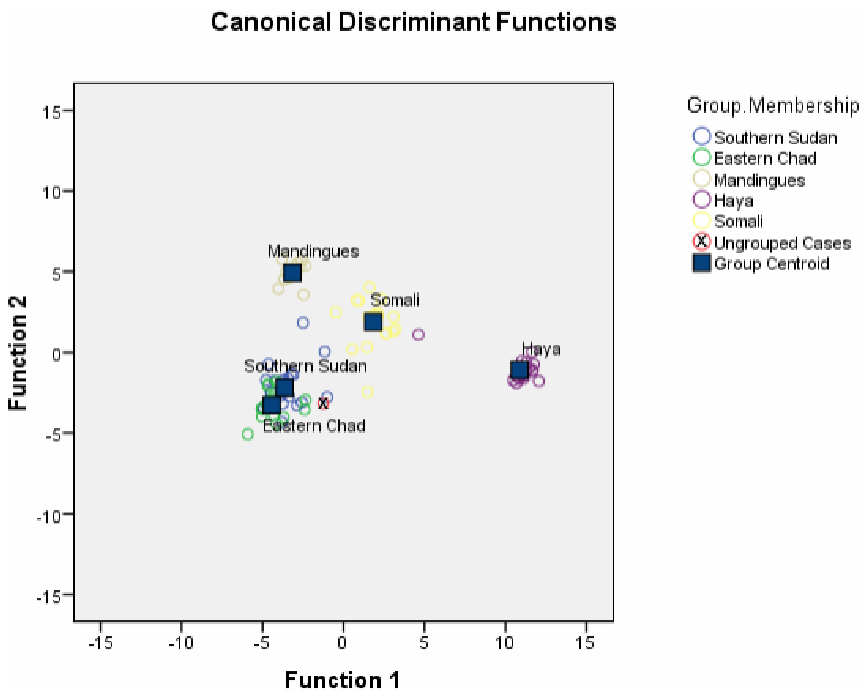
1.F.I.4. Classification: *Southern Sudan*

1.F.II. Analysis overview

1.F.II.1. Method:	*Mahalanobis distance*
1.F.II.2.a. Variables in matrix:	*58*
1.F.II.2.b. Variables entered:	*18*
1.F.II.3. Best predictors:	*Midline diastema (.632), Premolar mesial and distal accessory cusps UP1 (.381), Shovel UI1 (-.299), Tuberculum dentale UI2 (.633 - Function 2), Midline diastema (.455 - Function 3), Interruption groove UI2 (-.453 - Function 4)*
1.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .002 (Sig. .000), 3 through 4: .025 (Sig. .000), 4: .239 (Sig. .000)*
1.F.II.4.b. Eigenvalues:	*1: 33.039 (r: .985), 2: 9.468 (r: .951), 3: 8.682 (r: .947), 4: 3.189 (r: .873)*
1.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
1.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

1.F.III. Results

1.F.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 97.2%, Southern Sudan (D^2: 22.302), Chad (D^2: 31.304)*
1.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*91.7%*
1.F.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 14.771), Chad (D^2: 30.414)*
1.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 2 Somalis), Chad (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka), Haya (1 Somali)*
1.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Chad (1 Southern Sudan)*
1.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.F.IV. Additional results

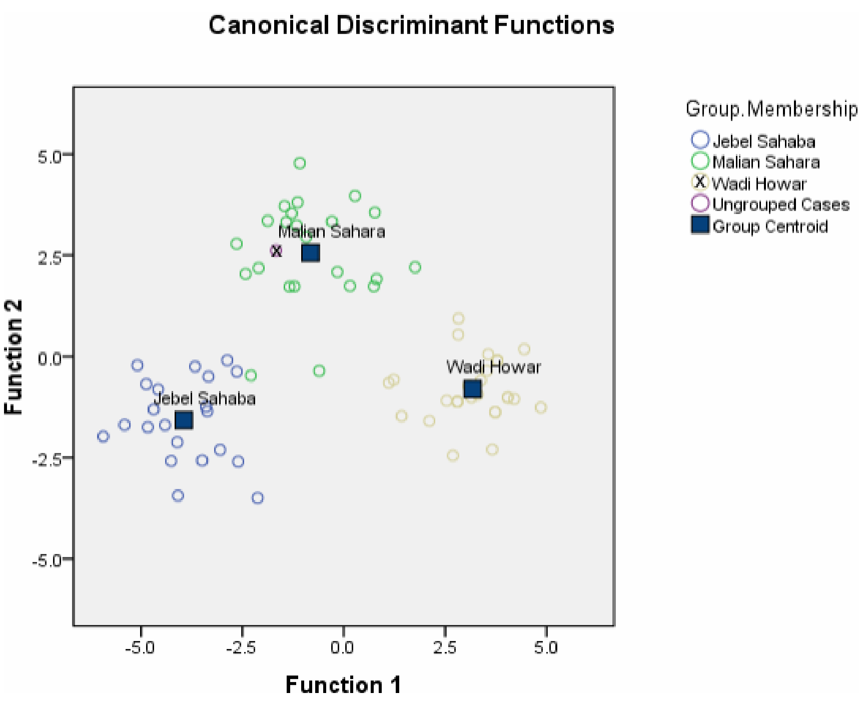
1.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Chad, 100.0%, 88.0%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (58)*
1.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 97.2%, 92.6%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (test not possible), variables entered (17)*
1.F.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 99.1%, 92.6%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (22)*
1.F.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 88.9%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (97)*

2. A-Group

2.A.I. Summary
2.A.I.1. Individual: *A-Group (Mean individual)*
2.A.I.2. Comparative samples: *Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
2.A.I.3. Data: *Cranial and dental measurements*
2.A.I.4. Classification: *Malian Sahara*

2.A.II. Analysis overview
2.A.II.1. Method: *Mahalanobis distance*
2.A.II.2.a. Variables in matrix: *35*
2.A.II.2.b. Variables entered: *16*
2.A.II.3. Best predictors: *71a. Minimum ramus width (-.290), 81. Crown length UI2 (.288), 50(1). Interorbital breadth (-.281), 63(2)d. 4^{th} internal dental arch breadth (md) (.240 - Function 2)*
2.A.II.4.a. Wilks' Lambda: *1 through 2: .024 (Sig. .000), 2: .246 (Sig. .000)*
2.A.II.4.b. Eigenvalues: *1: 9.118 (r: .949), 2: 3.065 (r: .868)*
2.A.II.5. Prior classification probability: *34.5% (prior prob. + 25%: 43.2%)*
2.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Jebel Sahaba/Tushka - -40.088, Malian Sahara - -34.155, Wadi Howar - -50.163), no outliers detected, no variables failed tolerance test*

2.A.III. Results
2.A.III.1.a. Within-groups covariance matrix: *Malian Sahara, 98.7%, Malian Sahara (D^2: .727), Jebel Sahaba/Tushka (D^2: 22.740)*
2.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *93.4%*
2.A.III.1.c. Separate-groups covariance matrix: *Malian Sahara, 98.7%, Malian Sahara (D^2: .541), Jebel Sahaba/Tushka (D^2: 24.335)*
2.A.III.2.a. Misclassifications (leave-one-out): *Malian Sahara (3 Jebel Sahaba/Tushka, 2 Wadi Howar)*
2.A.III.2.b. Misclassifications (separate-groups): *Malian Sahara (1 Jebel Sahaba/Tushka)*
2.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



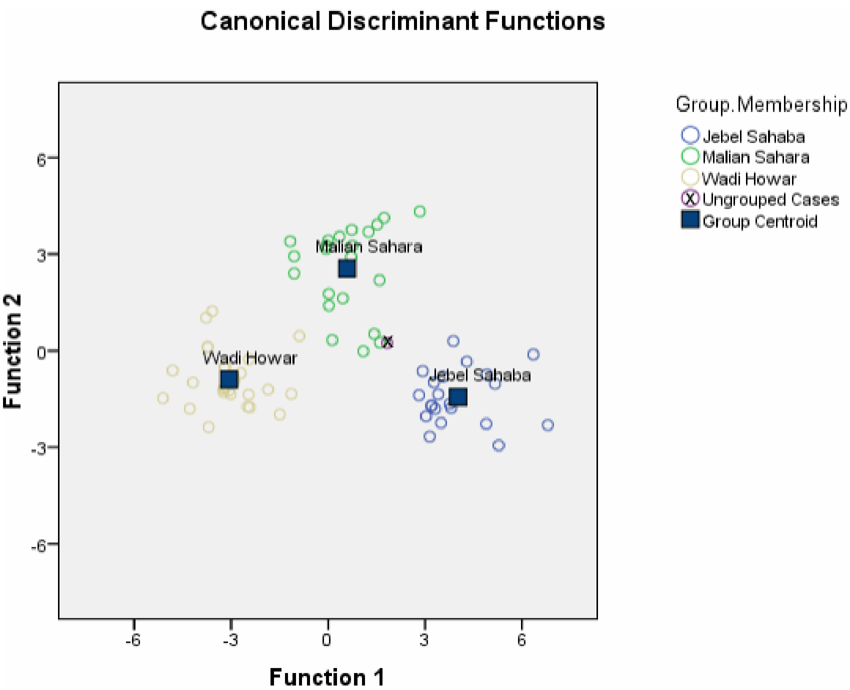
2.A.IV. Additional results
2.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Malian Sahara, 100.0%, 80.3%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (35)*
2.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Malian Sahara, 89.5%, 86.8%), separate-groups covariance matrix (Malian Sahara, 96.1%), Box's M (Sig. .000), variables entered (11)*
2.A.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 96.8%, 90.4%; separate-groups covariance matrix - Malian Sahara, 96.8%), Box's M (Sig. .000), variables entered (15)*

2.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 98.9%, 88.3%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (37)*
2.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 100.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (37)*
2.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 80.9%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (118)*

2.B.I. Summary	
2.B.I.1. Individual:	*A-Group (Mean individual)*
2.B.I.2. Comparative samples:	*Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
2.B.I.3. Data:	*Scaled cranial and dental measurements*
2.B.I.4. Classification:	*Malian Sahara*

2.B.II. Analysis overview	
2.B.II.1. Method:	*Mahalanobis distance*
2.B.II.2.a. Variables in matrix:	*29*
2.B.II.2.b. Variables entered:	*16*
2.B.II.3. Best predictors:	*19a. Mastoid height (.282), 71a. Minimum ramus width (.264), 50(1). Interorbital breadth (.246), 81(1). Crown width UM1 (-.394 - Function 2)*
2.B.II.4.a. Wilks' Lambda:	*1 through 2: .025 (Sig. .000), 2: .251 (Sig. .000)*
2.B.II.4.b. Eigenvalues:	*1: 8.876 (r: .948), 2: 2.991 (r: .866)*
2.B.II.5. Prior classification probability:	*34.5% (prior prob. + 25%: 43.2%)*
2.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Jebel Sahaba/Tushka - -91.926, Malian Sahara - -87.991, Wadi Howar - -100.504), no outliers detected, no variables failed tolerance test*

2.B.III. Results	
2.B.III.1.a. Within-groups covariance matrix:	*Malian Sahara, 100.0%, Malian Sahara (D^2: 6.889), Jebel Sahaba/Tushka (D^2: 7.638)*
2.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.8%*
2.B.III.1.c. Separate-groups covariance matrix:	*Malian Sahara, 98.7%, Malian Sahara (D^2: 4.864), Jebel Sahaba/Tushka (D^2: 7.826)*
2.B.III.2.a. Misclassifications (leave-one-out):	*Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (3 Jebel Sahaba/Tushka, 2 Wadi Howar), Wadi Howar (1 Malian Sahara)*
2.B.III.2.b. Misclassifications (separate-groups):	*Wadi Howar (1 Malian Sahara)*
2.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

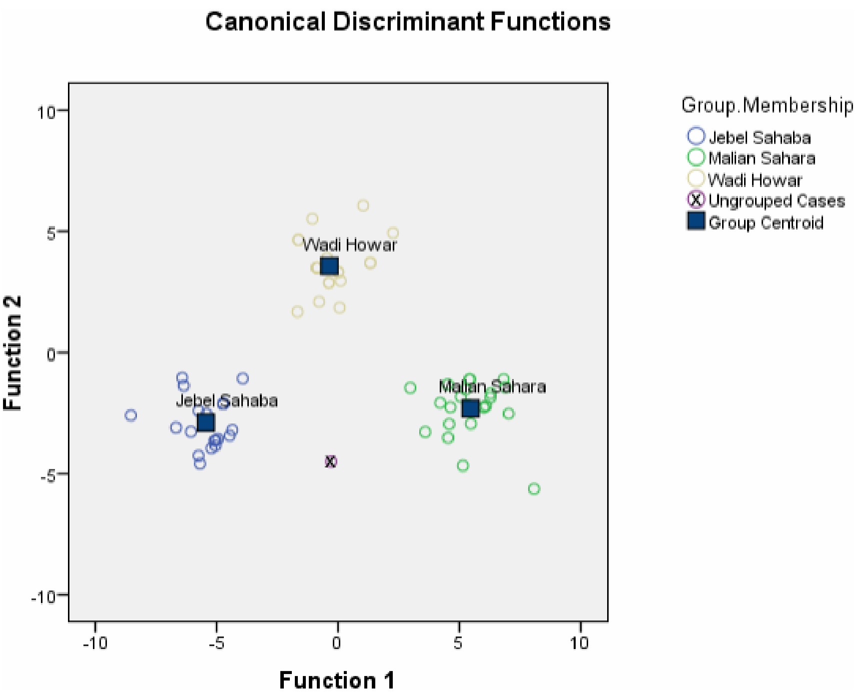


2.B.IV. Additional results	
2.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 88.2%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (29)*
2.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Malian Sahara, 94.7%, 89.5%), separate-groups covariance matrix (Malian Sahara, 94.7%), Box's M (Sig. .000), variables entered (8)*
2.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 94.7%; separate-groups covariance matrix - Malian Sahara, 98.9%), Box's M (test not possible), variables entered (24)*
2.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Wadi Howar, 100.0%, 88.3%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (38)*
2.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 100.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (63)*
2.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 84.0%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (116)*

2.C.I. Summary	
2.C.I.1. Individual:	*A-Group (Mean individual)*
2.C.I.2. Comparative samples:	*Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
2.C.I.3. Data:	*Non-metric cranial and dental traits*
2.C.I.4. Classification:	*Jebel Sahaba/Tushka*

2.C.II. Analysis overview	
2.C.II.1. Method:	*Mahalanobis distance*
2.C.II.2.a. Variables in matrix:	*55*
2.C.II.2.b. Variables entered:	*19*
2.C.II.3. Best predictors:	*Tuberculum dentale UI2 (.268), Premolar root number UP1 (-.143), Orientation of the Processus frontales maxillae (.125), Premolar lingual cusps LP2 (.336 - Function 2)*
2.C.II.4.a. Wilks' Lambda:	*1 through 2: .005 (Sig. .000), 2: .094 (Sig. .000)*
2.C.II.4.b. Eigenvalues:	*1: 17.978 (r: .973), 2: 9.665 (r: .952)*
2.C.II.5. Prior classification probability:	*34.5% (prior prob. + 25%: 43.2%)*
2.C.II.6. Remarks:	*Box's M (test not possible: Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular', Wadi Howar - 'singular'), no outliers detected, no variables failed tolerance test*

2.C.III. Results	
2.C.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 29.186), Malian Sahara (D^2: 37.833)*
2.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*98.7%*
2.C.III.1.c. Separate-groups covariance matrix:	*Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 28.219), Malian Sahara (D^2: 31.549)*
2.C.III.2.a. Misclassifications (leave-one-out):	*Wadi Howar (1 Jebel Sahaba/Tushka)*
2.C.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
2.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.C.IV. Additional results

2.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Malian Sahara, 100.0%, 78.9%), separate-groups covariance matrix (Malian Sahara, 100.0%), Box's M (test not possible), variables entered (55)*
2.C.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 98.7%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (18)*
2.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 96.8%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (26)*
2.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Wadi Howar, 100.0%, 83.0%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (55)*
2.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 97.9%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (29)*
2.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 71.3%; separate-groups covariance matrix - "Sudanese Hotchpotch", 100.0%), Box's M (test not possible), variables entered (95)*

2.D.I. Summary

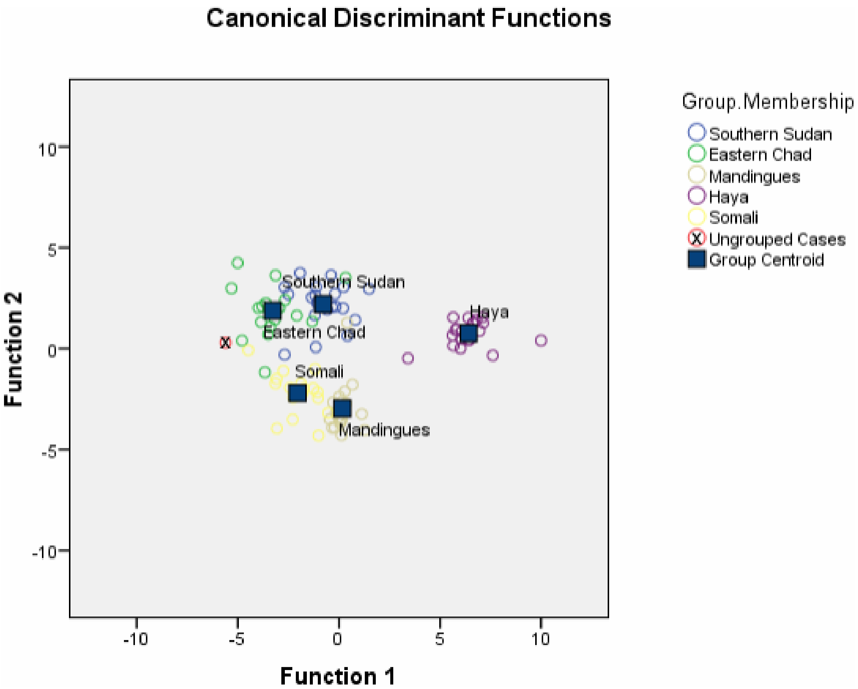
2.D.I.1. Individual:	*A-Group (Mean individual)*
2.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.D.I.3. Data:	*Cranial and dental measurements*
2.D.I.4. Classification:	*Somalis*

2.D.II. Analysis overview

2.D.II.1. Method:	*Mahalanobis distance*
2.D.II.2.a. Variables in matrix:	*53*
2.D.II.2.b. Variables entered:	*17*
2.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.534), 80(4)b. 1st premolar dental arch length (mx) (.534), 80a. Dental arch length of the mandible (.373), 81. Crown length LC (.405 - Function 2), 81. Crown length UI2 (.503 - Function 3), 81. Crown length LM1 (.341 - Function 4)*
2.D.II.4.a. Wilks' Lambda:	*1 through 4: .001 (Sig. .000), 2 through 4: .015 (Sig. .000), 3 through 4: .088 (Sig. .000), 4: .451 (Sig. .000)*
2.D.II.4.b. Eigenvalues:	*1: 11.257 (r: .958), 2: 4.819 (r: .910), 3: 4.117 (r: .897), 4: 1.219 (r: .741)*

2.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
2.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -24.185, Chad - -29.059, Mandinka - 'singular', Somalis - -29.892, Haya - -62.555), no outliers detected, no variables failed tolerance test*

2.D.III. Results
2.D.III.1.a. Within-groups covariance matrix: *Chad, 98.1%, Chad (D^2: 15.832), Somalis (D^2: 20.778)*
2.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*
2.D.III.1.c. Separate-groups covariance matrix: *Somalis, 98.1%, Somalis (D^2: 15.774), Chad (D^2: 14.412)*
2.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Chad), Haya (1 Somali)*
2.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Mandinka (1 Southern Sudan)*
2.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



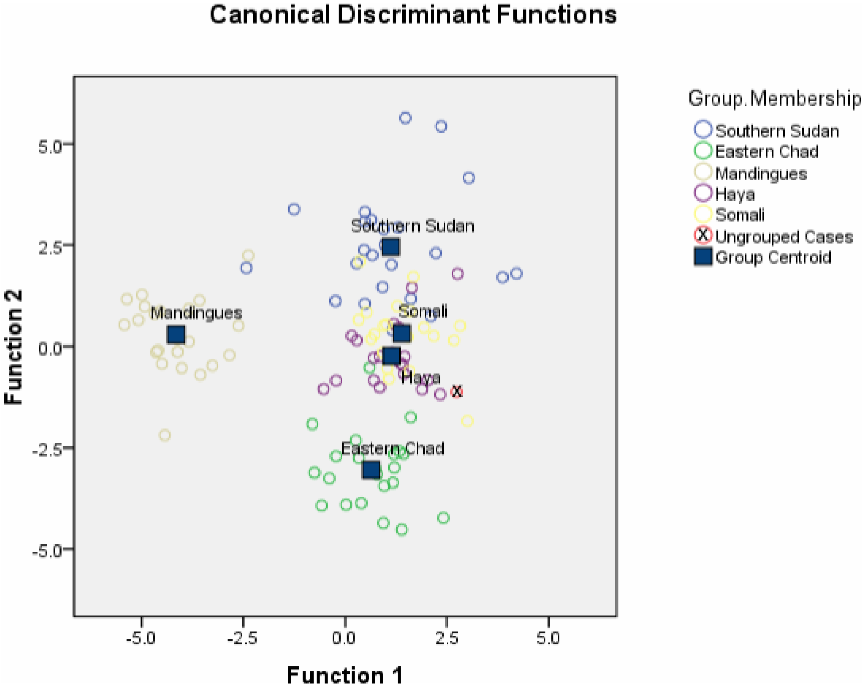
2.D.IV. Additional results
2.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 100.0%, 87.0%), separate-groups covariance matrix (Somalis, 100.0%), Box's M (test not possible), variables entered (53)*
2.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 98.1%, 90.7%), separate-groups covariance matrix (Somalis, 99.1%), Box's M (Sig. .000), variables entered (17)*
2.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 100.0%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (43)*
2.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Chad, 100.0%, 63.9%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (118)*

2.E.I. Summary
2.E.I.1. Individual: *A-Group (Mean individual)*
2.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.E.I.3. Data: *Scaled cranial and dental measurements*
2.E.I.4. Classification: *Somalis*

2.E.II. Analysis overview
2.E.II.1. Method: *Mahalanobis distance*
2.E.II.2.a. Variables in matrix: *45*
2.E.II.2.b. Variables entered: *18*
2.E.II.3. Best predictors: *81. Crown length UI2 (.413), 80(4)a. Canine dental arch length (md) (-.313), 81(1). Crown width UC (.215), 80a. Dental arch length of the mandible (.720 - Function 2),*

	69c. Thickness of the mandibular symphysis (-.335 - Function 3), 1. Maximum cranial length (.303 - Function 4)
2.E.II.4.a. Wilks' Lambda:	*1 through 4: .006 (Sig. .000), 2 through 4: .032 (Sig. .000), 3 through 4: .143 (Sig. .000), 4: .424 (Sig. .000)*
2.E.II.4.b. Eigenvalues:	*1: 4.693 (r: .908), 2: 3.434 (r: .880), 3: 1.962 (r: .814), 4: 1.358 (r: .759)*
2.E.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
2.E.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -86.182, Chad - -102.165, Mandinka - -135.828, Somalis - -95.860, Haya - -100.508), no outliers detected, no variables failed tolerance test*

2.E.III. Results	
2.E.III.1.a. Within-groups covariance matrix:	*Somalis, 97.2%, Somalis (D^2: 5.971), Chad (D^2: 12.022)*
2.E.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
2.E.III.1.c. Separate-groups covariance matrix:	*Somalis, 97.2%, Somalis (D^2: 8.704), Chad (D^2: 13.714)*
2.E.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (1 Chad, 2 Mandinka, 2 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 1 Haya), Haya (2 Southern Sudan)*
2.E.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Mandinka, 1 Somali), Somalis (1 Southern Sudan)*
2.E.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.E.IV. Additional results	
2.E.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 99.1%, 77.8%), separate-groups covariance matrix (Somalis, 100.0%), Box's M (test not possible), variables entered (45)*
2.E.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 96.3%, 89.8%), separate-groups covariance matrix (Somalis, 98.1%), Box's M (Sig. .000), variables entered (17)*
2.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 100.0%, 99.1%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (44)*
2.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Somalis, 100.0%, 46.3%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (116)*

2.F.I. Summary	
2.F.I.1. Individual:	*A-Group (Mean individual)*
2.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.F.I.3. Data:	*Non-metric cranial and dental traits*
2.F.I.4. Classification:	*Somalis*

2.F.II. Analysis overview

2.F.II.1. Method: *Mahalanobis distance*

2.F.II.2.a. Variables in matrix: *57*

2.F.II.2.b. Variables entered: *18*

2.F.II.3. Best predictors: *Midline diastema (.642), Premolar mesial and distal accessory cusps UP1 (.398), Shovel UI1 (-.313), Tuberculum dentale (.577 - Function 2), Midline diastema (.555 - Function 3), Canine mesial ridge (.461 - Function 4)*

2.F.II.4.a. Wilks' Lambda: *1 through 4: .000 (Sig. .000), 2 through 4: .002 (Sig. .000), 3 through 4: .023 (Sig. .000), 4: .221 (Sig. .000)*

2.F.II.4.b. Eigenvalues: *1: 31.050 (r: .984), 2: 9.102 (r: .949), 3: 8.647 (r: .947), 4: 3.534 (r: .883)*

2.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

2.F.II.6. Remarks: *Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected (except ungrouped case - D^2: 31.679; critical value: 28.869 - p 0.95, df 18), no variables failed tolerance test*

2.F.III. Results

2.F.III.1.a. Within-groups covariance matrix: *Somalis, 98.1%, Somalis (D^2: 44.589), Southern Sudan (D^2: 81.865)*

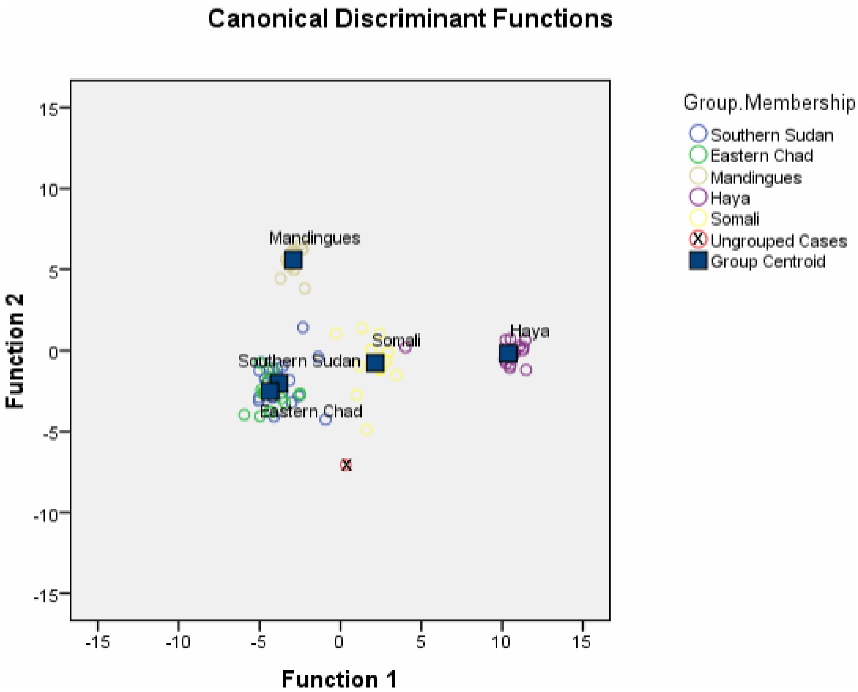
2.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *91.7%*

2.F.III.1.c. Separate-groups covariance matrix: *Somalis, 98.1%, Somalis (D^2: 31.679), Southern Sudan (D^2: 62.470)*

2.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 1 Mandinka, 2 Somalis), Chad (2 Southern Sudan), Somalis (1 Mandinka), Haya (1 Somali)*

2.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Chad (1 Southern Sudan)*

2.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.F.IV. Additional results

2.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 100.0%, 88.9%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (57)*

2.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Somalis, 98.1%, 91.7%), separate-groups covariance matrix (Somalis, 98.1%), Box's M (test not possible), variables entered (18)*

2.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Somalis, 99.1%, 93.5%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (22)*

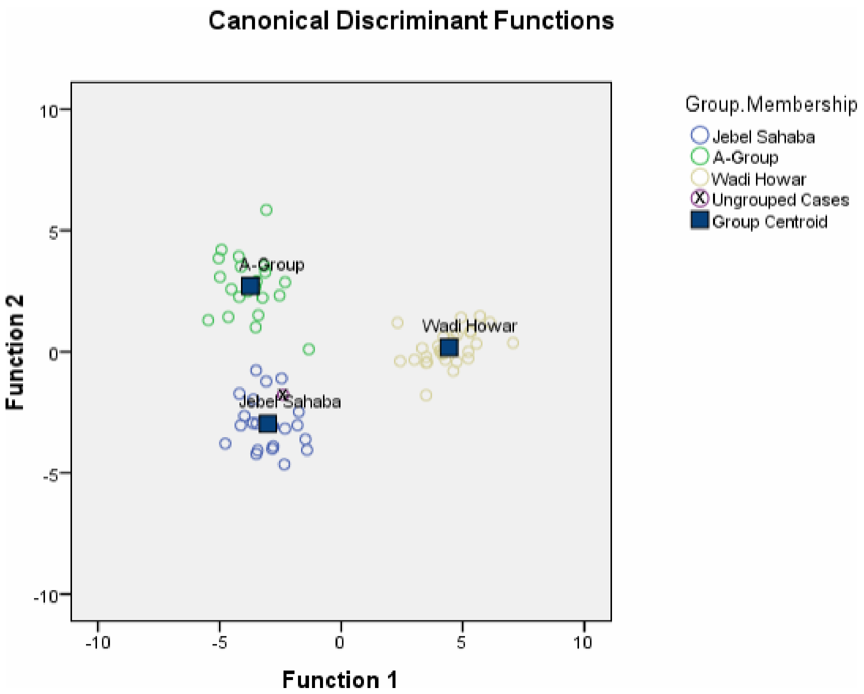
2.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 87.0%; separate-groups* *covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (95)*

3. Malian Sahara

3.A.I. Summary
3.A.I.1. Individual: *Malian Sahara (Mean individual)*
3.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Wadi Howar*
3.A.I.3. Data: *Cranial and dental measurements*
3.A.I.4. Classification: *Jebel Sahaba/Tushka*

3.A.II. Analysis overview
3.A.II.1. Method: *Mahalanobis distance*
3.A.II.2.a. Variables in matrix: *37*
3.A.II.2.b. Variables entered: *15*
3.A.II.3. Best predictors: *81. Crown length UI2 (.306), 81. Crown length LI2 (.264), 19a. Mastoid height (-.222), 80(1)d. 1st molar dental arch breadth (md) (-.501 - Function 2)*
3.A.II.4.a. Wilks' Lambda: *1 through 2: .010 (Sig. .000), 2: .172 (Sig. .000)*
3.A.II.4.b. Eigenvalues: *1: 15.688 (r: .970), 2: 4.799 (r: .910)*
3.A.II.5. Prior classification probability: *34.8% (prior prob. + 25%: 43.5%)*
3.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -36.926, Jebel Sahaba/Tushka - -37.802, Wadi Howar - -43.347), no outliers detected, no variables failed tolerance test*

3.A.III. Results
3.A.III.1.a. Within-groups covariance matrix: *Jebel Sahaba/Tushka, 98.6%, Jebel Sahaba/Tushka (D^2: 1.834), A-Group (D^2: 21.915)*
3.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *97.3%*
3.A.III.1.c. Separate-groups covariance matrix: *Jebel Sahaba/Tushka, 100.0%, Jebel Sahaba/Tushka (D^2: 1.980), A-Group (D^2: 12.873)*
3.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group)*
3.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*
3.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.A.IV. Additional results
3.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%, 95.9%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (37)*
3.A.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 98.6%, 98.6%), separate-groups covariance matrix (Jebel Sahaba/Tushka, 98.6%), Box's M (Sig. .000), variables entered (10)*
3.A.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 97.8%; separate-groups*

	covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (Sig. .000), variables entered (17)
3.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 91.3%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (38)*
3.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 100.0%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (40)*
3.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 75.0%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (118)*

3.B.I. Summary

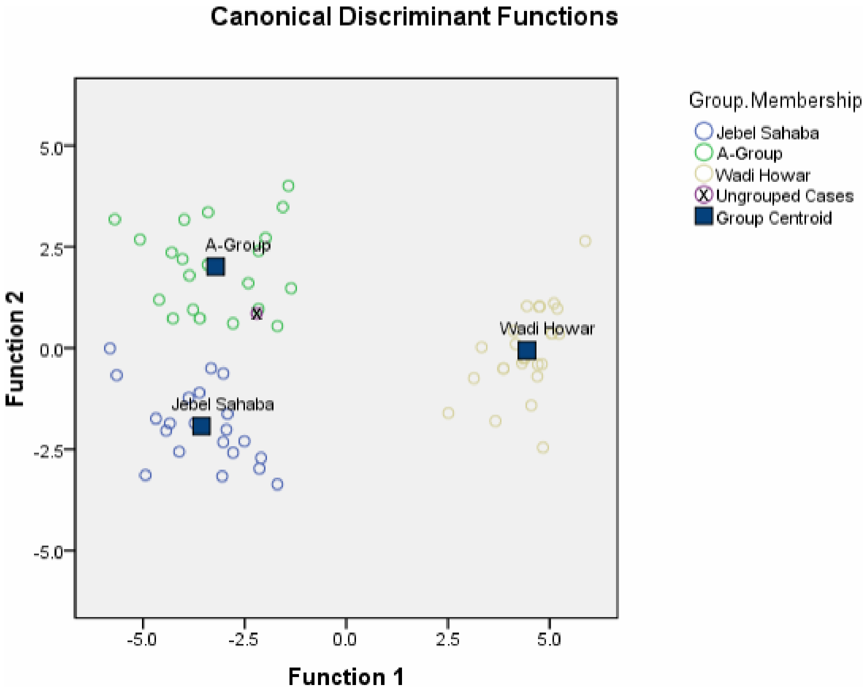
3.B.I.1. Individual:	*Malian Sahara (Mean individual)*
3.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Wadi Howar*
3.B.I.3. Data:	*Scaled cranial and dental measurements*
3.B.I.4. Classification:	*A-Group*

3.B.II. Analysis overview

3.B.II.1. Method:	*Mahalanobis distance*
3.B.II.2.a. Variables in matrix:	*32*
3.B.II.2.b. Variables entered:	*12*
3.B.II.3. Best predictors:	*3. Glabello-Lambda length (.299), 1. Maximum cranial length (.199), 81(1). Crown width LC (-.198), 30. Bregma-Lambda chord (.425 - Function 2)*
3.B.II.4.a. Wilks' Lambda:	*1 through 2: .018 (Sig. .000), 2: .304 (Sig. .000)*
3.B.II.4.b. Eigenvalues:	*1: 15.705 (r: .970), 2: 2.292 (r: .834)*
3.B.II.5. Prior classification probability:	*34.8% (prior prob. + 25%: 43.5%)*
3.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -91.194, Jebel Sahaba/Tushka - -90.488, Wadi Howar - -99.702), no outliers detected, no variables failed tolerance test*

3.B.III. Results

3.B.III.1.a. Within-groups covariance matrix:	*A-Group, 100.0%, A-Group (D^2: 2.355), Jebel Sahaba/Tushka (D^2: 9.563)*
3.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*94.6%*
3.B.III.1.c. Separate-groups covariance matrix:	*A-Group, 100.0%, A-Group (D^2: 1.801), Jebel Sahaba/Tushka (D^2: 18.705)*
3.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (2 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (2 A-Group)*
3.B.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
3.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*

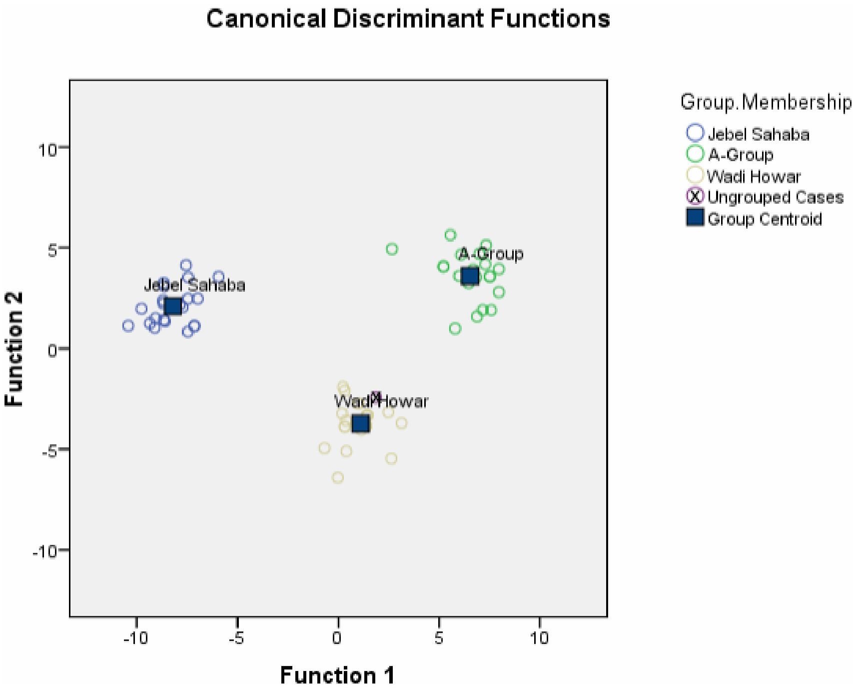


3.B.IV. Additional results	
3.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 98.6%, 83.8%), separate-groups covariance matrix (A-Group, 98.6%), Box's M (test not possible), variables entered (32)*
3.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 100.0%, 94.6%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (Sig. .000), variables entered (12)*
3.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.7%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (Sig. .000), variables entered (18)*
3.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 91.3%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (34)*
3.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 100.0%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (39)*
3.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, 65.2%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (116)*

3.C.I. Summary	
3.C.I.1. Individual:	*Malian Sahara (Mean individual)*
3.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Wadi Howar*
3.C.I.3. Data:	*Non-metric cranial and dental traits*
3.C.I.4. Classification:	*Wadi Howar*

3.C.II. Analysis overview	
3.C.II.1. Method:	*Mahalanobis distance*
3.C.II.2.a. Variables in matrix:	*56*
3.C.II.2.b. Variables entered:	*23*
3.C.II.3. Best predictors:	*Premolar lingual cusps LP2 (.176), Orientation of the Processus frontales maxillae (.137), Margo infranasalis (main) (.127), Tuberculum dentale (-.315 - Function 2)*
3.C.II.4.a. Wilks' Lambda:	*1 through 2: .002 (Sig. .000), 2: .081 (Sig. .000)*
3.C.II.4.b. Eigenvalues:	*1: 33.103 (r: .985), 2: 11.388 (r: .959)*
3.C.II.5. Prior classification probability:	*34.8% (prior prob. + 25%: 43.5%)*
3.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Wadi Howar - 'singular'), no outliers detected, no variables failed tolerance test*

3.C.III. Results	
3.C.III.1.a. Within-groups covariance matrix:	*Wadi Howar, 100.0%, Wadi Howar (D^2: 2.250), A-Group (D^2: 58.177)*
3.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*100.0%*
3.C.III.1.c. Separate-groups covariance matrix:	*Wadi Howar, 100.0%, Wadi Howar (D^2: 3.017), A-Group (D^2: 56.966)*
3.C.III.2.a. Misclassifications (leave-one-out):	*No misclassifications*
3.C.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
3.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.C.IV. Additional results

3.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 79.7%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (test not possible), variables entered (56)*

3.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Wadi Howar, 100.0%, 100.0%), separate-groups covariance matrix (Wadi Howar, 100.0%), Box's M (test not possible), variables entered (23)*

3.C.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 96.7%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (23)*

3.C.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - Wadi Howar, 100.0%, 81.5%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (56)*

3.C.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - "Sudanese Hotchpotch", 100.0%, 97.8%; separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%), Box's M (test not possible), variables entered (30)*

3.C.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Wadi Howar, 100.0%, 88.0%; separate-groups covariance matrix - Wadi Howar, 100.0%), Box's M (test not possible), variables entered (97)*

3.D.I. Summary

3.D.I.1. Individual: *Malian Sahara (Mean individual)*

3.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.D.I.3. Data: *Cranial and dental measurements*

3.D.I.4. Classification: *Southern Sudan*

3.D.II. Analysis overview

3.D.II.1. Method: *Mahalanobis distance*

3.D.II.2.a. Variables in matrix: *53*

3.D.II.2.b. Variables entered: *17*

3.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.534), 80(4)b. 1st premolar dental arch length (mx) (.534), 80a. Dental arch length of the mandible (.373), 81. Crown length LC (.405 - Function 2), 81. Crown length UI2 (.503 - Function 3), 81. Crown length LM1 (.341 - Function 4)*

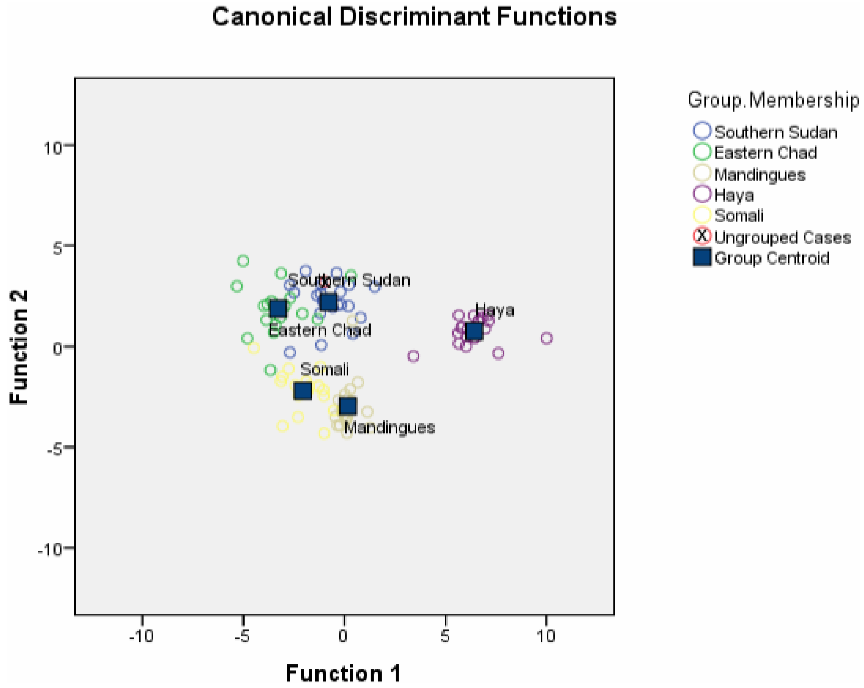
3.D.II.4.a. Wilks' Lambda: *1 through 4: .001 (Sig. .000), 2 through 4: .015 (Sig. .000), 3 through 4: .088 (Sig. .000), 4: .451 (Sig. .000)*

3.D.II.4.b. Eigenvalues: *1: 11.257 (r: .958), 2: 4.819 (r: .910), 3: 4.117 (r: .897), 4: 1.219 (r: .741)*

3.D.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
3.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Southern Sudan - -24.185, Chad - -29.059, Mandinka - 'singular', Somalis - -29.892, Haya - -62.555), no outliers detected, no variables failed tolerance test*

3.D.III. Results

3.D.III.1.a. Within-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 3.890), Chad (D^2: 15.655)*
3.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.9%*
3.D.III.1.c. Separate-groups covariance matrix:	*Southern Sudan, 98.1%, Southern Sudan (D^2: 6.915), Chad (D^2: 12.599)*
3.D.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 2 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Mandinka, 1 Haya), Mandinka (1 Southern Sudan), Somalis (2 Chad), Haya (1 Somali)*
3.D.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Mandinka (1 Southern Sudan)*
3.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.D.IV. Additional results

3.D.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Southern Sudan, 100.0%, 87.0%), separate-groups covariance matrix (Southern Sudan, 100.0%), Box's M (test not possible), variables entered (53)*
3.D.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Southern Sudan, 98.1%, 90.7%), separate-groups covariance matrix (Southern Sudan, 99.1%), Box's M (Sig. .000), variables entered (17)*
3.D.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 100.0%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (43)*
3.D.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Haya, 100.0%, 63.9%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (118)*

3.E.I. Summary

3.E.I.1. Individual:	*Malian Sahara (Mean individual)*
3.E.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.E.I.3. Data:	*Scaled cranial and dental measurements*
3.E.I.4. Classification:	*Chad*

3.E.II. Analysis overview

3.E.II.1. Method:	*Mahalanobis distance*
3.E.II.2.a. Variables in matrix:	*45*
3.E.II.2.b. Variables entered:	*18*

3.E.II.3. Best predictors: *81. Crown length UI2 (.413), 80(4)a. Canine dental arch length (md) (-.313), 81(1). Crown width UC (.215), 80a. Dental arch length of the mandible (.720 - Function 2), 69c. Thickness of the mandibular symphysis (-.335 - Function 3), 1. Maximum cranial length (.303 - Function 4)*

3.E.II.4.a. Wilks' Lambda: *1 through 4: .006 (Sig. .000), 2 through 4: .032 (Sig. .000), 3 through 4: .143 (Sig. .000), 4: .424 (Sig. .000)*

3.E.II.4.b. Eigenvalues: *1: 4.693 (r: .908), 2: 3.434 (r: .880), 3: 1.962 (r: .814), 4: 1.358 (r: .759)*

3.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

3.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -86.182, Chad - -102.165, Mandinka - -135.828, Somalis - -95.860, Haya - -100.508), no outliers detected, no variables failed tolerance test*

3.E.III. Results

3.E.III.1.a. Within-groups covariance matrix: *Chad, 97.2%, Chad (D^2: 1.172), Somalis (D^2: 17.141)*

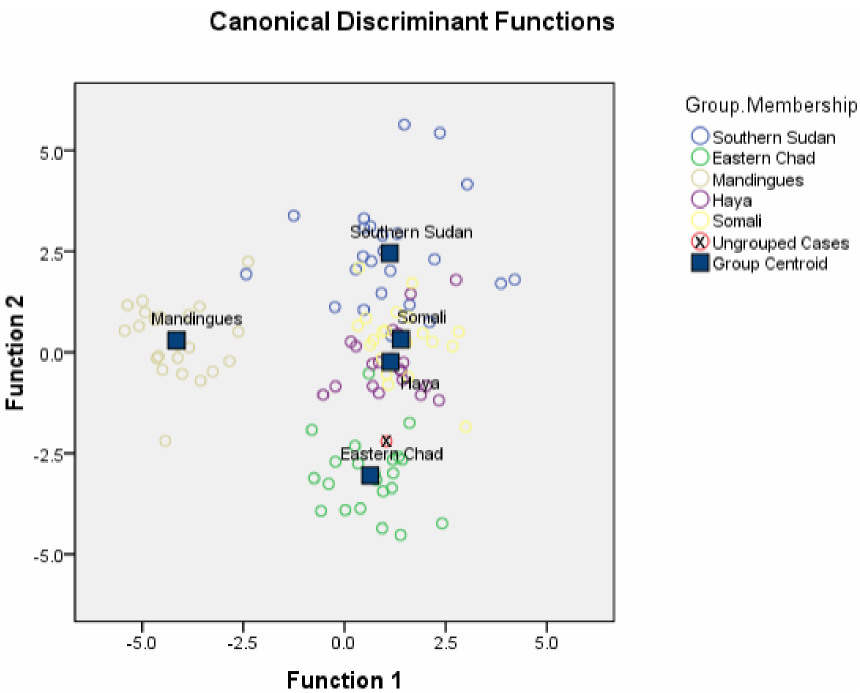
3.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *88.9%*

3.E.III.1.c. Separate-groups covariance matrix: *Chad, 97.2%, Chad (D^2: 1.834), Southern Sudan (D^2: 12.630)*

3.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 2 Mandinka, 2 Somalis, 1 Haya), Chad (1 Southern Sudan, 1 Somali), Somalis (1 Southern Sudan, 1 Haya), Haya (2 Southern Sudan)*

3.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka), Somalis (1 Southern Sudan)*

3.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.E.IV. Additional results

3.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 99.1%, 77.8%), separate-groups covariance matrix (Chad, 100.0%), Box's M (test not possible), variables entered (45)*

3.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 96.3%, 89.8%), separate-groups covariance matrix (Chad, 98.1%), Box's M (Sig. .000), variables entered (17)*

3.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Chad, 100.0%, 99.1%; separate-groups covariance matrix - Chad, 100.0%), Box's M (test not possible), variables entered (44)*

3.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 100.0%, 46.3%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (116)*

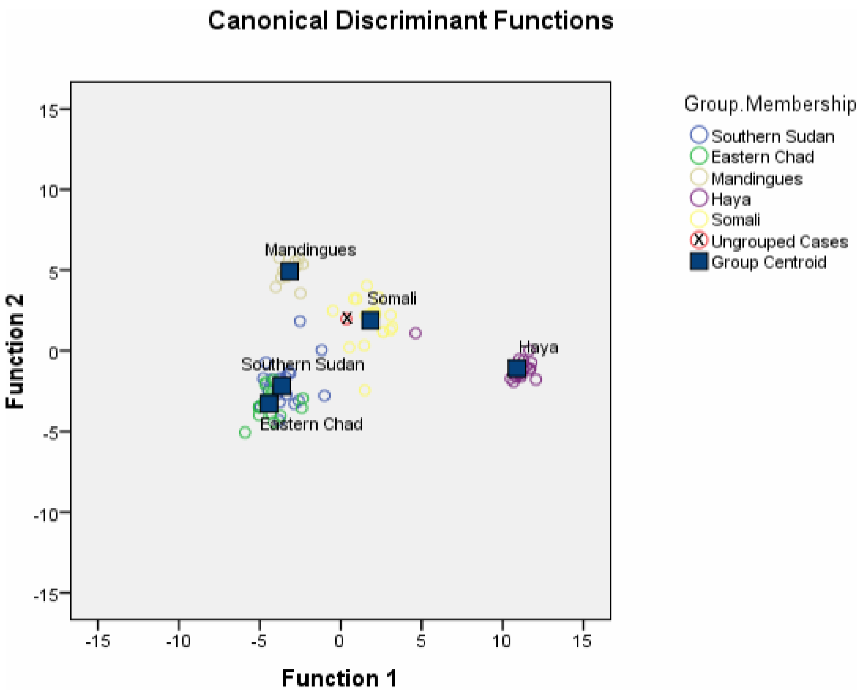
3.F.I. Summary

3.F.I.1. Individual: *Malian Sahara (Mean individual)*

3.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.F.I.3. Data: *Non-metric cranial and dental traits*

3.F.I.4. Classification:	*Somalis*
3.F.II. Analysis overview	
3.F.II.1. Method:	*Mahalanobis distance*
3.F.II.2.a. Variables in matrix:	*58*
3.F.II.2.b. Variables entered:	*18*
3.F.II.3. Best predictors:	*Midline diastema (.632), Premolar mesial and distal accessory cusps UP1 (.381), Shovel UI1 (-.299), Tuberculum dentale (.633 - Function 2), Midline diastema (.455 - Function 3), Interruption groove UI2 (-.453 - Function 4)*
3.F.II.4.a. Wilks' Lambda:	*1 through 4: .000 (Sig. .000), 2 through 4: .002 (Sig. .000), 3 through 4: .025 (Sig. .000), 4: .239 (Sig. .000)*
3.F.II.4.b. Eigenvalues:	*1: 33.039 (r: .985), 2: 9.486 (r: .951), 3: 8.682 (r: .947), 4: 3.189 (r: .873)*
3.F.II.5. Prior classification probability:	*20.1% (prior prob. + 25%: 25.1%)*
3.F.II.6. Remarks:	*Box's M (test not possible: Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*
3.F.III. Results	
3.F.III.1.a. Within-groups covariance matrix:	*Somalis, 97.2%, Somalis (D^2: 12.786), Southern Sudan (D^2: 45.741)*
3.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*91.7%*
3.F.III.1.c. Separate-groups covariance matrix:	*Somalis, 98.1%, Somalis (D^2: 8.588), Southern Sudan (D^2: 22.567)*
3.F.III.2.a. Misclassifications (leave-one-out):	*Southern Sudan (2 Chad, 1 Mandinka, 2 Somalis), Chad (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka), Haya (1 Somali)*
3.F.III.2.b. Misclassifications (separate-groups):	*Southern Sudan (1 Chad), Chad (1 Southern Sudan)*
3.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.F.IV. Additional results	
3.F.IV.1.a. Simultaneous:	*Within-groups covariance matrix (Somalis, 100.0%, 88.0%), separate-groups covariance matrix (Somalis, 100.0%), Box's M (test not possible), variables entered (58)*
3.F.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (Somalis, 97.2%, 92.6%), separate-groups covariance matrix (Somalis, 99.1%), Box's M (test not possible), variables entered (17)*
3.F.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - Somalis, 99.1%, 92.6%; separate-groups covariance matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (22)*
3.F.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Somalis, 100.0%, 88.9%; separate-groups covariance*

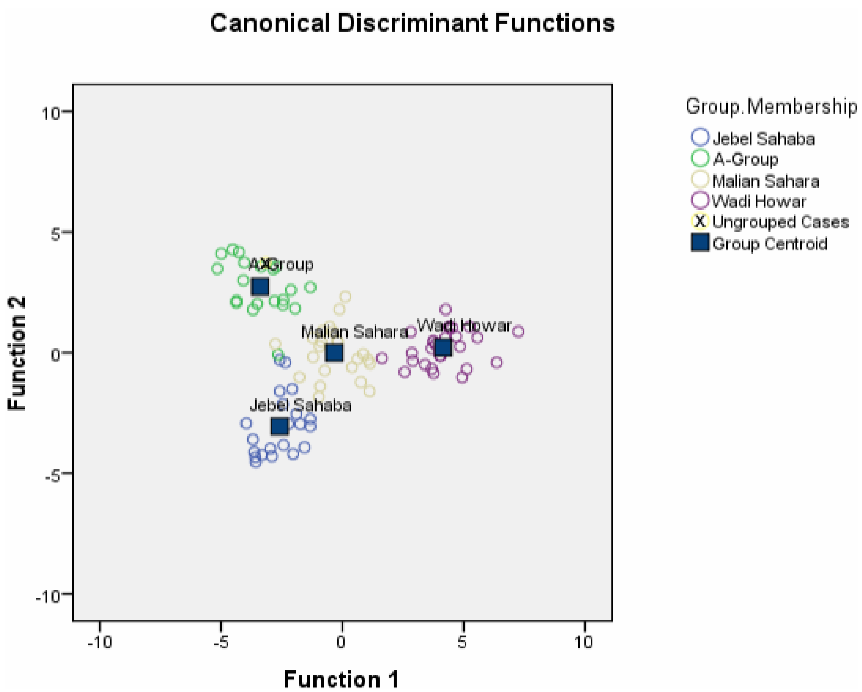
matrix - Somalis, 100.0%), Box's M (test not possible), variables entered (97)

4. "Sudanese Hotchpotch"

4.A.I. Summary
4.A.I.1. Individual: *"Sudanese Hotchpotch" (Mean individual)*
4.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
4.A.I.3. Data: *Cranial and dental measurements*
4.A.I.4. Classification: *A-Group*

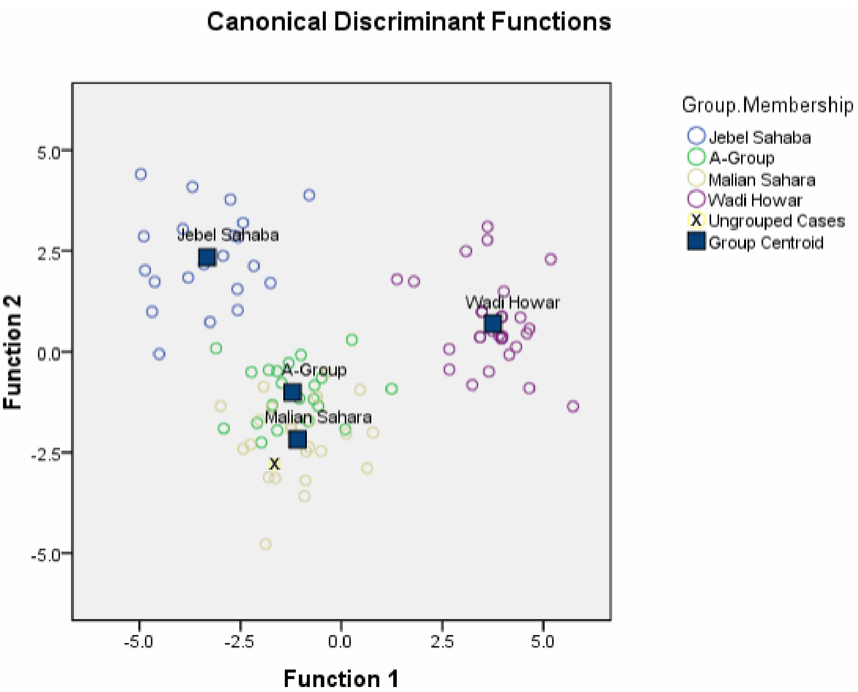
4.A.II. Analysis overview
4.A.II.1. Method: *Mahalanobis distance*
4.A.II.2.a. Variables in matrix: *46*
4.A.II.2.b. Variables entered: *19*
4.A.II.3. Best predictors: *81. Crown length UI2 (.352), 19a. Mastoid height (-.216), 80(1)a. Canine dental arch breadth (mx) (-.174), 81(1). Crown width LI2 (-.493 - Function 2), 80(1)d. 1st molar dental arch breadth (md) (.428 - Function 3)*
4.A.II.4.a. Wilks' Lambda: *1 through 3: .006 (Sig. .000), 2 through 3: .069 (Sig. .000), 3: .333 (Sig. .000)*
4.A.II.4.b. Eigenvalues: *1: 10.072 (r: .954), 2: 3.808 (r: .890), 3: 2.001 (r: .817)*
4.A.II.5. Prior classification probability: *25.8% (prior prob. + 25%: 32.3%)*
4.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: A-Group - -58.421, Jebel Sahaba/Tushka - -56.530, Malian Sahara - -54.780, Wadi Howar - -67.826), no outliers detected, no variables failed tolerance test*

4.A.III. Results
4.A.III.1.a. Within-groups covariance matrix: *A-Group, 100.0%, A-Group (D^2: 1.506), Malian Sahara (D^2: 38.113)*
4.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *91.8%*
4.A.III.1.c. Separate-groups covariance matrix: *A-Group, 99.0%, A-Group (D^2: 2.688), Malian Sahara (D^2: 23.821)*
4.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (2 A-Group), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka), Wadi Howar (1 Malian Sahara)*
4.A.III.2.b. Misclassifications (separate-groups): *A-Group (1 Jebel Sahaba/Tushka)*
4.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.A.IV. Additional results
4.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (A-Group, 100.0%, 84.5%), separate-groups covariance matrix (A-Group, 100.0%), Box's M (test not possible), variables entered (46)*

4.A.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 99.0%, 91.8%), separate-groups covariance matrix (A-Group, 99.0%), Box's M (Sig. .000), variables entered (16)*
4.A.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 99.0%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (31)*
4.A.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - A-Group, 100.0%, 40.2%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (118)*
4.B.I. Summary	
4.B.I.1. Individual:	*"Sudanese Hotchpotch" (Mean individual)*
4.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
4.B.I.3. Data:	*Scaled cranial and dental measurements*
4.B.I.4. Classification:	*A-Group*
4.B.II. Analysis overview	
4.B.II.1. Method:	*Mahalanobis distance*
4.B.II.2.a. Variables in matrix:	*37*
4.B.II.2.b. Variables entered:	*17*
4.B.II.3. Best predictors:	*19a. Mastoid height (-.301), 71a. Minimum ramus width (-.212), 81(1). Crown width LC (-.207), 48(1). Nasospinale-Prosthion height (.280 - Function 2), 30. Bregma-Lambda chord (.381 - Function 3)*
4.B.II.4.a. Wilks' Lambda:	*1 through 3: .010 (Sig. .000), 2 through 3: .090 (Sig. .000), 3: .342 (Sig. .000)*
4.B.II.4.b. Eigenvalues:	*1: 7.978 (r: .943), 2: 2.811 (r: .859), 3: 1.923 (r: .811)*
4.B.II.5. Prior classification probability:	*25.8% (prior prob. + 25%: 32.3%)*
4.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: A-Group - -100.802, Jebel Sahaba/Tushka - -99.304, Malian Sahara - -94.847, Wadi Howar - -109.488), no outliers detected, no variables failed tolerance test*
4.B.III. Results	
4.B.III.1.a. Within-groups covariance matrix:	*A-Group, 99.0%, A-Group (D^2: 3.568), Malian Sahara (D^2: 19.482)*
4.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*90.7%*
4.B.III.1.c. Separate-groups covariance matrix:	*A-Group, 97.9%, A-Group (D^2: 6.010), Malian Sahara (D^2: 20.233)*
4.B.III.2.a. Misclassifications (leave-one-out):	*A-Group (1 Jebel Sahaba/Tushka, 1 Wadi Howar), Jebel Sahaba/Tushka (1 A-Group, 1 Malian Sahara), Malian Sahara (4 A-Group), Wadi Howar (1 Jebel Sahaba/Tushka)*
4.B.III.2.b. Misclassifications (separate-groups):	*A-Group (1 Jebel Sahaba/Tushka), Malian Sahara (1 A-Group)*
4.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



4.B.IV. Additional results

4.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (A-Group, 97.9%, 83.5%), separate-groups covariance matrix (A-Group, 99.0%), Box's M (test not possible), variables entered (37)*
4.B.IV.1.b. Wilk's Lambda:	*Within-groups covariance matrix (A-Group, 97.9%, 89.7%), separate-groups covariance matrix (A-Group, 97.9%), Box's M (Sig. .000), variables entered (18)*
4.B.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - A-Group, 100.0%, 99.0%; separate-groups covariance matrix - A-Group, 100.0%), Box's M (test not possible), variables entered (35)*
4.B.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 42.3%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (116)*

4.C.I. Summary

4.C.I.1. Individual:	*"Sudanese Hotchpotch" (Mean individual)*
4.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara, Wadi Howar*
4.C.I.3. Data:	*Non-metric cranial and dental traits*
4.C.I.4. Classification:	*Wadi Howar*

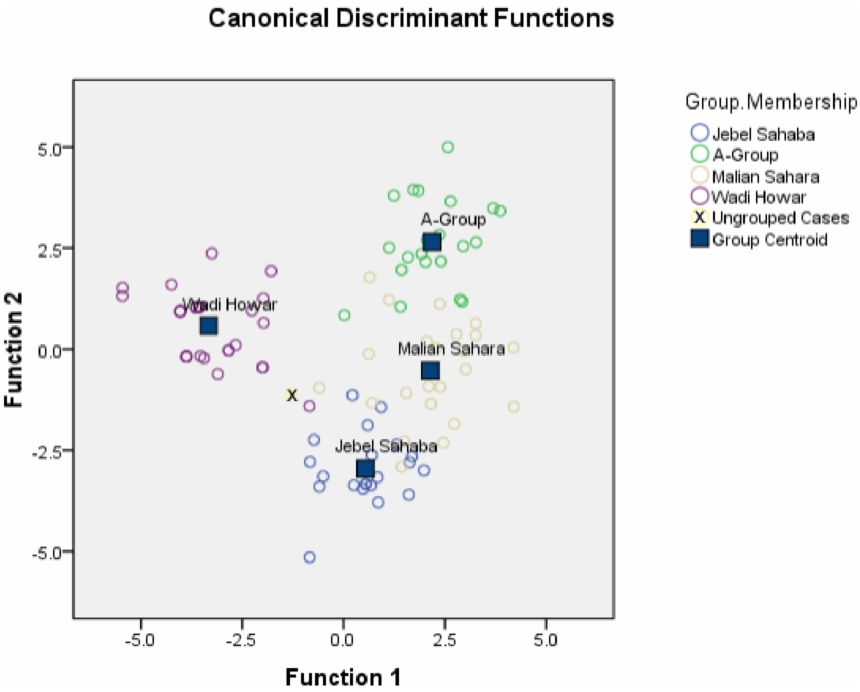
4.C.II. Analysis overview

4.C.II.1. Method:	*Mahalanobis distance*
4.C.II.2.a. Variables in matrix:	*43*
4.C.II.2.b. Variables entered:	*20*
4.C.II.3. Best predictors:	*Margo infranasalis (additional tendency/superstructure) (.317), Carabelli's trait UM1 (-.276), Orientation of the Processus frontales maxillae (.243), Premolar lingual cusps LP2 (.399 - Function 2), Shovel UI1 (-.354 - Function 3)*
4.C.II.4.a. Wilks' Lambda:	*1 through 3: .009 (Sig. .000), 2 through 3: .063 (Sig. .000), 3: .298 (Sig. .000)*
4.C.II.4.b. Eigenvalues:	*1: 6.093 (r: .927), 2: 3.745 (r: .888), 3: 2.353 (r: .838)*
4.C.II.5. Prior classification probability:	*25.8% (prior prob. + 25%: 32.3%)*
4.C.II.6. Remarks:	*Box's M (test not possible: A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular', Wadi Howar - 'singular'), no outliers detected, no variables failed tolerance test*

4.C.III. Results

4.C.III.1.a. Within-groups covariance matrix:	*Jebel Sahaba/Tushka, 99.0%, Jebel Sahaba/Tushka (D^2: 6.994), Wadi Howar (D^2: 9.051)*
4.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*85.6%*
4.C.III.1.c. Separate-groups covariance matrix:	*Wadi Howar, 100.0%, Wadi Howar (D^2: 8.090), Jebel Sahaba/Tushka (D^2: 12.927)*

4.C.III.2.a. Misclassifications (leave-one-out): *A-Group (3 Malian Sahara, 1 Wadi Howar), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (2 A-Group, 3 Jebel Sahaba/Tushka, 2 Wadi Howar), Wadi Howar (1 A-Group, 1 Jebel Sahaba/Tushka)*
4.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
4.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.C.IV. Additional results
4.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (Wadi Howar, 99.0%, 72.2%), separate-groups covariance matrix (Wadi Howar, 100.0%), Box's M (test not possible), variables entered (43)*
4.C.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Jebel Sahaba/Tushka, 97.9%, 89.7%), separate-groups covariance matrix (Wadi Howar, 99.0%), Box's M (test not possible), variables entered (18)*
4.C.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Malian Sahara, 100.0%, 99.0%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (23)*
4.C.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Malian Sahara, 100.0%, 88.7%; separate-groups covariance matrix - Malian Sahara, 100.0%), Box's M (test not possible), variables entered (97)*

4.D.I. Summary
4.D.I.1. Individual: *"Sudanese Hotchpotch" (Mean individual)*
4.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*
4.D.I.3. Data: *Cranial and dental measurements*
4.D.I.4. Classification: *Chad*

4.D.II. Analysis overview
4.D.II.1. Method: *Mahalanobis distance*
4.D.II.2.a. Variables in matrix: *48*
4.D.II.2.b. Variables entered: *15*
4.D.II.3. Best predictors: *81. Crown length LC (.705), 81(1). Crown width UP1 (.304), 81(1). Crown width UI2 (.290), 81. Crown length UI2 (.701 - Function 2), 63(2)d. 4th internal dental arch breadth (md) (.479 - Function 3), 81(1). Crown width UI2 (.443 - Function 4)*
4.D.II.4.a. Wilks' Lambda: *1 through 4: .016 (Sig. .000), 2 through 4: .070 (Sig. .000), 3 through 4: .278 (Sig. .000), 4: .577 (Sig. .000)*
4.D.II.4.b. Eigenvalues: *1: 3.408 (r: .879), 2: 2.942 (r: .864), 3: 1.077 (r: .720), 4: .734 (r: .651)*
4.D.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*
4.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -12.679, Chad - -16.500, Mandinka - -45.252, Somalis - -*

13.952, Haya - -14.279), no outliers detected, no variables failed tolerance test

4.D.III. Results

4.D.III.1.a. Within-groups covariance matrix: *Chad, 90.7%, Chad (D^2: 2.526), Somalis (D^2: 6.684)*

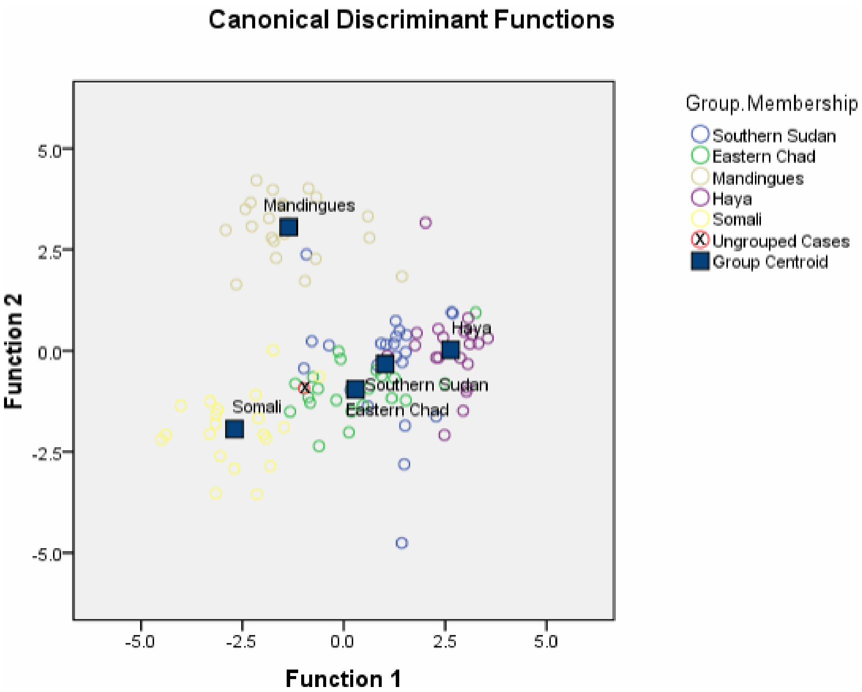
4.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *80.6%*

4.D.III.1.c. Separate-groups covariance matrix: *Chad, 95.4%, Chad (D^2: 2.930), Somalis (D^2: 10.991)*

4.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 1 Mandinka, 3 Haya), Chad (2 Southern Sudan, 1 Somali, 2 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 1 Chad), Haya (3 Southern Sudan, 2 Chad, 1 Mandinka)*

4.D.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Haya), Chad (1 Haya), Mandinka (1 Southern Sudan), Haya (1 Chad)*

4.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.D.IV. Additional results

4.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (Chad, 97.2%, 76.9%), separate-groups covariance matrix (Chad, 99.1%), Box's M (test not possible), variables entered (48)*

4.D.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 89.8%, 81.5%), separate-groups covariance matrix (Somalis, 89.8%), Box's M (Sig. .000), variables entered (13)*

4.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 99.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (38)*

4.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 68.5%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (112)*

4.E.I. Summary

4.E.I.1. Individual: *"Sudanese Hotchpotch" (Mean individual)*

4.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

4.E.I.3. Data: *Scaled cranial and dental measurements*

4.E.I.4. Classification: *Somalis*

4.E.II. Analysis overview

4.E.II.1. Method: *Mahalanobis distance*

4.E.II.2.a. Variables in matrix: *43*

4.E.II.2.b. Variables entered: *15*

4.E.II.3. Best predictors: *81. Crown length UI2 (.624), 81(1). Crown width UC (.262), 48(1). Nasospinale-Prosthion height (.211), 69c. Thickness of the mandibular symphysis (-.436 - Function 2), 19a. Mastoid height (.335 - Function 3), 61a(4). 1st molar alveolar breadth (md) (.434 - Function 4)*

4.E.II.4.a. Wilks' Lambda: *1 through 4: .026 (Sig. .000), 2 through 4: .100 (Sig. .000), 3 through 4: .280 (Sig. .000), 4: .609 (Sig. .000)*

4.E.II.4.b. Eigenvalues: *1: 2.855 (r: .861), 2: 1.809 (r: .803), 3: 1.176 (r: .735), 4: .641 (r: .625)*

4.E.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

4.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Southern Sudan - -72.555, Chad - -78.649, Mandinka - -103.701, Somalis - -75.350, Haya - -77.020), no outliers detected, no variables failed tolerance test*

4.E.III. Results

4.E.III.1.a. Within-groups covariance matrix: *Somalis, 88.0%, Somalis (D^2: 4.056), Chad (D^2: 8.716)*

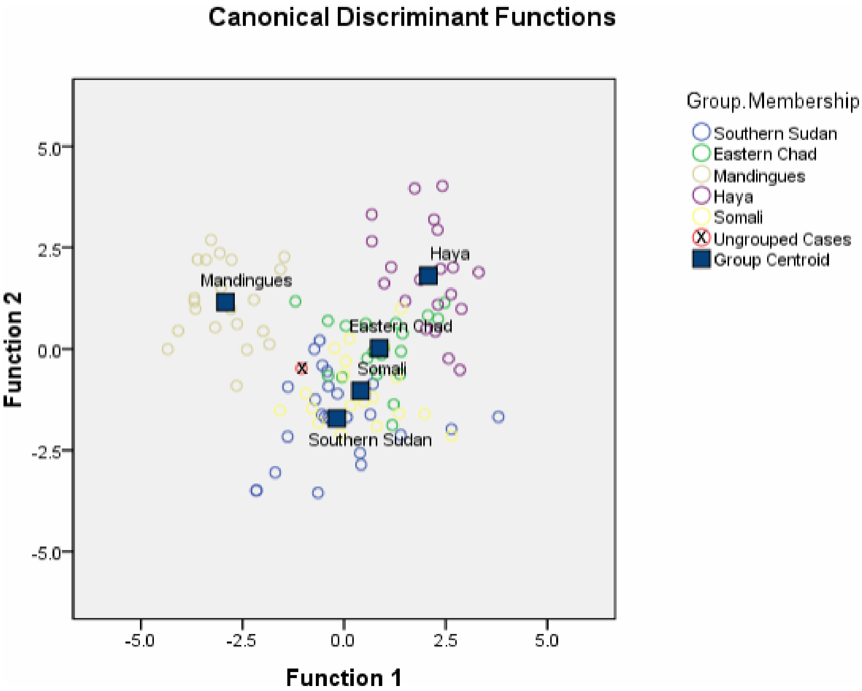
4.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *76.9%*

4.E.III.1.c. Separate-groups covariance matrix: *Somalis, 90.7%, Somalis (D^2: 6.528), Southern Sudan (D^2: 7.255)*

4.E.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (2 Chad, 2 Somalis), Chad (2 Southern Sudan, 1 Mandinka, 2 Somalis, 3 Haya), Mandinka (2 Southern Sudan, 1 Chad), Somalis (2 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Southern Sudan, 4 Chad)*

4.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad, 1 Somali, 1 Haya), Chad (2 Southern Sudan, 1 Mandinka), Somalis (2 Southern Sudan, 1 Chad), Haya (1 Chad)*

4.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.E.IV. Additional results

4.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (Somalis, 99.1%, 67.6%), separate-groups covariance matrix (Somalis, 100.0%), Box's M (test not possible), variables entered (43)*

4.E.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Chad, 86.1%, 75.0%), separate-groups covariance matrix (Chad, 94.4%), Box's M (Sig. .000), variables entered (15)*

4.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 100.0%, 98.1%; separate-groups covariance matrix - Southern Sudan, 100.0%), Box's M (test not possible), variables entered (34)*

4.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Mandinka, 100.0%, 55.6%; separate-groups covariance matrix - Mandinka, 100.0%), Box's M (test not possible), variables entered (110)*

4.F.I. Summary

4.F.I.1. Individual: *"Sudanese Hotchpotch" (Mean individual)*

4.F.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

4.F.I.3. Data: *Non-metric cranial and dental traits*

4.F.I.4. Classification: *Southern Sudan*

4.F.II. Analysis overview

4.F.II.1. Method: *Mahalanobis distance*

4.F.II.2.a. Variables in matrix: *45*

4.F.II.2.b. Variables entered: *11*

4.F.II.3. Best predictors: *Shovel UI1 (-.752), Carabelli's trait UM1 (.363), Cusp number LM2 (.340), Parastyle UM3 (-.653 - Function 2), Sella nasi (additional tendency/superstructure) (.485 - Function 3), Alveolar prognathism (.366 - Function 4)*

4.F.II.4.a. Wilks' Lambda: *1 through 4: .029 (Sig. .000), 2 through 4: .212 (Sig. .000), 3 through 4: .479 (Sig. .000), 4: .779 (Sig. .002)*

4.F.II.4.b. Eigenvalues: *1: 6.361 (r: .930), 2: 1.264 (r: .747), 3: .627 (r: .621), 4: .284 (r: .470)*

4.F.II.5. Prior classification probability: *20.1% (prior prob. + 25%: 25.1%)*

4.F.II.6. Remarks: *Box's M (test result not accepted; Sig. .150; Log determinants: Southern Sudan - -23.581, Chad - -23.021, Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

4.F.III. Results

4.F.III.1.a. Within-groups covariance matrix: *Southern Sudan, 79.6%, Southern Sudan (D^2: 8.451), Mandinka (D^2: 12.902)*

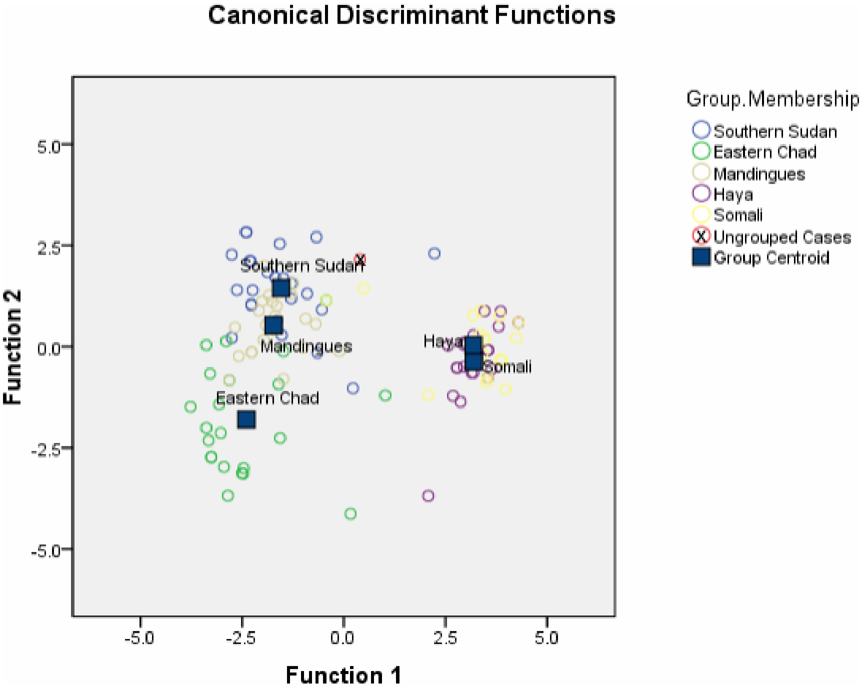
4.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *70.4%*

4.F.III.1.c. Separate-groups covariance matrix: *Southern Sudan, 83.3%, Southern Sudan (D^2: 5.418), Somalis (D^2: 9.909)*

4.F.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (1 Chad, 6 Mandinka, 1 Somali), Chad (1 Southern Sudan, 6 Mandinka, 1 Haya), Mandinka (7 Southern Sudan), Somalis (1 Southern Sudan, 1 Mandinka, 3 Haya), Haya (4 Somalis)*

4.F.III.2.b. Misclassifications (separate-groups): *Southern Sudan (6 Mandinka, 1 Somali), Chad (1 Southern Sudan, 3 Mandinka), Mandinka (1 Southern Sudan), Somalis (2 Southern Sudan, 2 Haya), Haya (2 Somalis)*

4.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



4.F.IV. Additional results

4.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (Southern Sudan, 95.4%, 57.4%), separate-groups covariance matrix (Southern Sudan, 95.4%), Box's M (test not possible), variables entered (45)*

4.F.IV.1.b. Wilk's Lambda: *Within-groups covariance matrix (Southern Sudan, 75.9%, 66.7%), separate-groups covariance matrix (Southern Sudan, 80.6%), Box's M (test result not accepted), variables entered (10)*

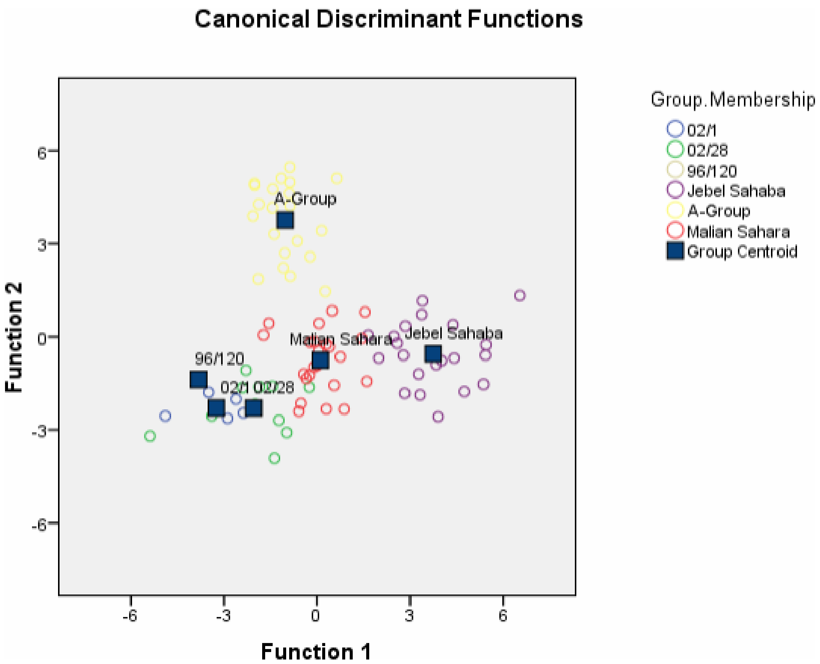
4.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - Southern Sudan, 90.7%, 84.3%; separate-groups covariance matrix - Southern Sudan, 91.7%), Box's M (test not possible), variables entered (14)*

4.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - Southern Sudan, 98.1%, 65.7%; separate-groups covariance matrix - Southern Sudan, 98.1%), Box's M (test not possible), variables entered (72)*

Appendix XXV.A.1.c. Wadi Howar sub-samples and sample as a whole

1. Sites

1.A.I. Summary	
1.A.I.1. Groups:	*Wadi Howar - Sites*
1.A.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.A.I.3. Data:	*Cranial and dental measurements*
1.A.I.4. Classification:	*02/1 (highest group - 100.0% 02/1; second highest group - 83.3% Malian Sahara) 02/28 (highest group - 100.0% 02/28; second highest group - 85.7% Malian Sahara) 96/120 (highest group - 100.0% 96/120; second highest group - 100.0% 02/28)*
1.A.II. Analysis overview	
1.A.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.A.II.2.a. Variables in matrix:	*47*
1.A.II.2.b. Variables entered:	*19*
1.A.II.3. Best predictors:	*71a. Minimum ramus width (.367), 69. Height of the mandibular symphysis (-.322), 50(1). Interorbital breadth (.298), 81. Crown length UI2 (-.450 - Function 2), 30. Bregma-Lambda chord (.349 - Function 3), 80(1)d. 1st molar dental arch breadth (md) (.435 - Function 4), 30. Bregma-Lambda chord (.343 - Function 5)*
1.A.II.4.a. Wilks' Lambda:	*1 through 5: .002 (Sig. .000), 2 through 5: .016 (Sig. .000), 3 through 5: .100 (Sig. .000), 4 through 5: .347 (Sig. .000), 5: .796 (Sig. .317)*
1.A.II.4.b. Eigenvalues:	*1: 5.884 (r: .925), 2: 5.215 (r: .916), 3: 2.483 (r: .844), 4: 1.293 (r: .751), 5: .257 (r: .452)*
1.A.II.5. Prior classification probability:	*21.3% (prior prob. + 25%: 26.7%)*
1.A.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', A-Group - -50.452, Jebel Sahaba/Tushka - -46.727, Malian Sahara - -43.726), no outliers detected, no variables failed tolerance test*
1.A.III. Results	
1.A.III.1.a. Within-groups covariance matrix:	*100.0%*
1.A.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.5%*
1.A.III.1.c. Separate-groups covariance matrix:	*100.0%*
1.A.III.1.d. Closest centroids:	*02/1 (highest group - 6 02/1; second highest group - 1 02/28, 5 Malian Sahara), 02/28 (highest group - 14 02/28; second highest group - 2 Jebel Sahaba/Tushka, 12 Malian Sahara), 96/120 (highest group - 3 96/120; second highest group - 3 02/28)*
1.A.III.2.a. Misclassifications (leave-one-out):	*02/28 (1 96/120), Jebel Sahaba/Tushka (2 Malian Sahara), Malian Sahara (1 Jebel Sahaba/Tushka)*
1.A.III.2.b. Misclassifications (separate-groups):	*No misclassifications*
1.A.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.A.IV. Additional results

1.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 85.2%), separate-groups covariance matrix (3.4% - error), Box's M (test not possible), variables entered (47)*

1.A.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (100.0%, 89.8%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (21), F values for pairwise distances (02/1 - 02/28: 15.547, 02/1 - 96/120: 9.577, 02/1 - A-Group: 18.128, 02/1 - Jebel Sahaba/Tushka: 25.395, 02/1 - Malian Sahara: 14.054, 02/28 - 96/120: 4.469, 02/28 - A-Group: 20.479, 02/28 - Jebel Sahaba/Tushka: 17.469, 02/28 - Malian Sahara: 11.944, 96/120 - A-Group: 10.070, 96/120 - Jebel Sahaba/Tushka: 11.305, 96/120 - Malian Sahara: 8.004, A-Group - Jebel Sahaba/Tushka: 15.075, A-Group - Malian Sahara: 10.513, Jebel Sahaba/Tushka - Malian Sahara: 10.929)*

1.A.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (100.0%, 94.3%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (22), F values for pairwise distances (02/1 - 02/28: 14.318, 02/1 - 96/120: 11.686, 02/1 - A-Group: 17.966, 02/1 - Jebel Sahaba/Tushka: 22.460, 02/1 - Malian Sahara: 12.975, 02/28 - 96/120: 5.328, 02/28 - A-Group: 17.195, 02/28 - Jebel Sahaba/Tushka: 15.874, 02/28 - Malian Sahara: 11.733, 96/120 - A-Group: 11.189, 96/120 - Jebel Sahaba/Tushka: 13.703, 96/120 - Malian Sahara: 10.758, A-Group - Jebel Sahaba/Tushka: 14.549, A-Group - Malian Sahara: 11.343, Jebel Sahaba/Tushka - Malian Sahara: 9.937)*

1.A.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - 99.1%, 92.5%; separate-groups covariance matrix - 2.8% - error), Box's M (test not possible), variables entered (27), F values for pairwise distances (02/1 - 02/28: 14.143, 02/1 - 96/120: 11.275, 02/1 - A-Group: 18.089, 02/1 - Jebel Sahaba/Tushka: 24.418, 02/1 - Malian Sahara: 17.384, 02/1 - "Sudanese Hotchpotch": 29.372, 02/28 - 96/120: 3.249, 02/28 - A-Group: 11.294, 02/28 - Jebel Sahaba/Tushka: 12.363, 02/28 - Malian Sahara: 8.005, 02/28 - "Sudanese Hotchpotch": 24.956, 96/120 - A-Group: 6.330, 96/120 - Jebel Sahaba/Tushka: 6.958, 96/120 - Malian Sahara: 4.877, 96/120 - "Sudanese Hotchpotch": 10.914, A-Group - Jebel Sahaba/Tushka: 14.210, A-Group - Malian Sahara: 12.056, A-Group - "Sudanese Hotchpotch": 16.095, Jebel Sahaba/Tushka - Malian Sahara: 10.717, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 27.176, Malian Sahara - "Sudanese Hotchpotch": 26.065)*

1.A.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - 100.0%, 85.8%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (47)*

1.A.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 98.1%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (39), F values for pairwise distances (02/1 - 02/28: 81.376, 02/1 - 96/120: 48.309, 02/1 - A-Group: 85.121, 02/1 - Jebel Sahaba/Tushka: 94.445, 02/1 - Malian Sahara: 81.062, 02/1 - "Sudanese Hotchpotch": 104.786, 02/28 - 96/120: 6.661, 02/28 - A-Group: 21.669, 02/28 - Jebel Sahaba/Tushka: 20.970, 02/28 - Malian Sahara: 18.735, 02/28 - "Sudanese Hotchpotch": 35.589, 96/120 - A-Group: 17.201, 96/120 - Jebel Sahaba/Tushka: 14.801, 96/120 - Malian Sahara: 13.308, 96/120 - "Sudanese Hotchpotch": 20.122, A-Group - Jebel Sahaba/Tushka: 16.366, A-Group - Malian Sahara: 15.599, A-Group - "Sudanese Hotchpotch": 20.856, Jebel Sahaba/Tushka - Malian Sahara: 15.308, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 31.145, Malian Sahara - "Sudanese Hotchpotch": 23.869)*

1.A.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 48.1%; separate-groups covariance matrix - 2.8% - error), Box's M (test not possible), variables entered (118)*

1.B.I. Summary

1.B.I.1. Groups: *Wadi Howar - Sites*

1.B.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

1.B.I.3. Data: *Scaled cranial and dental measurements*

1.B.I.4. Classification: *02/1 (highest group - 100.0% 02/1; second highest group - 83.3% Malian Sahara)*
02/28 (highest group - 100.0% 02/28; second highest group - 78.6% Malian Sahara)
96/120 (highest group - 100.0% 96/120; second highest group - 100.0% 02/28)

1.B.II. Analysis overview

1.B.II.1. Method: *Mahalanobis distance, simultaneous entry*

1.B.II.2.a. Variables in matrix: *37*

1.B.II.2.b. Variables entered: *16*

1.B.II.3. Best predictors: *71a. Minimum ramus width (-.298), 50(1). Interorbital breadth (-.291), 69. Height of the mandibular symphysis (.274), 80(1)a. Canine dental arch breadth (mx) (-.362 - Function 2), 30. Bregma-Lambda chord (.326 - Function 3), 71a. Minimum ramus width (.449 - Function 4), 50(1). Interorbital breadth (-.438 - Function 5)*

1.B.II.4.a. Wilks' Lambda: *1 through 5: .006 (Sig. .000), 2 through 5: .039 (Sig. .000), 3 through 5: .154 (Sig. .000), 4 through 5: .460 (Sig. .000), 5: .852 (Sig. .434)*

1.B.II.4.b. Eigenvalues: *1: 5.126 (r: .915), 2: 2.931 (r: .863), 3: 1.982 (r: .815), 4: .854 (r: .679), 1: .173 (r: .384)*

1.B.II.5. Prior classification probability: *21.3% (prior prob. + 25%: 26.7%)*

1.B.II.6. Remarks: *Box's M (Sig. .000; Log determinants: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', A-Group - -96.951, Jebel Sahaba/Tushka - -96.034, Malian Sahara - -93.014), no outliers detected, no variables failed tolerance test*

1.B.III. Results

1.B.III.1.a. Within-groups covariance matrix: *98.9%*

1.B.III.1.b. Within-groups covariance matrix (Leave-one-out): *92.0%*

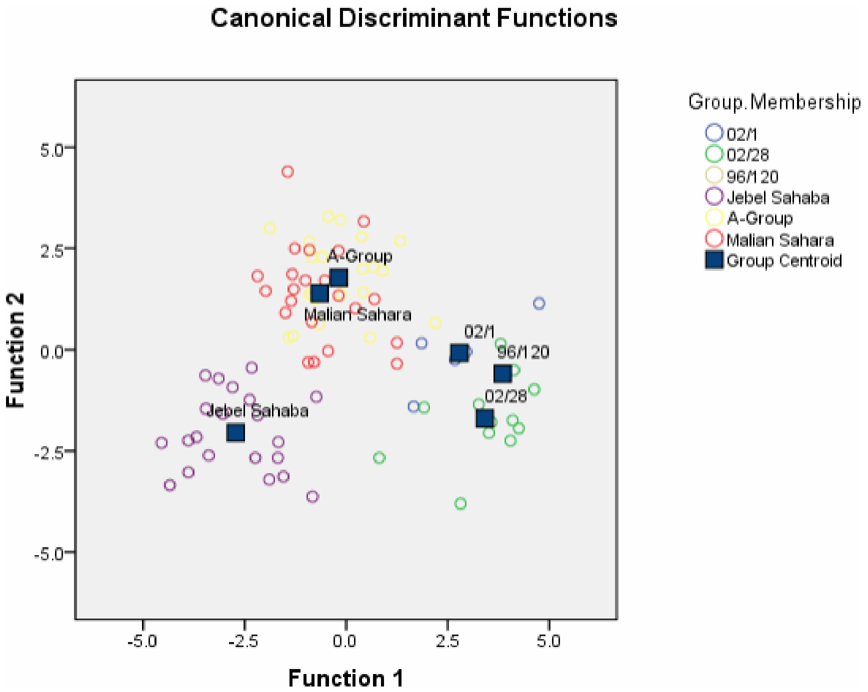
1.B.III.1.c. Separate-groups covariance matrix: *98.9%*

1.B.III.1.d. Closest centroids: *02/1 (highest group - 6 02/1; second highest group - 1 Jebel Sahaba/Tushka, 5 Malian Sahara), 02/28 (highest group - 14 02/28; second highest group - 2 A-Group, 1 Jebel Sahaba/Tushka, 11 Malian Sahara), 96/120 (highest group - 3 96/120; second highest group - 3 02/28)*

1.B.III.2.a. Misclassifications (leave-one-out): *02/28 (1 96/120, 1 Jebel Sahaba/Tushka), A-Group (1 02/28, 1 Jebel Sahaba/Tushka), Malian Sahara (2 02/28, 1 A-Group)*

1.B.III.2.b. Misclassifications (separate-groups): *Malian Sahara (1 A-Group)*

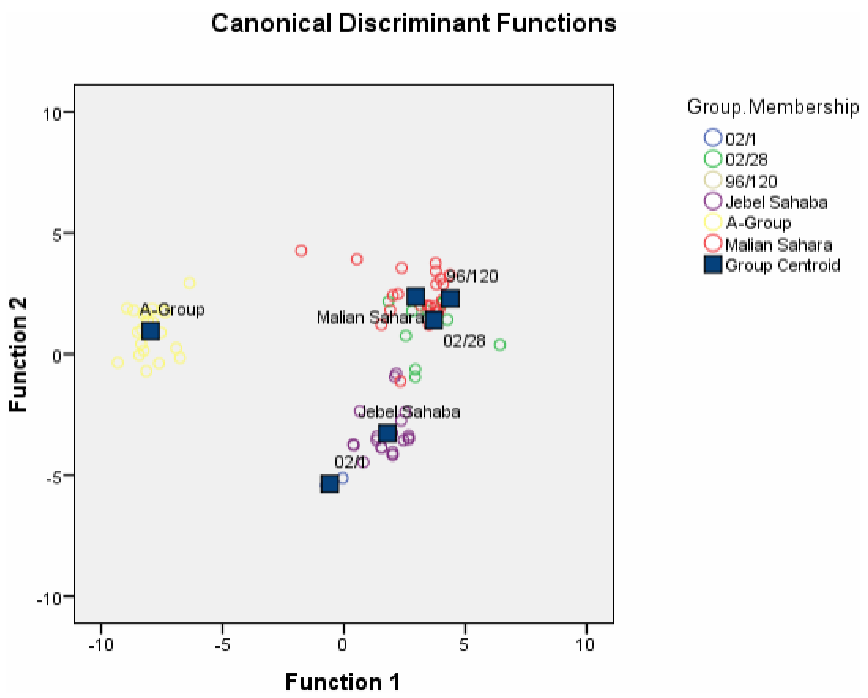
1.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



1.B.IV. Additional results

1.B.IV.1.a. Simultaneous:	*Within-groups covariance matrix (100.0%, 84.1%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (37)*
1.B.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (96.6%, 90.9%), separate-groups covariance matrix (96.6%), Box's M (Sig. .000), variables entered (20), F values for pairwise distances (02/1 - 02/28: 15.308, 02/1 - 96/120: 12.374, 02/1 - A-Group: 16.220, 02/1 - Jebel Sahaba/Tushka: 24.887, 02/1 - Malian Sahara: 18.137, 02/28 - 96/120: 3.895, 02/28 - A-Group: 14.799, 02/28 - Jebel Sahaba/Tushka: 20.092, 02/28 - Malian Sahara: 15.063, 96/120 - A-Group: 7.905, 96/120 - Jebel Sahaba/Tushka: 11.584, 96/120 - Malian Sahara: 10.146, A-Group - Jebel Sahaba/Tushka: 10.307, A-Group - Malian Sahara: 8.617, Jebel Sahaba/Tushka - Malian Sahara: 11.362)*
1.B.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (96.6%, 88.6%), separate-groups covariance matrix (97.7%), Box's M (test not possible), variables entered (21), F values for pairwise distances (02/1 - 02/28: 18.004, 02/1 - 96/120: 12.031, 02/1 - A-Group: 19.515, 02/1 - Jebel Sahaba/Tushka: 30.095, 02/1 - Malian Sahara: 20.990, 02/28 - 96/120: 4.419, 02/28 - A-Group: 13.786, 02/28 - Jebel Sahaba/Tushka: 16.904, 02/28 - Malian Sahara: 14.196, 96/120 - A-Group: 7.822, 96/120 - Jebel Sahaba/Tushka: 11.957, 96/120 - Malian Sahara: 9.844, A-Group - Jebel Sahaba/Tushka: 11.023, A-Group - Malian Sahara: 8.092, Jebel Sahaba/Tushka - Malian Sahara: 11.888)*
1.B.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - 96.2%, 85.8%; separate-groups covariance matrix - 99.1%), Box's M (test not possible), variables entered (22), F values for pairwise distances (02/1 - 02/28: 18.239, 02/1 - 96/120: 8.463, 02/1 - A-Group: 15.133, 02/1 - Jebel Sahaba/Tushka: 26.409, 02/1 - Malian Sahara: 19.007, 02/1 - "Sudanese Hotchpotch": 29.121, 02/28 - 96/120: 1.385, 02/28 - A-Group: 14.933, 02/28 - Jebel Sahaba/Tushka: 20.001, 02/28 - Malian Sahara: 9.964, 02/28 - "Sudanese Hotchpotch": 29.305, 96/120 - A-Group: 4.539, 96/120 - Jebel Sahaba/Tushka: 8.410, 96/120 - Malian Sahara: 4.103, 96/120 - "Sudanese Hotchpotch": 8.657, A-Group - Jebel Sahaba/Tushka: 13.759, A-Group - Malian Sahara: 6.632, A-Group - "Sudanese Hotchpotch": 19.898, Jebel Sahaba/Tushka - Malian Sahara: 11.918, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 36.828, Malian Sahara - "Sudanese Hotchpotch": 25.087)*
1.B.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - 100.0%, 84.0%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (41)*
1.B.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.2%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (56), F values for pairwise distances (02/1 - 02/28: 52.068, 02/1 - 96/120: 28.463, 02/1 - A-Group: 51.643, 02/1 - Jebel Sahaba/Tushka: 35.970, 02/1 - Malian Sahara: 24.889, 02/1 - "Sudanese Hotchpotch": 31.033, 02/28 - 96/120: 7.318, 02/28 - A-Group: 32.107, 02/28 - Jebel Sahaba/Tushka: 45.898, 02/28 - Malian Sahara: 45.878, 02/28 - "Sudanese Hotchpotch": 40.652, 96/120 - A-Group: 13.509, 96/120 - Jebel Sahaba/Tushka: 16.380, 96/120 - Malian Sahara: 16.192, 96/120 - "Sudanese Hotchpotch": 18.241, A-Group - Jebel Sahaba/Tushka: 27.001, A-Group - Malian Sahara: 28.535, A-Group - "Sudanese Hotchpotch": 24.485, Jebel Sahaba/Tushka - Malian Sahara: 19.480, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 31.646, Malian Sahara - "Sudanese Hotchpotch": 17.797)*
1.B.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 48.1%; separate-groups covariance matrix - 2.8% - error), Box's M (test not possible), variables entered (116)*

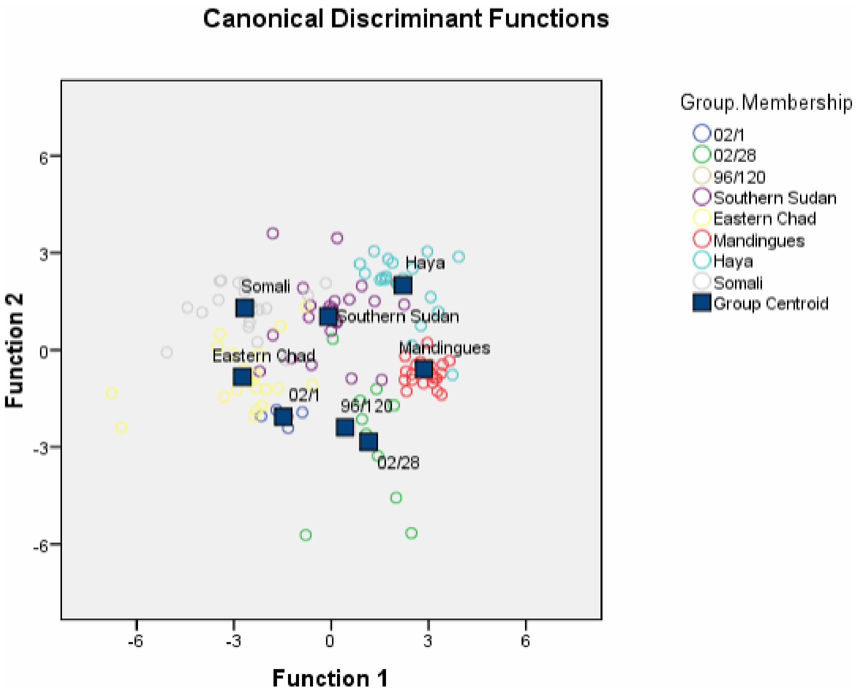
1.C.I. Summary	
1.C.I.1. Groups:	*Wadi Howar - Sites*
1.C.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
1.C.I.3. Data:	*Non-metric cranial and dental traits*
1.C.I.4. Classification:	*02/1 (highest group - 100.0% 02/1; second highest group - 100.0% Jebel Sahaba/Tushka)* *02/28 (highest group - 100.0% 02/28; second highest group - 57.1% Malian Sahara)* *96/120 (highest group - 100.0% 02/28; second highest group - 100.0% Malian Sahara)*
1.C.II. Analysis overview	
1.C.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.C.II.2.a. Variables in matrix:	*56*
1.C.II.2.b. Variables entered:	*19*
1.C.II.3. Best predictors:	*Distal accessory ridge UC (.584), Tuberculum dentale UI2 (.263), Interruption groove UI2 (.244), Tuberculum dentale UI2 (.561 - Function 2), Margo infranasalis (additional tendency/superstructure) (.330 - Function 3), Premolar root number UP1 (.491 - Function 4), Symphyseal height (.613 - Function 5)*
1.C.II.4.a. Wilks' Lambda:	*1 through 5: .000 (Sig. .000), 2 through 5: .007 (Sig. .000), 3 through 5: .058 (Sig. .000), 4 through 5: .271 (Sig. .000), 5: .789 (Sig. .283)*
1.C.II.4.b. Eigenvalues:	*1: 22.584 (r: .979), 2: 7.178 (r: .937), 3: 3.648 (r: .886) , 4: 1.915 (r: .811) , 5: .267 (r: .459)*
1.C.II.5. Prior classification probability:	*21.3% (prior prob. + 25%: 26.7%)*
1.C.II.6. Remarks:	*Box's M (test not possible: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*
1.C.III. Results	
1.C.III.1.a. Within-groups covariance matrix:	*100.0%*
1.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*93.2%*
1.C.III.1.c. Separate-groups covariance matrix:	*96.6%*
1.C.III.1.d. Closest centroids:	*02/1 (highest group - 6 02/1; second highest group - 6 Jebel Sahaba/Tushka), 02/28 (highest group - 14 02/28; second highest group - 6 Jebel Sahaba/Tushka, 8 Malian Sahara), 96/120 (highest group - 3 02/28; second highest group - 3 Malian Sahara)*
1.C.III.2.a. Misclassifications (leave-one-out):	*02/28 (1 Jebel Sahaba/Tushka, 1 Malian Sahara), Jebel Sahaba/Tushka (1 02/1), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
1.C.III.2.b. Misclassifications (separate-groups):	*96/120 (3 02/28)*
1.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.C.IV. Additional results

1.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (100.0%, 85.2%), separate-groups covariance matrix (96.6%), Box's M (test not possible), variables entered (56)*
1.C.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (100.0%, 89.8%), separate-groups covariance matrix (96.6%), Box's M (test not possible), variables entered (27), F values for pairwise distances (02/1 - 02/28: 22.985, 02/1 - 96/120: 16.147, 02/1 - A-Group: 22.922, 02/1 - Jebel Sahaba/Tushka: 10.387, 02/1 - Malian Sahara: 19.597, 02/28 - 96/120: 3.389, 02/28 - A-Group: 49.752, 02/28 - Jebel Sahaba/Tushka: 17.602, 02/28 - Malian Sahara: 21.673, 96/120 - A-Group: 18.022, 96/120 - Jebel Sahaba/Tushka: 11.557, 96/120 - Malian Sahara: 11.431, A-Group - Jebel Sahaba/Tushka: 53.681, A-Group - Malian Sahara: 48.353, Jebel Sahaba/Tushka - Malian Sahara: 23.562)*
1.C.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (98.9%, 90.9%), separate-groups covariance matrix (95.5%), Box's M (test not possible), variables entered (23), F values for pairwise distances (02/1 - 02/28: 22.196, 02/1 - 96/120: 15.785, 02/1 - A-Group: 19.782, 02/1 - Jebel Sahaba/Tushka: 12.541, 02/1 - Malian Sahara: 16.378, 02/28 - 96/120: 3.965, 02/28 - A-Group: 60.435, 02/28 - Jebel Sahaba/Tushka: 16.995, 02/28 - Malian Sahara: 22.429, 96/120 - A-Group: 21.656, 96/120 - Jebel Sahaba/Tushka: 11.450, 96/120 - Malian Sahara: 12.281, A-Group - Jebel Sahaba/Tushka: 58.842, A-Group - Malian Sahara: 55.988, Jebel Sahaba/Tushka - Malian Sahara: 20.799)*
1.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 92.5%; separate-groups covariance matrix - 97.2%), Box's M (test not possible), variables entered (31), F values for pairwise distances (02/1 - 02/28: 25.110, 02/1 - 96/120: 17.287, 02/1 - A-Group: 21.707, 02/1 - Jebel Sahaba/Tushka: 11.973, 02/1 - Malian Sahara: 19.450, 02/1 - "Sudanese Hotchpotch": 10.775, 02/28 - 96/120: 3.055, 02/28 - A-Group: 53.693, 02/28 - Jebel Sahaba/Tushka: 20.505, 02/28 - Malian Sahara: 23.037, 02/28 - "Sudanese Hotchpotch": 26.248, 96/120 - A-Group: 19.947, 96/120 - Jebel Sahaba/Tushka: 12.227, 96/120 - Malian Sahara: 11.680, 96/120 - "Sudanese Hotchpotch": 14.705, A-Group - Jebel Sahaba/Tushka: 55.721, A-Group - Malian Sahara: 49.263, A-Group - "Sudanese Hotchpotch": 49.125, Jebel Sahaba/Tushka - Malian Sahara: 25.641, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 14.309, Malian Sahara - "Sudanese Hotchpotch": 21.183)*
1.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - 100.0%, 89.6%; separate-groups covariance matrix - 97.2%), Box's M (test not possible), variables entered (56)*
1.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 95.3%; separate-groups covariance matrix - 97.2%), Box's M (test not possible), variables entered (37), F values for pairwise distances (02/1 - 02/28: 44.423, 02/1 - 96/120: 13.460, 02/1 - A-Group: 53.114, 02/1 - Jebel Sahaba/Tushka: 19.396, 02/1 - Malian Sahara: 27.215, 02/1 - "Sudanese Hotchpotch": 23.637, 02/28 - 96/120: 36.783, 02/28 - A-Group: 112.964, 02/28 - Jebel Sahaba/Tushka: 78.664, 02/28 - Malian Sahara: 84.346, 02/28 - "Sudanese Hotchpotch": 48.930, 96/120 - A-Group: 57.390, 96/120 - Jebel Sahaba/Tushka: 31.792, 96/120 - Malian Sahara: 32.301, 96/120 - "Sudanese Hotchpotch": 32.204, A-Group - Jebel Sahaba/Tushka: 91.633, A-Group - Malian Sahara: 75.926, A-Group - "Sudanese Hotchpotch": 43.696, Jebel Sahaba/Tushka - Malian Sahara: 31.467, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 26.890, Malian Sahara - "Sudanese Hotchpotch": 22.747)*
1.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 89.6%; separate-groups covariance matrix - 97.2%), Box's M (test not possible), variables entered (97)*

1.D.I. Summary	
1.D.I.1. Groups:	*Wadi Howar - Sites*
1.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.D.I.3. Data:	*Cranial and dental measurements*
1.D.I.4. Classification:	*02/1 (highest group - 100.0% 02/1; second highest group - 100.0% Southern Sudan)* *02/28 (highest group - 100.0% 02/28; second highest group - 71.4% Southern Sudan)* *96/120 (highest group - 100.0% 96/120; second highest group - 100.0% Chad)*
1.D.II. Analysis overview	
1.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.D.II.2.a. Variables in matrix:	*23*
1.D.II.2.b. Variables entered:	*15*
1.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.787), 80(4)a. Canine dental arch length (md) (.525), 81. Crown length UI2 (.410), 81. Crown length UI2 (-.527 - Function 2), 63(2)b. 2nd internal dental arch breadth (mx) (-.445 - Function 3), 30. Bregma-Lambda chord (.357 - Function 4), 81(1). Crown width UP1 (.700 - Function 5), 69b. 2nd molar mandibular body thickness (.767 - Function 6), 30. Bregma-Lambda chord (-.549 - Function 7)*
1.D.II.4.a. Wilks' Lambda:	*1 through 7: .003 (Sig. .000), 2 through 7: .019 (Sig. .000), 3 through 7: .068 (Sig. .000), 4 through 7: .199 (Sig. .000), 5 through 7: .442 (Sig. .000), 6 through 7: .775 (Sig. .068), 7: .975 (Sig. .965)*
1.D.II.4.b. Eigenvalues:	*1: 5.027 (r: .913), 2: 2.583 (r: .849), 3: 1.901 (r: .810), 4: 1.227 (r: .742), 5: .754 (r: .656), 6: .257 (r: .452), 7: .026 (r: .158)*
1.D.II.5. Prior classification probability:	*15.1% (prior prob. + 25%: 18.9%)*
1.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', Southern Sudan - -13.060, Chad - -20.672, Mandinka - 'singular', Somalis - -16.834, Haya - -11.944), no outliers detected, no variables failed tolerance test*
1.D.III. Results	
1.D.III.1.a. Within-groups covariance matrix:	*92.4%*
1.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*85.5%*
1.D.III.1.c. Separate-groups covariance matrix:	*99.2%*
1.D.III.1.d. Closest centroids:	*02/1 (highest group - 6 02/1; second highest group - 6 Southern Sudan), 02/28 (highest group - 14 02/28; second highest group - 10 Southern Sudan, 4 Chad), 96/120 (highest group - 3 96/120; second highest group - 3 Chad)*
1.D.III.2.a. Misclassifications (leave-one-out):	*02/28 (1 Southern Sudan), Southern Sudan (3 Chad, 1 Mandinka, 1 Somali, 1 Haya), Chad (1 02/28, 1 Southern Sudan, 2 Somalis, 1 Haya), Mandinka (1 Southern Sudan), Somalis (1 Southern Sudan, 3 Chad, 1 Haya), Haya (1 Southern Sudan)*
1.D.III.2.b. Misclassifications (separate-groups):	*Chad (1 Somali)*
1.D.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.D.IV. Additional results

1.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (92.4%, 84.0%), separate-groups covariance matrix (6.9% - error), Box's M (test not possible), variables entered (23)*

1.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (91.6%, 81.7%), separate-groups covariance matrix (2.3% - error), Box's M (Sig. .000), variables entered (16), F values for pairwise distances (02/1 - 02/28: 14.936, 02/1 - 96/120: 6.553, 02/1 - Southern Sudan: 19.579, 02/1 - Chad: 20.280, 02/1 - Mandinka: 23.046, 02/1 - Somalis: 16.210, 02/1 - Haya: 21.646, 02/28 - 96/120: 2.446, 02/28 - Southern Sudan: 10.454, 02/28 - Chad: 10.999, 02/28 - Mandinka: 9.648, 02/28 - Somalis: 16.927, 02/28 - Haya: 12.790, 96/120 - Southern Sudan: 4.709, 96/120 - Chad: 4.299, 96/120 - Mandinka: 4.449, 96/120 - Somalis: 4.822, 96/120 - Haya: 4.676, Southern Sudan - Chad: 9.418, Southern Sudan - Mandinka: 10.412, Southern Sudan - Somalis: 8.696, Southern Sudan - Haya: 10.108, Chad - Mandinka: 22.285, Chad - Somalis: 5.617, Chad - Haya: 21.294, Mandinka - Somalis: 20.641, Mandinka - Haya: 10.212, Somalis - Haya: 16.214)*

1.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (91.6%, 81.7%), separate-groups covariance matrix (2.3% - error), Box's M (Sig. .000), variables entered (16), F values for pairwise distances (02/1 - 02/28: 14.936, 02/1 - 96/120: 6.553, 02/1 - Southern Sudan: 19.579, 02/1 - Chad: 20.280, 02/1 - Mandinka: 23.046, 02/1 - Somalis: 16.210, 02/1 - Haya: 21.646, 02/28 - 96/120: 2.446, 02/28 - Southern Sudan: 10.454, 02/28 - Chad: 10.999, 02/28 - Mandinka: 9.648, 02/28 - Somalis: 16.927, 02/28 - Haya: 12.790, 96/120 - Southern Sudan: 4.709, 96/120 - Chad: 4.299, 96/120 - Mandinka: 4.449, 96/120 - Somalis: 4.822, 96/120 - Haya: 4.676, Southern Sudan - Chad: 9.418, Southern Sudan - Mandinka: 10.412, Southern Sudan - Somalis: 8.696, Southern Sudan - Haya: 10.108, Chad - Mandinka: 22.285, Chad - Somalis: 5.617, Chad - Haya: 21.294, Mandinka - Somalis: 20.641, Mandinka - Haya: 10.212, Somalis - Haya: 16.214)*

1.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 95.4%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (40), F values for pairwise distances (02/1 - 02/28: 64.083, 02/1 - 96/120: 38.417, 02/1 - Southern Sudan: 87.113, 02/1 - Chad: 96.020, 02/1 - Mandinka: 91.451, 02/1 - Somalis: 87.366, 02/1 - Haya: 111.757, 02/28 - 96/120: 4.316, 02/28 - Southern Sudan: 25.462, 02/28 -*

Chad: 42.793, 02/28 - Mandinka: 39.114, 02/28 - Somalis: 27.843, 02/28 - Haya: 64.889, 96/120 - Southern Sudan: 14.472, 96/120 - Chad: 19.904, 96/120 - Mandinka: 16.332, 96/120 - Somalis: 12.066, 96/120 - Haya: 24.645, Southern Sudan - Chad: 20.778, Southern Sudan - Mandinka: 21.630, Southern Sudan - Somalis: 17.418, Southern Sudan - Haya: 57.298, Chad - Mandinka: 22.684, Chad - Somalis: 17.805, Chad - Haya: 38.551, Mandinka - Somalis: 26.240, Mandinka - Haya: 37.165, Somalis - Haya: 45.913)

1.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 52.7%; separate-groups covariance matrix - 97.7%), Box's M (test not possible), variables entered (118)*

1.E.I. Summary

1.E.I.1. Groups: *Wadi Howar - Sites*

1.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

1.E.I.3. Data: *Scaled cranial and dental measurements*

1.E.I.4. Classification: *02/1 (highest group - 100.0% 02/1; second highest group - 83.3% Haya)*
02/28 (highest group - 100.0% 02/28; second highest group - 92.9% Haya)
96/120 (highest group - 100.0% 96/120; second highest group - 100.0% Haya)

1.E.II. Analysis overview

1.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

1.E.II.2.a. Variables in matrix: *31*

1.E.II.2.b. Variables entered: *19*

1.E.II.3. Best predictors: *1. Maximum cranial length (.261), 8. Maximum cranial breadth (.256), 69c. Thickness of the mandibular symphysis (-.248), 80(4)a. Canine dental arch length (md) (.653 - Function 2), 63(2)b. 2nd internal dental arch breadth (mx) (.511 - Function 3), 63(2)c. 3rd internal dental arch breadth (md) (.295 - Function 4), 8. Maximum cranial breadth (.409 - Function 5), 69b. 2nd molar mandibular body thickness (-.538 - Function 6), 69b. 2nd molar mandibular body thickness (.526 - Function 7)*

1.E.II.4.a. Wilks' Lambda: *1 through 7: .005 (Sig. .000), 2 through 7: .026 (Sig. .000), 3 through 7: .084 (Sig. .000), 4 through 7: .186 (Sig. .000), 5 through 7: .384 (Sig. .000), 6 through 7: .617 (Sig. .001), 7: .842 (Sig. .094)*

1.E.II.4.b. Eigenvalues: *1: 3.994 (r: .894), 2: 2.264 (r: .833), 3: 1.203 (r: .739), 4: 1.067 (r: .718), 5: .606 (r: .614), 6: .364 (r: .517), 7: .188 (r: .397)*

1.E.II.5. Prior classification probability: *15.1% (prior prob. + 25%: 18.9%)*

1.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', Southern Sudan - -127.408, Chad - -136.049, Mandinka - -121.441, Somalis - -130.029, Haya - -123.567), no outliers detected, no variables failed tolerance test*

1.E.III. Results

1.E.III.1.a. Within-groups covariance matrix: *92.4%*

1.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *83.2%*

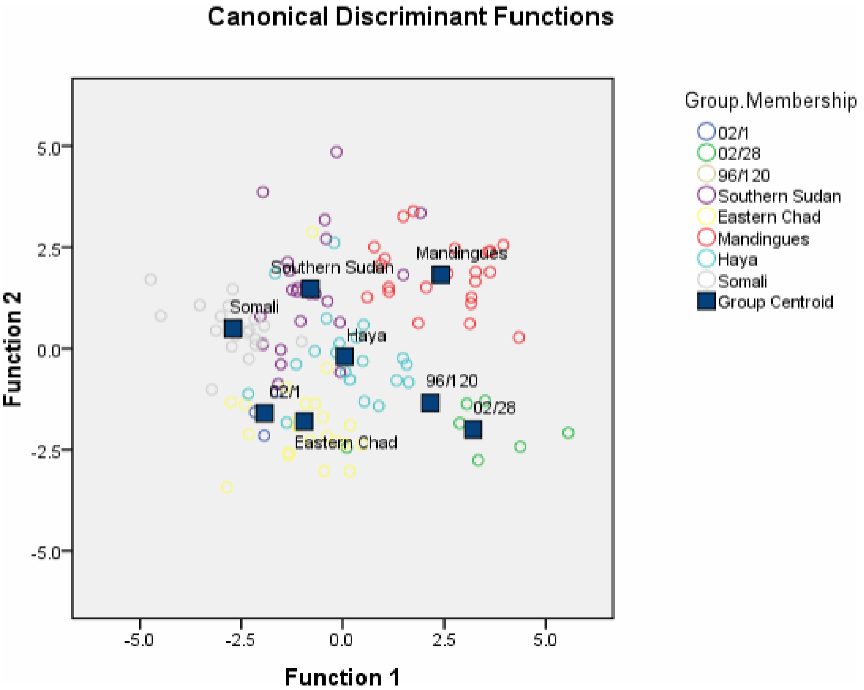
1.E.III.1.c. Separate-groups covariance matrix: *97.7%*

1.E.III.1.d. Closest centroids: *02/1 (highest group - 6 02/1; second highest group - 1 Chad, 5 Haya), 02/28 (highest group - 14 02/28; second highest group - 1 Mandinka, 13 Haya), 96/120 (highest group - 3 96/120; second highest group - 3 Haya)*

1.E.III.2.a. Misclassifications (leave-one-out): *02/28 (1 Chad), Southern Sudan (1 Chad, 2 Mandinka, 1 Somali, 2 Haya), Chad (1 Haya), Mandinka (1 02/28, 1 Southern Sudan, 1 Haya), Somalis (1 Southern Sudan, 2 Haya), Haya (1 02/28, 2 Southern Sudan, 3 Chad, 1 Mandinka, 1 Somali)*

1.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Chad), Haya (1 Southern Sudan, 1 Chad)*

1.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



1.E.IV. Additional results

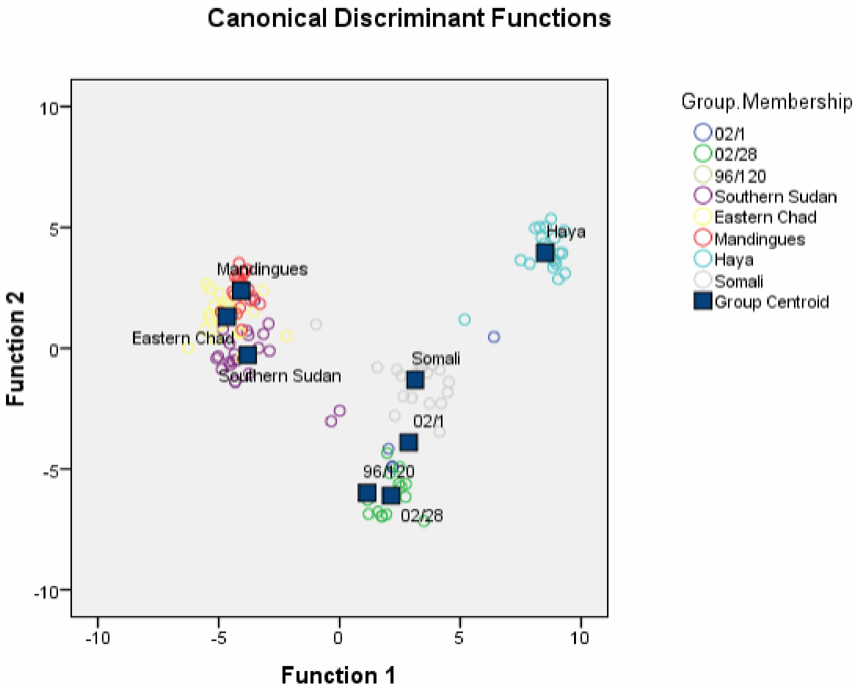
1.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (95.4%, 76.3%), separate-groups covariance matrix (94.7%), Box's M (test not possible), variables entered (31)*

1.E.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (90.1%, 82.4%), separate-groups covariance matrix (94.7%), Box's M (Sig. .000), variables entered (20), F values for pairwise distances (02/1 - 02/28: 9.580, 02/1 - 96/120: 8.055, 02/1 - Southern Sudan: 7.921, 02/1 - Chad: 6495, 02/1 - Mandinka: 10.389, 02/1 - Somalis: 5.229, 02/1 - Haya: 6.537, 02/28 - 96/120: 5.088, 02/28 - Southern Sudan: 12.117, 02/28 - Chad: 8.929, 02/28 - Mandinka: 8.161, 02/28 - Somalis: 16.049, 02/28 - Haya: 8.543, 96/120 - Southern Sudan: 9.592, 96/120 - Chad: 8.498, 96/120 - Mandinka: 7.861, 96/120 - Somalis: 8.492, 96/120 - Haya: 7.461, Southern Sudan - Chad: 7.436, Southern Sudan - Mandinka: 8.819, Southern Sudan - Somalis: 6.079, Southern Sudan - Haya: 6.535, Chad - Mandinka: 12.634, Chad - Somalis: 5.744, Chad - Haya: 4.317, Mandinka - Somalis: 13.364, Mandinka - Haya: 6.546, Somalis - Haya: 6.176)*

1.E.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (90.8%, 80.2%), separate-groups covariance matrix (97.7%), Box's M (Sig. .000), variables entered (21), F values for pairwise distances (02/1 - 02/28: 11.415, 02/1 - 96/120: 9.130, 02/1 - Southern Sudan: 16.953, 02/1 - Chad: 14.033, 02/1 - Mandinka: 17.498, 02/1 - Somalis: 12.214, 02/1 - Haya: 13.452, 02/28 - 96/120: 4.776, 02/28 - Southern Sudan: 14.472, 02/28 - Chad: 9.713, 02/28 - Mandinka: 9.761, 02/28 - Somalis: 15.683, 02/28 - Haya: 9.375, 96/120 - Southern Sudan: 10.169, 96/120 - Chad: 8.618, 96/120 - Mandinka: 8.088, 96/120 - Somalis: 8.367, 96/120 - Haya: 7.539, Southern Sudan - Chad: 7.295, Southern Sudan - Mandinka: 8.296, Southern Sudan - Somalis: 6.381, Southern Sudan - Haya: 6.914, Chad - Mandinka: 11.567, Chad - Somalis: 5.524, Chad - Haya: 4.073, Mandinka - Somalis: 12.193, Mandinka - Haya: 6.376, Somalis - Haya: 5.679)*

1.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.7%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (57), F values for pairwise distances (02/1 - 02/28: 13.336, 02/1 - 96/120: 7.697, 02/1 - Southern Sudan: 19.523, 02/1 - Chad: 22.491, 02/1 - Mandinka: 29.256, 02/1 - Somalis: 22.750, 02/1 - Haya: 46.606, 02/28 - 96/120: 5.271, 02/28 - Southern Sudan: 18.288, 02/28 - Chad: 26.876, 02/28 - Mandinka: 37.226, 02/28 - Somalis: 28.394, 02/28 - Haya: 54.379, 96/120 -*

	Southern Sudan: 12.769, 96/120 - Chad: 13.791, 96/120 - Mandinka: 16.797, 96/120 - Somalis: 11.936, 96/120 - Haya: 24.573, Southern Sudan - Chad: 23.453, Southern Sudan - Mandinka: 24.706, Southern Sudan - Somalis: 21.045, Southern Sudan - Haya: 57.844, Chad - Mandinka: 21.303, Chad - Somalis: 23.670, Chad - Haya: 33.830, Mandinka - Somalis: 35.265, Mandinka - Haya: 45.092, Somalis - Haya: 49.735)
1.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 68.7%; separate-groups covariance matrix - 2.3% - error), Box's M (test not possible), variables entered (116)*
1.F.I. Summary	
1.F.I.1. Groups:	*Wadi Howar - Sites*
1.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
1.F.I.3. Data:	*Non-metric cranial and dental traits*
1.F.I.4. Classification:	*02/1 (highest group - 100.0% 02/1; second highest group - 83.3% Southern Sudan)* *02/28 (highest group - 85.7% 02/28; second highest group - 85.7% 02/1)* *96/120 (highest group - 100.0% 02/1; second highest group - 100.0% 02/28)*
1.F.II. Analysis overview	
1.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
1.F.II.2.a. Variables in matrix:	*59*
1.F.II.2.b. Variables entered:	*24*
1.F.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.534), Midline diastema (.463), Shovel UI1 (-.303), Midline diastema (.481 - Function 2), Canine mesial ridge UC (.548 - Function 3), Tuberculum dentale UI2 (-.528 - Function 4), Interruption groove UI2 (-.546 - Function 5), Distal accessory ridge UC (-.516 - Function 6), Parastyle UM2 (.578 - Function 7)*
1.F.II.4.a. Wilks' Lambda:	*1 through 7: .000 (Sig. .000), 2 through 7: .000 (Sig. .000), 3 through 7: .001 (Sig. .000), 4 through 7: .011 (Sig. .000), 5 through 7: .061 (Sig. .000), 6 through 7: .230 (Sig. .000), 7: .693 (Sig. .001)*
1.F.II.4.b. Eigenvalues:	*1: 24.001 (r: .980), 2: 9.993 (r: .953), 3: 7.945 (r: .942), 4: 4.481 (r: .904), 5: 2.774 (r: .857), 6: 2.018 (r: .818), 7: .443 (r: .554)*
1.F.II.5. Prior classification probability:	*15.1% (prior prob. + 25%: 18.9%)*
1.F.II.6. Remarks:	*Box's M (test not possible: 02/1 - 'singular', 02/28 - 'singular', 96/120 - 'singular', Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*
1.F.III. Results	
1.F.III.1.a. Within-groups covariance matrix:	*98.5%*
1.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*92.4%*
1.F.III.1.c. Separate-groups covariance matrix:	*96.2%*
1.F.III.1.d. Closest centroids:	*02/1 (highest group - 6 02/1; second highest group - 5 Southern Sudan, 1 Somali), 02/28 (highest group - 2 02/1, 12 02/28; second highest group - 12 02/1, 2 02/28), 96/120 (highest group - 3 02/1; second highest group - 3 02/28)*
1.F.III.2.a. Misclassifications (leave-one-out):	*02/1 (1 Haya), 02/28 (2 96/120), Southern Sudan (1 2/28, 1 Chad), Chad (2 Southern Sudan), Somalis (1 Chad), Haya (1 Somali)*
1.F.III.2.b. Misclassifications (separate-groups):	*02/28 (2 02/1), 96/120 (3 02/1)*
1.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



1.F.IV. Additional results

1.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 87.0%), separate-groups covariance matrix (97.7%), Box's M (test not possible), variables entered (59)*

1.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (98.5%, 89.3%), separate-groups covariance matrix (96.9%), Box's M (test not possible), variables entered (27), F values for pairwise distances (02/1 - 02/28: 17.525, 02/1 - 96/120: 14.070, 02/1 - Southern Sudan: 21.625, 02/1 - Chad: 19.838, 02/1 - Mandinka: 27.693, 02/1 - Somalis: 16.830, 02/1 - Haya: 22.182, 02/28 - 96/120: 2.696, 02/28 - Southern Sudan: 28.709, 02/28 - Chad: 42.427, 02/28 - Mandinka: 31.390, 02/28 - Somalis: 23.579, 02/28 - Haya: 35.824, 96/120 - Southern Sudan: 12.967, 96/120 - Chad: 17.263, 96/120 - Mandinka: 11.932, 96/120 - Somalis: 12.401, 96/120 - Haya: 16.068, Southern Sudan - Chad: 12.317, Southern Sudan - Mandinka: 14.804, Southern Sudan - Somalis: 33.878, Southern Sudan - Haya: 57.799, Chad - Mandinka: 20.345, Chad - Somalis: 38.136, Chad - Haya: 64.168, Mandinka - Somalis: 40.145, Mandinka - Haya: 57.769, Somalis - Haya: 31.100)*

1.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (98.5%, 90.1%), separate-groups covariance matrix (91.6%), Box's M (test not possible), variables entered (25), F values for pairwise distances (02/1 - 02/28: 17.947, 02/1 - 96/120: 14.051, 02/1 - Southern Sudan: 22.833, 02/1 - Chad: 20.450, 02/1 - Mandinka: 30.776, 02/1 - Somalis: 18.067, 02/1 - Haya: 26.668, 02/28 - 96/120: 2.711, 02/28 - Southern Sudan: 26.630, 02/28 - Chad: 41.057, 02/28 - Mandinka: 34.437, 02/28 - Somalis: 22.323, 02/28 - Haya: 39.410, 96/120 - Southern Sudan: 11.090, 96/120 - Chad: 15.572, 96/120 - Mandinka: 12.129, 96/120 - Somalis: 11.121, 96/120 - Haya: 16.559, Southern Sudan - Chad: 13.616, Southern Sudan - Mandinka: 15.315, Southern Sudan - Somalis: 34.062, Southern Sudan - Haya: 62.708, Chad - Mandinka: 21.264, Chad - Somalis: 38.335, Chad - Haya: 68.907, Mandinka - Somalis: 39.337, Mandinka - Haya: 60.982, Somalis - Haya: 33.053)*

1.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 98.5%, 90.8%; separate-groups covariance matrix - 96.9%), Box's M (test not possible), variables entered (29), F values for pairwise distances (02/1 - 02/28: 40.114, 02/1 - 96/120: 12.178, 02/1 - Southern Sudan: 40.621, 02/1 - Chad: 45.216, 02/1 - Mandinka: 63.366, 02/1 - Somalis: 35.539, 02/1 - Haya: 49.930, 02/28 - 96/120: 7.316, 02/28 - Southern Sudan: 40.826, 02/28 -*

Chad: 65.651, 02/28 - Mandinka: 61.585, 02/28 - Somalis: 45.371, 02/28 - Haya: 46.089, 96/120 - Southern Sudan: 11.356, 96/120 - Chad: 16.635, 96/120 - Mandinka: 17.464, 96/120 - Somalis: 9.853, 96/120 - Haya: 12.966, Southern Sudan - Chad: 17.616, Southern Sudan - Mandinka: 30.822, Southern Sudan - Somalis: 33.956, Southern Sudan - Haya: 51.518, Chad - Mandinka: 35.620, Chad - Somalis: 42.968, Chad - Haya: 73.105, Mandinka - Somalis: 52.899, Mandinka - Haya: 57.464, Somalis - Haya: 37.671)

1.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 85.5%; separate-groups covariance matrix - 97.7%), Box's M (test not possible), variables entered (97)*

2. Occupation phases

2.A.I. Summary

2.A.I.1. Groups: *Wadi Howar - Occupation phases*

2.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

2.A.I.3. Data: *Cranial and dental measurements*

2.A.I.4. Classification: *pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 87.5% Malian Sahara)*
Leiterband (highest group - 100.0% Leiterband; second highest group - 100.0% Malian Sahara)
Handessi (highest group - 100.0% Handessi; second highest group - 100.0% Leiterband)

2.A.II. Analysis overview

2.A.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.A.II.2.a. Variables in matrix: *47*

2.A.II.2.b. Variables entered: *19*

2.A.II.3. Best predictors: *81. Crown length UI2 (-.466), 50(1). Interorbital breadth (.270), 69. Height of the mandibular symphysis (-.220), 80(1)a. Canine dental arch breadth (mx) (.419 - Function 2), 30. Bregma-Lambda chord (.351 - Function 3), 80(1)d. 1st molar dental arch breadth (md) (.397 - Function 4), 81(1). Crown width LI2 (.377 - Function 5)*

2.A.II.4.a. Wilks' Lambda: *1 through 5: .003 (Sig. .000), 2 through 5: .016 (Sig. .000), 3 through 5: .081 (Sig. .000), 4 through 5: .323 (Sig. .000), 5: .779 (Sig. .140)*

2.A.II.4.b. Eigenvalues: *1: 5.195 (r: .916), 2: 4.156 (r: .898), 3: 3.009 (r: .866), 4: 1.410 (r: .765), 5: .284 (r: .470)*

2.A.II.5. Prior classification probability: *20.4% (prior prob. + 25%: 25.5%)*

2.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: pre-Leiterband - 'singular', Leiterband - 'singular', Handessi - 'singular', A-Group - -54.521, Jebel Sahaba/Tushka - -54.130, Malian Sahara - -47.654), no outliers detected, no variables failed tolerance test*

2.A.III. Results

2.A.III.1.a. Within-groups covariance matrix: *100.0%*

2.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *94.8%*

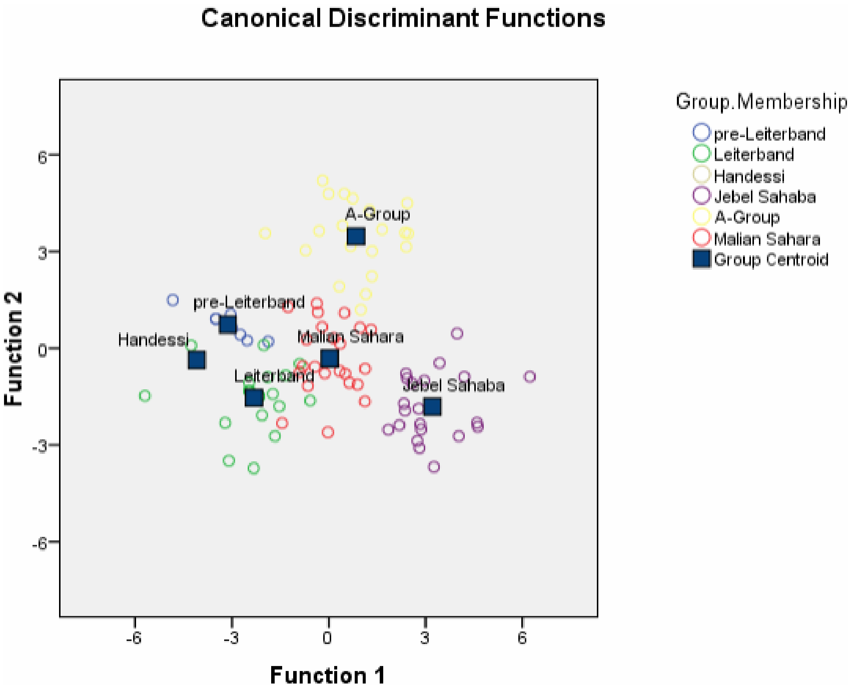
2.A.III.1.c. Separate-groups covariance matrix: *100.0%*

2.A.III.1.d. Closest centroids: *pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 1 Leiterband, 7 Malian Sahara), Leiterband (highest group - 21 Leiterband; second highest group - 21 Malian Sahara), Handessi (highest group - 3 Handessi; second highest group - 3 Leiterband)*

2.A.III.2.a. Misclassifications (leave-one-out): *Leiterband (1 Handessi, 1 Jebel Sahaba/Tushka), A-Group (1 Jebel Sahaba/Tushka), Malian Sahara (1 Leiterband, 1 Jebel Sahaba/Tushka)*

2.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

2.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.A.IV. Additional results

2.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 86.6%), separate-groups covariance matrix (3.1% - error), Box's M (test not possible), variables entered (47)*

2.A.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (100.0%, 88.7%), separate-groups covariance matrix (3.1% - error), Box's M (test not possible), variables entered (22), F values for pairwise distances (pre-Leiterband - Leiterband: 22.760, pre-Leiterband - Handessi: 13.982, pre-Leiterband - A-Group: 20.998, pre-Leiterband - Jebel Sahaba/Tushka: 31.876, pre-Leiterband - Malian Sahara: 18.533, Leiterband - Handessi: 5.012, Leiterband - A-Group: 24.932, Leiterband - Jebel Sahaba/Tushka: 23.587, Leiterband - Malian Sahara: 15.214, Handessi - A-Group: 11.479, Handessi - Jebel Sahaba/Tushka: 13.419, Handessi - Malian Sahara: 9.633, A-Group - Jebel Sahaba/Tushka: 14.833, A-Group - Malian Sahara: 9.983, Jebel Sahaba/Tushka - Malian Sahara: 11.070)*

2.A.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (100.0%, 88.7%), separate-groups covariance matrix (97.9%), Box's M (test not possible), variables entered (22), F values for pairwise distances (pre-Leiterband - Leiterband: 24.516, pre-Leiterband - Handessi: 14.137, pre-Leiterband - A-Group: 20.974, pre-Leiterband - Jebel Sahaba/Tushka: 35.091, pre-Leiterband - Malian Sahara: 19,826, Leiterband - Handessi: 4.738, Leiterband - A-Group: 26.147, Leiterband - Jebel Sahaba/Tushka: 23.154, Leiterband - Malian Sahara: 15.732, Handessi - A-Group: 11.103, Handessi - Jebel Sahaba/Tushka: 12.577, Handessi - Malian Sahara: 9.339, A-Group - Jebel Sahaba/Tushka: 17.965, A-Group - Malian Sahara: 9.245, Jebel Sahaba/Tushka - Malian Sahara: 11.502)*

2.A.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - 99.1%, 91.3%; separate-groups covariance matrix - 99.1%), Box's M (test not possible), variables entered (27), F values for pairwise distances (pre-Leiterband - Leiterband: 20.509, pre-Leiterband - Handessi: 15.090, pre-Leiterband - A-Group: 21.779, pre-Leiterband - Jebel Sahaba/Tushka: 29.559, pre-Leiterband - Malian Sahara: 23.804, pre-Leiterband - "Sudanese Hotchpotch": 37.930, Leiterband - Handessi: 4.133, Leiterband - A-Group: 15.756, Leiterband - Jebel Sahaba/Tushka: 16.317, Leiterband - Malian Sahara: 10.511, Leiterband - "Sudanese Hotchpotch": 34.307, Handessi - A-Group: 8.020, Handessi - Jebel Sahaba/Tushka: 9.405, Handessi - Malian Sahara:*

	6.663, Handessi - "Sudanese Hotchpotch": 12.586, A-Group - Jebel Sahaba/Tushka: 14.721, A-Group - Malian Sahara: 10.980, A-Group - "Sudanese Hotchpotch": 18.037, Jebel Sahaba/Tushka - Malian Sahara: 10.016, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 28.461, Malian Sahara - "Sudanese Hotchpotch": 25.768)
2.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - 100.0%, 88.7%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (48)*
2.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 98.3%; separate-groups covariance matrix - 2.6% - error), Box's M (test not possible), variables entered (56), F values for pairwise distances (pre-Leiterband - Leiterband: 78.446, pre-Leiterband - Handessi: 44.285, pre-Leiterband - A-Group: 77.386, pre-Leiterband - Jebel Sahaba/Tushka: 97.932, pre-Leiterband - Malian Sahara: 88.010, pre-Leiterband - "Sudanese Hotchpotch": 105.866, Leiterband - Handessi: 9.990, Leiterband - A-Group: 20.645, Leiterband - Jebel Sahaba/Tushka: 34.860, Leiterband - Malian Sahara: 49.991, Leiterband - "Sudanese Hotchpotch": 41.659, Handessi - A-Group: 15.404, Handessi - Jebel Sahaba/Tushka: 12.575, Handessi - Malian Sahara: 12.746, Handessi - "Sudanese Hotchpotch": 15.996, A-Group - Jebel Sahaba/Tushka: 19.944, A-Group - Malian Sahara: 37.110, A-Group - "Sudanese Hotchpotch": 20.835, Jebel Sahaba/Tushka - Malian Sahara: 18.656, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 28.003, Malian Sahara - "Sudanese Hotchpotch": 33.149)*
2.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 48.7%; separate-groups covariance matrix - 2.6% - error), Box's M (test not possible), variables entered (118)*

2.B.I. Summary	
2.B.I.1. Groups:	*Wadi Howar - Occupation phases*
2.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
2.B.I.3. Data:	*Scaled cranial and dental measurements*
2.B.I.4. Classification:	*pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 100.0% Malian Sahara)* *Leiterband (highest group - 100.0% Leiterband; second highest group - 100.0% Malian Sahara)* *Handessi (highest group - 100.0% Handessi; second highest group - 100.0% Malian Sahara)*

2.B.II. Analysis overview	
2.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.B.II.2.a. Variables in matrix:	*38*
2.B.II.2.b. Variables entered:	*18*
2.B.II.3. Best predictors:	*3. Glabello-Lambda length (.278), 80(1)a. Canine dental arch breadth (mx) (.234), 81(1). Crown width LC (-.233), 71a. Minimum ramus width (-.377 - Function 2), 81(1). Crown width LI1 (.329 - Function 3), 71a. Minimum ramus width (.402 - Function 4), 81(1). Crown width LM3 (-.410 - Function 5)*
2.B.II.4.a. Wilks' Lambda:	*1 through 5: .003 (Sig. .000), 2 through 5: .021 (Sig. .000), 3 through 5: .084 (Sig. .000), 4 through 5: .293 (Sig. .000), 5: .714 (Sig. .013)*
2.B.II.4.b. Eigenvalues:	*1: 7.164 (r: .937), 2: 2.922 (r: .863), 3: 2.508 (r: .846), 4: 1.437 (r: .768), 1: .401 (r: .535)*
2.B.II.5. Prior classification probability:	*20.4% (prior prob. + 25%: 25.5%)*
2.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: pre-Leiterband - 'singular', Leiterband - 'singular', Handessi - 'singular', A-Group - -123.779, Jebel Sahaba/Tushka - -123.092, Malian Sahara - -118.479), no outliers detected, no variables failed tolerance test*

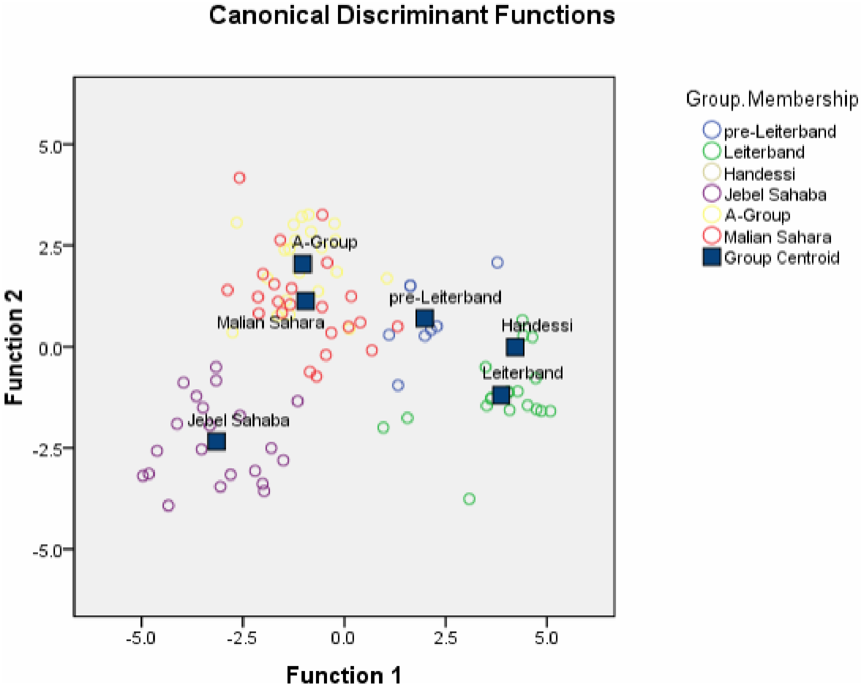
2.B.III. Results	
2.B.III.1.a. Within-groups covariance matrix:	*99.0%*
2.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*91.8%*
2.B.III.1.c. Separate-groups covariance matrix:	*99.0%*
2.B.III.1.d. Closest centroids:	*pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 8 Malian Sahara), Leiterband (highest group - 21 Leiterband; second highest group - 21 Malian*

Sahara), Handessi (highest group - 3 Handessi; second highest group - 3 Malian Sahara)

2.B.III.2.a. Misclassifications (leave-one-out): *Leiterband (2 Jebel Sahaba/Tushka), A-Group (1 pre-Leiterband, 1 Jebel Sahaba/Tushka), Jebel Sahaba/Tushka (1 A-Group), Malian Sahara (1 pre-Leiterband, 2 A-Group)*

2.B.III.2.b. Misclassifications (separate-groups): *Malian Sahara (1 A-Group)*

2.B.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.B.IV. Additional results

2.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (99.0%, 84.5%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (38)*

2.B.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (99.0%, 90.7%), separate-groups covariance matrix (99.0%), Box's M (test not possible), variables entered (23), F values for pairwise distances (pre-Leiterband - Leiterband: 23.152, pre-Leiterband - Handessi: 13.332, pre-Leiterband - A-Group: 24.078, pre-Leiterband - Jebel Sahaba/Tushka: 35.310, pre-Leiterband - Malian Sahara: 26.968, Leiterband - Handessi: 3.176, Leiterband - A-Group: 19.841, Leiterband - Jebel Sahaba/Tushka: 26.151, Leiterband - Malian Sahara: 18.648, Handessi - A-Group: 8.226, Handessi - Jebel Sahaba/Tushka: 11.543, Handessi - Malian Sahara: 9.709, A-Group - Jebel Sahaba/Tushka: 9.951, A-Group - Malian Sahara: 7.605, Jebel Sahaba/Tushka - Malian Sahara: 10.616)*

2.B.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (97.9%, 88.7%), separate-groups covariance matrix (97.9%), Box's M (Sig. .000), variables entered (20), F values for pairwise distances (pre-Leiterband - Leiterband: 22.004, pre-Leiterband - Handessi: 12.748, pre-Leiterband - A-Group: 25.733, pre-Leiterband - Jebel Sahaba/Tushka: 37.800, pre-Leiterband - Malian Sahara: 26.828, Leiterband - Handessi: 3.601, Leiterband - A-Group: 18.592, Leiterband - Jebel Sahaba/Tushka: 23.910, Leiterband - Malian Sahara: 17.014, Handessi - A-Group: 6.929, Handessi - Jebel Sahaba/Tushka: 10.771, Handessi - Malian Sahara: 8.699, A-Group - Jebel Sahaba/Tushka: 12.995, A-Group - Malian Sahara: 7.301, Jebel Sahaba/Tushka - Malian Sahara: 11.217)*

2.B.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - 97.4%, 91.3%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (31), F values for pairwise distances (pre-Leiterband - Leiterband: 21.705, pre-Leiterband - Handessi: 9.651, pre-Leiterband - A-Group: 19.208, pre-Leiterband - Jebel Sahaba/Tushka: 29.427, pre-Leiterband - Malian*

Sahara: 22.640, pre-Leiterband - “Sudanese Hotchpotch”: 38.884, Leiterband - Handessi: 1.414, Leiterband - A-Group: 15.291, Leiterband - Jebel Sahaba/Tushka: 23.699, Leiterband - Malian Sahara: 17.892, Leiterband - “Sudanese Hotchpotch”: 31.130, Handessi - A-Group: 5.673, Handessi - Jebel Sahaba/Tushka: 9.771, Handessi - Malian Sahara: 6.638, Handessi - “Sudanese Hotchpotch”: 8.848, A-Group - Jebel Sahaba/Tushka: 11.987, A-Group - Malian Sahara: 6.194, A-Group - “Sudanese Hotchpotch”: 18.387, Jebel Sahaba/Tushka - Malian Sahara: 9.692, Jebel Sahaba/Tushka - “Sudanese Hotchpotch”: 33.634, Malian Sahara - “Sudanese Hotchpotch”: 26.188)

2.B.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - 100.0%, 87.8%; separate-groups covariance matrix - 100.0%), Box’s M (test not possible), variables entered (44)*

2.B.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.4%; separate-groups covariance matrix - 2.6% - error), Box’s M (test not possible), variables entered (55), F values for pairwise distances (pre-Leiterband - Leiterband: 27.777, pre-Leiterband - Handessi: 14.128, pre-Leiterband - A-Group: 26.963, pre-Leiterband - Jebel Sahaba/Tushka: 36.173, pre-Leiterband - Malian Sahara: 21.995, pre-Leiterband - “Sudanese Hotchpotch”: 38.143, Leiterband - Handessi: 5.158, Leiterband - A-Group: 26.402, Leiterband - Jebel Sahaba/Tushka: 37.652, Leiterband - Malian Sahara: 34.130, Leiterband - “Sudanese Hotchpotch”: 51.158, Handessi - A-Group: 10.836, Handessi - Jebel Sahaba/Tushka: 9.123, Handessi - Malian Sahara: 9.682, Handessi - “Sudanese Hotchpotch”: 15.532, A-Group - Jebel Sahaba/Tushka: 19.098, A-Group - Malian Sahara: 31.802, A-Group - “Sudanese Hotchpotch”: 21.322, Jebel Sahaba/Tushka - Malian Sahara: 22.669, Jebel Sahaba/Tushka - “Sudanese Hotchpotch”: 28.244, Malian Sahara - “Sudanese Hotchpotch”: 40.736)*

2.B.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 58.3%; separate-groups covariance matrix - 2.6% - error), Box’s M (test not possible), variables entered (116)*

2.C.I. Summary

2.C.I.1. Groups: *Wadi Howar - Occupation phases*

2.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*

2.C.I.3. Data: *Non-metric cranial and dental traits*

2.C.I.4. Classification: *pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 100.0% Malian Sahara)*
Leiterband (highest group - 100.0% Leiterband; second highest group - 81.0% Malian Sahara)
Handessi (highest group - 100.0% Malian Sahara; second highest group - 100.0% Leiterband)

2.C.II. Analysis overview

2.C.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.C.II.2.a. Variables in matrix: *56*

2.C.II.2.b. Variables entered: *18*

2.C.II.3. Best predictors: *Distal accessory ridge UC (.713), Interruption groove UI2 (.296), Tuberculum dentale UI2 (.261), Tuberculum dentale UI2 (.538 - Function 2), Premolar mesial and distal accessory cusps (.306 - Function 3), Premolar root number UP1 (.622 - Function 4), Symphyseal height (.726 - Function 5)*

2.C.II.4.a. Wilks’ Lambda: *1 through 5: .001 (Sig. .000), 2 through 5: .009 (Sig. .000), 3 through 5: .066 (Sig. .000), 4 through 5: .306 (Sig. .000), 5: .822 (Sig. .284)*

2.C.II.4.b. Eigenvalues: *1: 16.395 (r: .971), 2: 6.042 (r: .926), 3: 3.658 (r: .886) , 4: 1.688 (r: .792) , 5: .217 (r: .422)*

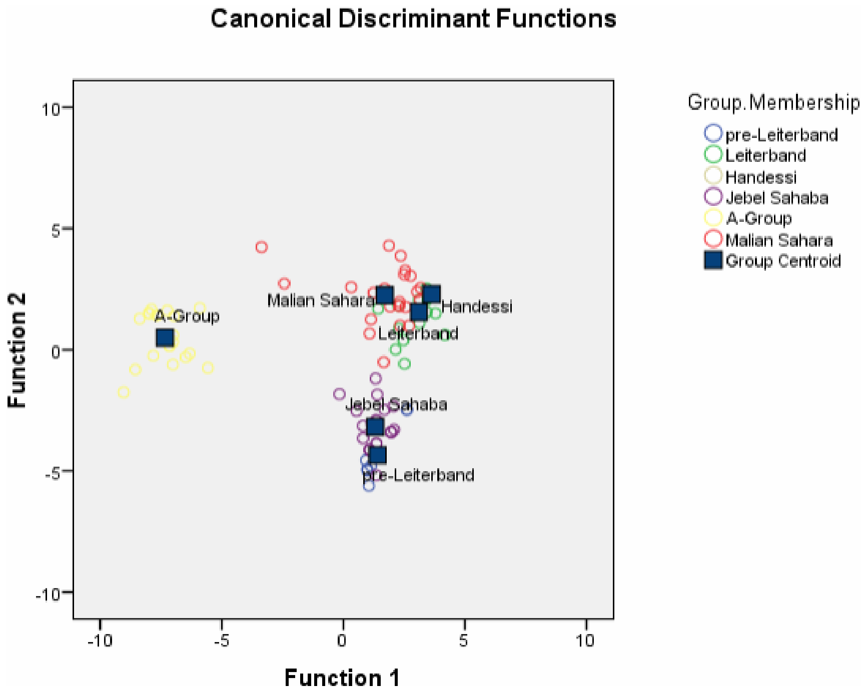
2.C.II.5. Prior classification probability: *20.4% (prior prob. + 25%: 25.5%)*

2.C.II.6. Remarks: *Box’s M (test not possible: pre-Leiterband - ‘singular’, Leiterband - ‘singular’, Handessi - ‘singular’, A-Group - ‘singular’, Jebel Sahaba/Tushka - ‘singular’, Malian Sahara - ‘singular’), no outliers detected, no variables failed tolerance test*

2.C.III. Results

2.C.III.1.a. Within-groups covariance matrix: *100.0%*

2.C.III.1.b. Within-groups covariance matrix (Leave-one-out):	*95.9%*
2.C.III.1.c. Separate-groups covariance matrix:	*96.9%*
2.C.III.1.d. Closest centroids:	*pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 8 Malian Sahara), Leiterband (highest group - 21 Leiterband; second highest group - 1 pre-Leiterband 3 Jebel Sahaba/Tushka, 17 Malian Sahara), Handessi (highest group - 3 Malian Sahara; second highest group - 3 Leiterband)*
2.C.III.2.a. Misclassifications (leave-one-out):	*Leiterband (1 Jebel Sahaba/Tushka), Malian Sahara (2 A-Group, 1 Jebel Sahaba/Tushka)*
2.C.III.2.b. Misclassifications (separate-groups):	*Handessi (3 Malian Sahara)*
2.C.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



2.C.IV. Additional results	
2.C.IV.1.a. Simultaneous:	*Within-groups covariance matrix (100.0%, 82.5%), separate-groups covariance matrix (96.9%), Box's M (test not possible), variables entered (56)*
2.C.IV.1.b. Mahalanobis distance:	*Within-groups covariance matrix (100.0%, 93.8%), separate-groups covariance matrix (96.9%), Box's M (test not possible), variables entered (25), F values for pairwise distances (pre-Leiterband - Leiterband: 14.130, pre-Leiterband - Handessi: 7.679, pre-Leiterband - A-Group: 25.674, pre-Leiterband - Jebel Sahaba/Tushka: 11.819, pre-Leiterband - Malian Sahara: 14.024, Leiterband - Handessi: 1.451, Leiterband - A-Group: 54.787, Leiterband - Jebel Sahaba/Tushka: 18.857, Leiterband - Malian Sahara: 16.874, Handessi - A-Group: 15.484, Handessi - Jebel Sahaba/Tushka: 7.473, Handessi - Malian Sahara: 5.360, A-Group - Jebel Sahaba/Tushka: 60.496, A-Group - Malian Sahara: 49.427, Jebel Sahaba/Tushka - Malian Sahara: 21.847)*
2.C.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (97.9%, 93.8%), separate-groups covariance matrix (90.7%), Box's M (test not possible), variables entered (16), F values for pairwise distances (pre-Leiterband - Leiterband: 14.707, pre-Leiterband - Handessi: 9.504, pre-Leiterband - A-Group: 32.506, pre-Leiterband - Jebel Sahaba/Tushka: 15.003, pre-Leiterband - Malian Sahara: 12.005, Leiterband - Handessi: 1.637, Leiterband - A-Group: 59.452, Leiterband - Jebel Sahaba/Tushka: 20.807, Leiterband - Malian Sahara: 19.526, Handessi - A-Group: 18.218, Handessi - Jebel Sahaba/Tushka: 7.850, Handessi - Malian Sahara: 6.290, A-Group - Jebel Sahaba/Tushka: 66.105, A-Group - Malian Sahara: 68.669, Jebel Sahaba/Tushka - Malian Sahara: 22.756)*
2.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 93.9%; separate-groups covariance matrix - 97.4%), Box's M (test not possible), variables entered*

(30), F values for pairwise distances (pre-Leiterband - Leiterband: 16.767, pre-Leiterband - Handessi: 8.494, pre-Leiterband - A-Group: 28.397, pre-Leiterband - Jebel Sahaba/Tushka: 12.207, pre-Leiterband - Malian Sahara: 14.290, pre-Leiterband - "Sudanese Hotchpotch": 8.341, Leiterband - Handessi: 1.244, Leiterband - A-Group: 56.413, Leiterband - Jebel Sahaba/Tushka: 21.527, Leiterband - Malian Sahara: 18.407, Leiterband - "Sudanese Hotchpotch": 25.705, Handessi - A-Group: 14.953, Handessi - Jebel Sahaba/Tushka: 7.914, Handessi - Malian Sahara: 5.561, Handessi - "Sudanese Hotchpotch": 9.628, A-Group - Jebel Sahaba/Tushka: 63.764, A-Group - Malian Sahara: 52.005, A-Group - "Sudanese Hotchpotch": 52.420, Jebel Sahaba/Tushka - Malian Sahara: 22.475, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 12.793, Malian Sahara - "Sudanese Hotchpotch": 20.943)

2.C.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - 99.1%, 88.7%; separate-groups covariance matrix - 97.4%), Box's M (test not possible), variables entered (56)*

2.C.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.4%; separate-groups covariance matrix - 97.4%), Box's M (test not possible), variables entered (35), F values for pairwise distances (pre-Leiterband - Leiterband: 22.254, pre-Leiterband - Handessi: 8.195, pre-Leiterband - A-Group: 52.968, pre-Leiterband - Jebel Sahaba/Tushka: 19.962, pre-Leiterband - Malian Sahara: 28.866, pre-Leiterband - "Sudanese Hotchpotch": 21.262, Leiterband - Handessi: 2.477, Leiterband - A-Group: 71.864, Leiterband - Jebel Sahaba/Tushka: 49.415, Leiterband - Malian Sahara: 38.552, Leiterband - "Sudanese Hotchpotch": 31.649, Handessi - A-Group: 22.249, Handessi - Jebel Sahaba/Tushka: 11.732, Handessi - Malian Sahara: 10.180, Handessi - "Sudanese Hotchpotch": 10.855, A-Group - Jebel Sahaba/Tushka: 103.484, A-Group - Malian Sahara: 73.805, A-Group - "Sudanese Hotchpotch": 43.873, Jebel Sahaba/Tushka - Malian Sahara: 36.481, Jebel Sahaba/Tushka - "Sudanese Hotchpotch": 29.599, Malian Sahara - "Sudanese Hotchpotch": 27.695)*

2.C.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 81.7%; separate-groups covariance matrix - 97.4%), Box's M (test not possible), variables entered (97)*

2.D.I. Summary

2.D.I.1. Groups: *Wadi Howar - Occupation phases*

2.D.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

2.D.I.3. Data: *Cranial and dental measurements*

2.D.I.4. Classification: *pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 62.5% Southern Sudan)*
Leiterband (highest group - 100.0% Leiterband; second highest group - 81.0% Southern Sudan)
Handessi (highest group - 100.0% Handessi; second highest group - 100.0% Southern Sudan)

2.D.II. Analysis overview

2.D.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.D.II.2.a. Variables in matrix: *31*

2.D.II.2.b. Variables entered: *19*

2.D.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (.919), 81(1). Crown width UI2 (.350), 63(2)d. 4th internal dental arch breadth (md) (.331), 3. Glabello-Lambda length (-.854 - Function 2), 30. Bregma-Lambda chord (.707 - Function 3), 81. Crown length UI2 (.921 - Function 4), 54. Nasal breadth (.664 - Function 5), 63(2)d. 4th internal dental arch breadth (md) (.805 - Function 6), 81(1). Crown width UM2 (.791 - Function 7)*

2.D.II.4.a. Wilks' Lambda: *1 through 7: .001 (Sig. .000), 2 through 7: .004 (Sig. .000), 3 through 7: .017 (Sig. .000), 4 through 7: .059 (Sig. .000), 5 through 7: .187 (Sig. .000), 6 through 7: .417 (Sig. .000), 7: .724 (Sig. .000)*

2.D.II.4.b. Eigenvalues: *1: 5.126 (r: .915), 2: 3.779 (r: .889), 3: 2.479 (r: .844), 4: 2.157 (r: .827), 5: 1.232 (r: .743), 6: .735 (r: .651), 7: .382 (r: .526)*

2.D.II.5. Prior classification probability: *14.6% (prior prob. + 25%: 18.2%)*

2.D.II.6. Remarks: *Box's M (Sig. .000; Log determinants: pre-Leiterband - 'singular', Leiterband - 'singular', Handessi - 'singular', Southern Sudan - -34.332, Chad - -47.508, Mandinka - 'singular', Somalis - -38.509, Haya - -36.019), no outliers detected, no variables failed tolerance test*

2.D.III. Results

2.D.III.1.a. Within-groups covariance matrix: *97.9%*

2.D.III.1.b. Within-groups covariance matrix (Leave-one-out): *90.0%*

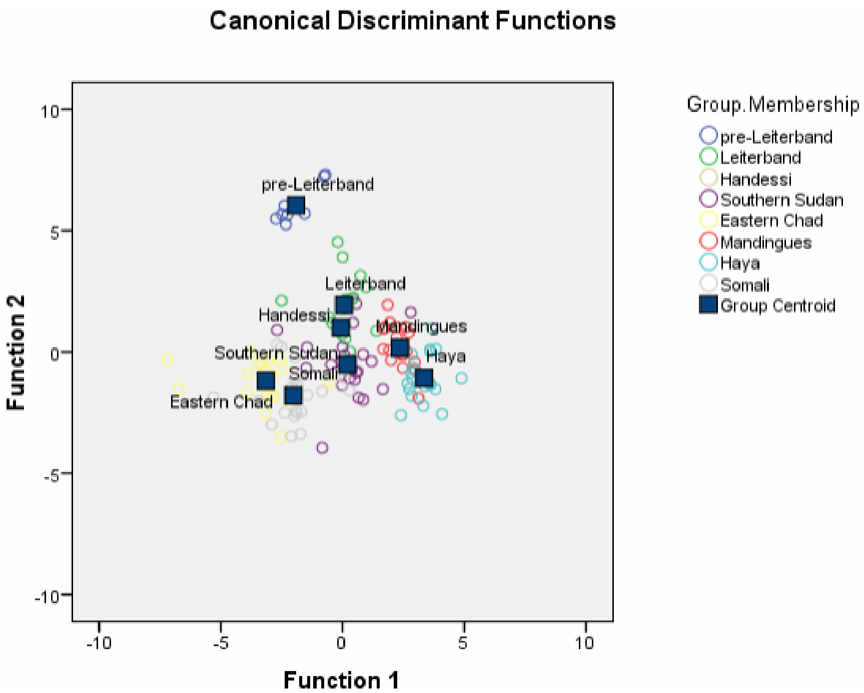
2.D.III.1.c. Separate-groups covariance matrix: *100.0%*

2.D.III.1.d. Closest centroids: *pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 5 Southern Sudan, 3 Somalis), Leiterband (highest group - 21 Leiterband; second highest group - 17 Southern Sudan, 1 Chad, 2 Somalis, 1 Haya), Handessi (highest group - 3 Handessi; second highest group - 3 Southern Sudan)*

2.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 2 Mandinka, 1 Haya), Chad (1 Southern Sudan, 2 Haya), Mandinka (1 Southern Sudan), Somalis (1 Mandinka), Haya (1 Leiterband, 1 Southern Sudan, 1 Mandinka)*

2.D.III.2.b. Misclassifications (separate-groups): *No misclassifications*

2.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.D.IV. Additional results

2.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (97.1%, 88.6%), separate-groups covariance matrix (2.1% - error), Box's M (test not possible), variables entered (31)*

2.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (97.9%, 87.9%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (24), F values for pairwise distances (pre-Leiterband - Leiterband: 14.051, pre-Leiterband - Handessi: 9.119, pre-Leiterband - Southern Sudan: 17.274, pre-Leiterband - Chad: 18.232, pre-Leiterband - Mandinka: 21.641, pre-Leiterband - Somalis: 18.739, pre-Leiterband - Haya: 20.433, Leiterband - Handessi: 3.048, Leiterband - Southern Sudan: 8.626, Leiterband - Chad: 12.108, Leiterband - Mandinka: 12.578, Leiterband - Somalis: 14.414, Leiterband - Haya: 14.075, Handessi - Southern Sudan: 5.734, Handessi - Chad: 6.224, Handessi - Mandinka: 6.140, Handessi - Somalis: 5.651, Handessi - Haya: 6.600, Southern Sudan - Chad: 7.673, Southern Sudan - Mandinka: 11.075, Southern Sudan - Somalis: 8.779, Southern Sudan - Haya: 8.848, Chad - Mandinka: 19.420, Chad - Somalis: 7.375, Chad - Haya: 18.909, Mandinka - Somalis: 13.504, Mandinka - Haya: 11.255, Somalis - Haya: 15.077)*

2.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (96.4%, 88.6%), separate-groups covariance matrix (99.3%), Box's M (test not possible), variables entered (22), F values for pairwise distances (pre-Leiterband - Leiterband: 14.645, pre-Leiterband - Handessi: 9.645, pre-Leiterband - Southern Sudan: 19.825, pre-Leiterband - Chad: 20.923, pre-Leiterband - Mandinka: 23.768, pre-Leiterband - Somalis: 19.905, pre-Leiterband - Haya: 21.919, Leiterband - Handessi: 3.369, Leiterband - Southern Sudan: 10.747, Leiterband - Chad: 14.583, Leiterband - Mandinka: 15.446, Leiterband - Somalis: 16.526, Leiterband - Haya: 15.726, Handessi - Southern Sudan: 6.373, Handessi - Chad: 6.937, Handessi - Mandinka: 6.741, Handessi - Somalis: 6.148, Handessi - Haya: 7.189, Southern Sudan - Chad: 8.425, Southern Sudan - Mandinka: 10.081, Southern Sudan - Somalis: 7.760, Southern Sudan - Haya: 9.621, Chad - Mandinka: 19.323, Chad - Somalis: 6.244, Chad - Haya: 19.917, Mandinka - Somalis: 15.113, Mandinka - Haya: 13.431, Somalis - Haya: 16.222)*

2.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 98.6%; separate-groups covariance matrix - 7.9% - error), Box's M (test not possible), variables entered (51), F values for pairwise distances (pre-Leiterband - Leiterband: 88.025, pre-Leiterband - Handessi: 37.129, pre-Leiterband - Southern Sudan: 108.724, pre-Leiterband - Chad: 122.068, pre-Leiterband - Mandinka: 120.896, pre-Leiterband - Somalis: 111.946, pre-Leiterband - Haya: 155.069, Leiterband - Handessi: 3.290, Leiterband - Southern Sudan: 25.537, Leiterband - Chad: 53.473, Leiterband - Mandinka: 47.906, Leiterband - Somalis: 38.465, Leiterband - Haya: 103.206, Handessi - Southern Sudan: 10.799, Handessi - Chad: 14.819, Handessi - Mandinka: 14.574, Handessi - Somalis: 9.765, Handessi - Haya: 28.922, Southern Sudan - Chad: 33.631, Southern Sudan - Mandinka: 27.013, Southern Sudan - Somalis: 29.880, Southern Sudan - Haya: 81.633, Chad - Mandinka: 18.582, Chad - Somalis: 15.174, Chad - Haya: 40.937, Mandinka - Somalis: 22.412, Mandinka - Haya: 47.173, Somalis - Haya: 61.315)*

2.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 72.9%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (118)*

2.E.I. Summary

2.E.I.1. Groups: *Wadi Howar - Occupation phases*

2.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

2.E.I.3. Data: *Scaled cranial and dental measurements*

2.E.I.4. Classification: *pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 100.0% Chad)*
Leiterband (highest group - 100.0% Leiterband; second highest group - 76.2% Somalis)
Handessi (highest group - 100.0% Handessi; second highest group - 100.0% Somalis)

2.E.II. Analysis overview

2.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

2.E.II.2.a. Variables in matrix: *33*

2.E.II.2.b. Variables entered: *22*

2.E.II.3. Best predictors: *80(4)c. 2nd premolar dental arch length (md) (-.444), 80(4)a. Canine dental arch length (md) (.367), 63(2)b. 2nd internal dental arch breadth (mx) (.302), 80(4)c. 2nd premolar dental arch length (md) (.356 - Function 2), 80(4)c. 2nd premolar dental arch length (md) (.564 - Function 3), 54. Nasal breadth (.365 - Function 4), 80(1)c. 2nd premolar dental arch breadth (md) (-.369 - Function 5), 3. Glabello-Lambda length (-.385 - Function 6), 69b. 2nd molar mandibular body thickness (.626 - Function 7)*

2.E.II.4.a. Wilks' Lambda: *1 through 7: .000 (Sig. .000), 2 through 7: .003 (Sig. .000), 3 through 7: .017 (Sig. .000), 4 through 7: .073 (Sig. .000), 5 through 7: .203 (Sig. .000), 6 through 7: .485 (Sig. .000), 7: .780 (Sig. .014)*

2.E.II.4.b. Eigenvalues: *1: 5.854 (r: .924), 2: 4.291 (r: .901), 3: 3.251 (r: .875), 4: 1.785 (r: .801), 5: 1.397 (r: .763), 6: .606 (r: .614), 7: .283 (r: .469)*

2.E.II.5. Prior classification probability: *14.6% (prior prob. + 25%: 18.2%)*

2.E.II.6. Remarks: *Box's M (test not possible: pre-Leiterband - 'singular', Leiterband - 'singular', Handessi - 'singular', Southern Sudan - -156.811, Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), no outliers detected, no variables failed tolerance test*

2.E.III. Results

2.E.III.1.a. Within-groups covariance matrix: *95.0%*

2.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *85.0%*

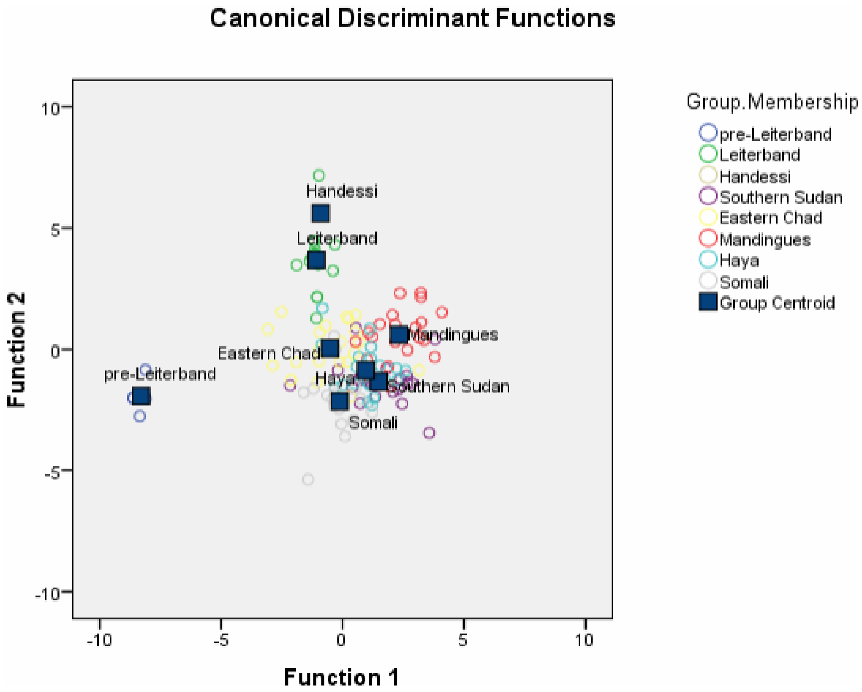
2.E.III.1.c. Separate-groups covariance matrix: *98.6%*

2.E.III.1.d. Closest centroids: *pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 8 Chad), Leiterband (highest group - 21 Leiterband; second highest group - 5 Chad, 16 Somalis), Handessi (highest group - 3 Handessi; second highest group - 3 Somalis)*

2.E.III.2.a. Misclassifications (leave-one-out): *Leiterband (1 Haya), Southern Sudan (3 Chad, 3 Mandinka, 1 Somali), Chad (1 Southern Sudan, 1 Haya), Mandinka (1 Southern Sudan, 1 Haya), Somalis (2 Southern Sudan, 1 Chad, 2 Haya), Haya (1 Leiterband, 2 Southern Sudan, 1 Mandinka)*

2.E.III.2.b. Misclassifications (separate-groups): *Somalis (1 Haya), Haya (1 Southern Sudan)*

2.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.E.IV. Additional results

2.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (97.1%, 77.9%), separate-groups covariance matrix (99.3%), Box's M (test not possible), variables entered (33)*

2.E.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (95.7%, 84.3%), separate-groups covariance matrix (98.6%), Box's M (test not possible), variables entered (25), F values for pairwise distances (pre-Leiterband - Leiterband: 18.508, pre-Leiterband - Handessi: 12.857, pre-Leiterband - Southern Sudan: 23.284, pre-Leiterband - Chad: 21.329, pre-Leiterband - Mandinka: 25.497, pre-Leiterband - Somalis: 17.565, pre-Leiterband - Haya: 19.872, Leiterband - Handessi: 5.185, Leiterband - Southern Sudan: 13.840, Leiterband - Chad: 9.510, Leiterband - Mandinka: 12.523, Leiterband - Somalis: 14.112, Leiterband - Haya: 12.092, Handessi - Southern Sudan: 10.646, Handessi - Chad: 9.329, Handessi - Mandinka: 9.174, Handessi - Somalis: 8.119, Handessi - Haya: 8.914, Southern Sudan - Chad: 8.239, Southern Sudan - Mandinka: 7.982, Southern Sudan - Somalis: 6.595, Southern Sudan - Haya: 7.697, Chad - Mandinka:*

	14.525, Chad - Somalis: 7.902, Chad - Haya: 9.296, Mandinka - Somalis: 11.619, Mandinka - Haya: 6.027, Somalis - Haya: 6.188)
2.E.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (93.6%, 84.3%), separate-groups covariance matrix (98.6%), Box's M (test not possible), variables entered (23), F values for pairwise distances (pre-Leiterband - Leiterband: 19.661, pre-Leiterband - Handessi: 13.629, pre-Leiterband - Southern Sudan: 23.869, pre-Leiterband - Chad: 20.464, pre-Leiterband - Mandinka: 25.753, pre-Leiterband - Somalis: 17.984, pre-Leiterband - Haya: 20.420, Leiterband - Handessi: 5.673, Leiterband - Southern Sudan: 14.908, Leiterband - Chad: 9.177, Leiterband - Mandinka: 13.073, Leiterband - Somalis: 15.443, Leiterband - Haya: 13.048, Handessi - Southern Sudan: 11.782, Handessi - Chad: 10.193, Handessi - Mandinka: 10.103, Handessi - Somalis: 8.986, Handessi - Haya: 9.772, Southern Sudan - Chad: 8.715, Southern Sudan - Mandinka: 8.708, Southern Sudan - Somalis: 7.263, Southern Sudan - Haya: 8.121, Chad - Mandinka: 16.000, Chad - Somalis: 8.167, Chad - Haya: 9.656, Mandinka - Somalis: 12.627, Mandinka - Haya: 6.302, Somalis - Haya: 6.574)*
2.E.IV.2.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 98.6%; separate-groups covariance matrix - 2.1% - error), Box's M (test not possible), variables entered (48), F values for pairwise distances (pre-Leiterband - Leiterband: 21.973, pre-Leiterband - Handessi: 11.038, pre-Leiterband - Southern Sudan: 20.704, pre-Leiterband - Chad: 18.508, pre-Leiterband - Mandinka: 20.969, pre-Leiterband - Somalis: 28.492, pre-Leiterband - Haya: 46.368, Leiterband - Handessi: 4.425, Leiterband - Southern Sudan: 29.473, Leiterband - Chad: 32.187, Leiterband - Mandinka: 42.444, Leiterband - Somalis: 34.423, Leiterband - Haya: 53.858, Handessi - Southern Sudan: 11.553, Handessi - Chad: 12.191, Handessi - Mandinka: 12.455, Handessi - Somalis: 11.104, Handessi - Haya: 18.823, Southern Sudan - Chad: 26.262, Southern Sudan - Mandinka: 22.911, Southern Sudan - Somalis: 16.910, Southern Sudan - Haya: 55.917, Chad - Mandinka: 17.868, Chad - Somalis: 23.547, Chad - Haya: 29.777, Mandinka - Somalis: 27.649, Mandinka - Haya: 43.582, Somalis - Haya: 37.658)*
2.E.IV.2.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 77.1%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (116)*

2.F.I. Summary	
2.F.I.1. Groups:	*Wadi Howar - Occupation phases*
2.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
2.F.I.3. Data:	*Non-metric cranial and dental traits*
2.F.I.4. Classification:	*pre-Leiterband (highest group - 100.0% pre-Leiterband; second highest group - 87.5% Southern Sudan)* *Leiterband (highest group - 100.0% Leiterband; second highest group - 81.0% Southern Sudan)* *Handessi (highest group - 100.0% Leiterband; second highest group - 100.0% Southern Sudan)*

2.F.II. Analysis overview	
2.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
2.F.II.2.a. Variables in matrix:	*59*
2.F.II.2.b. Variables entered:	*24*
2.F.II.3. Best predictors:	*Premolar mesial and distal accessory cusps UP1 (.497), Midline diastema (.428), Premolar mesial and distal accessory cusps UP2 (.372), Midline diastema (-.663 - Function 2), Canine mesial ridge UC (.516 - Function 3), Tuberculum dentale UI2 (-.467 - Function 4), Interruption groove UI2 (-.521 - Function 5), Distal accessory ridge UC (-.455 - Function 6), Symphyseal height (.623 - Function 7)*
2.F.II.4.a. Wilks' Lambda:	*1 through 7: .000 (Sig. .000), 2 through 7: .000 (Sig. .000), 3 through 7: .003 (Sig. .000), 4 through 7: .021 (Sig. .000), 5 through 7: .079 (Sig. .000), 6 through 7: .272 (Sig. .000), 7: .852 (Sig. .351)*

2.F.II.4.b. Eigenvalues: *1: 20.544 (r: .977), 2: 8.768 (r: .947), 3: 5.642 (r: .922), 4: 2.730 (r: .856), 5: 2.440 (r: .842), 6: 2.133 (r: .825), 7: .173 (r: .384)*

2.F.II.5. Prior classification probability: *14.6% (prior prob. + 25%: 18.2%)*

2.F.II.6. Remarks: *Box's M (test not possible: pre-Leiterband - 'singular', Leiterband - 'singular', Handessi - 'singular', Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), outliers - not removed: Handessi - Djabarona 96/120-3 (D^2: 36.517; critical value: 36.415 - p 0.95, df 24), Handessi - Djabarona 96/120-4 (D^2: 36.517; critical value: 36.415 - p 0.95, df 24), Handessi - Djabarona 96/120-5 (D^2: 36.517; critical value: 36.415 - p 0.95, df 24), no variables failed tolerance test*

2.F.III. Results

2.F.III.1.a. Within-groups covariance matrix: *98.6%*

2.F.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.0%*

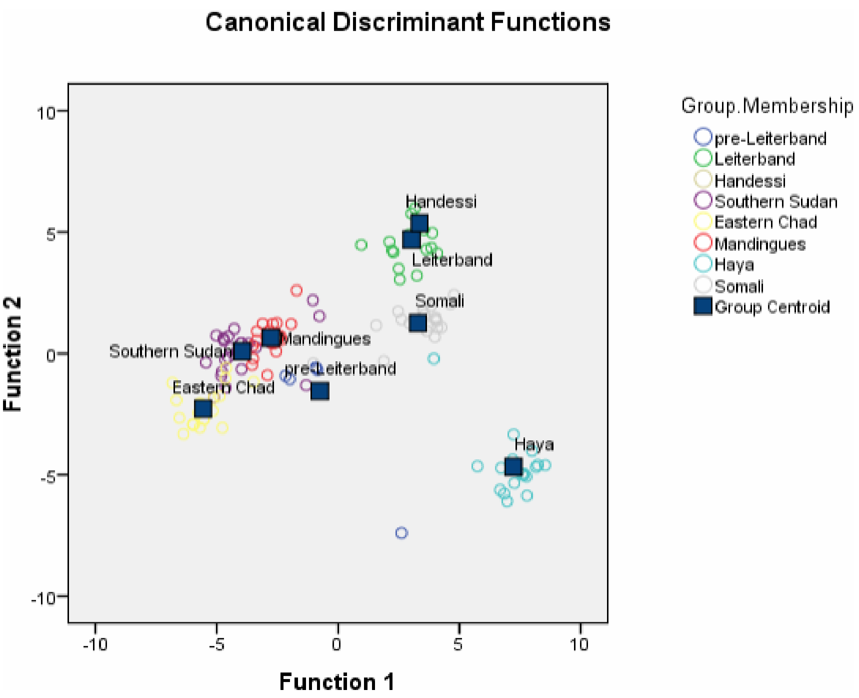
2.F.III.1.c. Separate-groups covariance matrix: *97.9%*

2.F.III.1.d. Closest centroids: *pre-Leiterband (highest group - 8 pre-Leiterband; second highest group - 7 Southern Sudan, 1 Haya), Leiterband (highest group - 21 Leiterband; second highest group - 17 Southern Sudan, 4 Somalis), Handessi (highest group - 3 Leiterband; second highest group - 3 Southern Sudan)*

2.F.III.2.a. Misclassifications (leave-one-out): *pre-Leiterband (1 Haya), Southern Sudan (1 Leiterband, 1 Chad), Chad (2 Southern Sudan), Somalis (1Mandinka), Haya (1 Somali)*

2.F.III.2.b. Misclassifications (separate-groups): *Handessi (3 Leiterband)*

2.F.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



2.F.IV. Additional results

2.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (98.6%, 87.1%), separate-groups covariance matrix (97.9%), Box's M (test not possible), variables entered (59)*

2.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (98.6%, 92.1%), separate-groups covariance matrix (97.1%), Box's M (test not possible), variables entered (24), F values for pairwise distances (pre-Leiterband - Leiterband: 17.328, pre-Leiterband - Handessi: 9.244, pre-Leiterband - Southern Sudan: 17.773, pre-Leiterband - Chad: 16.187, pre-Leiterband - Mandinka: 18.060, pre-Leiterband - Somalis: 19.350, pre-Leiterband - Haya: 32.632, Leiterband - Handessi: 1.076, Leiterband - Southern Sudan: 32.135, Leiterband - Chad: 48.544, Leiterband - Mandinka: 28.069, Leiterband - Somalis: 22.539, Leiterband - Haya: 43.652, Handessi - Southern Sudan: 10.370, Handessi - Chad: 13.931, Handessi - Mandinka:*

8.966, Handessi - Somalis: 7.860, Handessi - Haya: 13.654, Southern Sudan - Chad: 13.984, Southern Sudan - Mandinka: 13.704, Southern Sudan - Somalis: 36.164, Southern Sudan - Haya: 66.663, Chad - Mandinka: 21.169, Chad - Somalis: 42.564, Chad - Haya: 75.872, Mandinka - Somalis: 33.485, Mandinka - Haya: 56.136, Somalis - Haya: 37.271)*

2.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (97.9%, 91.4%), separate-groups covariance matrix (97.1%), Box's M (test not possible), variables entered (21), F values for pairwise distances (pre-Leiterband - Leiterband: 17.909, pre-Leiterband - Handessi: 9.005, pre-Leiterband - Southern Sudan: 17.663, pre-Leiterband - Chad: 15.615, pre-Leiterband - Mandinka: 17.353, pre-Leiterband - Somalis: 19.482, pre-Leiterband - Haya: 35.501, Leiterband - Handessi: 1.064, Leiterband - Southern Sudan: 36.527, Leiterband - Chad: 55.760, Leiterband - Mandinka: 32.579, Leiterband - Somalis: 23.749, Leiterband - Haya: 50.320, Handessi - Southern Sudan: 11.780, Handessi - Chad: 15.980, Handessi - Mandinka: 10.471, Handessi - Somalis: 8.226, Handessi - Haya: 15.530, Southern Sudan - Chad: 16.389, Southern Sudan - Mandinka: 15.154, Southern Sudan - Somalis: 40.302, Southern Sudan - Haya: 75.892, Chad - Mandinka: 24.036, Chad - Somalis: 48.209, Chad - Haya: 86.984, Mandinka - Somalis: 36.903, Mandinka - Haya: 64.842, Somalis - Haya: 42.663)*

2.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 99.3%, 91.4%; separate-groups covariance matrix - 97.1%), Box's M (test not possible), variables entered (33), F values for pairwise distances (pre-Leiterband - Leiterband: 33.057, pre-Leiterband - Handessi: 11.685, pre-Leiterband - Southern Sudan: 42.223, pre-Leiterband - Chad: 43.671, pre-Leiterband - Mandinka: 63.701, pre-Leiterband - Somalis: 30.761, pre-Leiterband - Haya: 53.600, Leiterband - Handessi: 1.661, Leiterband - Southern Sudan: 33.496, Leiterband - Chad: 53.129, Leiterband - Mandinka: 54.527, Leiterband - Somalis: 31.506, Leiterband - Haya: 42.733, Handessi - Southern Sudan: 9.860, Handessi - Chad: 14.002, Handessi - Mandinka: 14.856, Handessi - Somalis: 9.036, Handessi - Haya: 12.482, Southern Sudan - Chad: 17.459, Southern Sudan - Mandinka: 27.143, Southern Sudan - Somalis: 32.704, Southern Sudan - Haya: 51.019, Chad - Mandinka: 34.241, Chad - Somalis: 43.034, Chad - Haya: 72.493, Mandinka - Somalis: 50.971, Mandinka - Haya: 54.211, Somalis - Haya: 40.150)*

2.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 86.4%; separate-groups covariance matrix - 97.9%), Box's M (test not possible), variables entered (97)*

3. Wadi Howar

3.A.I. Summary
3.A.I.1. Group: *Wadi Howar*
3.A.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
3.A.I.3. Data: *Cranial and dental measurements*
3.A.I.4. Classification: *Highest group - 100.0% Wadi Howar; second highest group - 100.0% Malian Sahara*

3.A.II. Analysis overview
3.A.II.1. Method: *Mahalanobis distance, simultaneous entry*
3.A.II.2.a. Variables in matrix: *47*
3.A.II.2.b. Variables entered: *18*
3.A.II.3. Best predictors: *81. Crown length UI2 (-.371), 19a. Mastoid height (.232), 81. Crown length (-.172), 81. Crown length LI2 (.554 - Function 2), 8. Maximum cranial breadth (-.396 - Function 3)*
3.A.II.4.a. Wilks' Lambda: *1 through 3: .008 (Sig. .000), 2 through 3: .082 (Sig. .000), 3: .335 (Sig. .000)*
3.A.II.4.b. Eigenvalues: *1: 8.946 (r: .948), 2: 3.077 (r: .869), 3: 1.983 (r: .815)*
3.A.II.5. Prior classification probability: *25.8% (prior prob. + 25%: 32.3%)*
3.A.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Wadi Howar - -64.469, A-Group - -56.506, Jebel Sahaba/Tushka - -*

53.621, Malian Sahara - -49.332), no outliers detected, no variables failed tolerance test

3.A.III. Results

3.A.III.1.a. Within-groups covariance matrix: *100.0%*

3.A.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.9%*

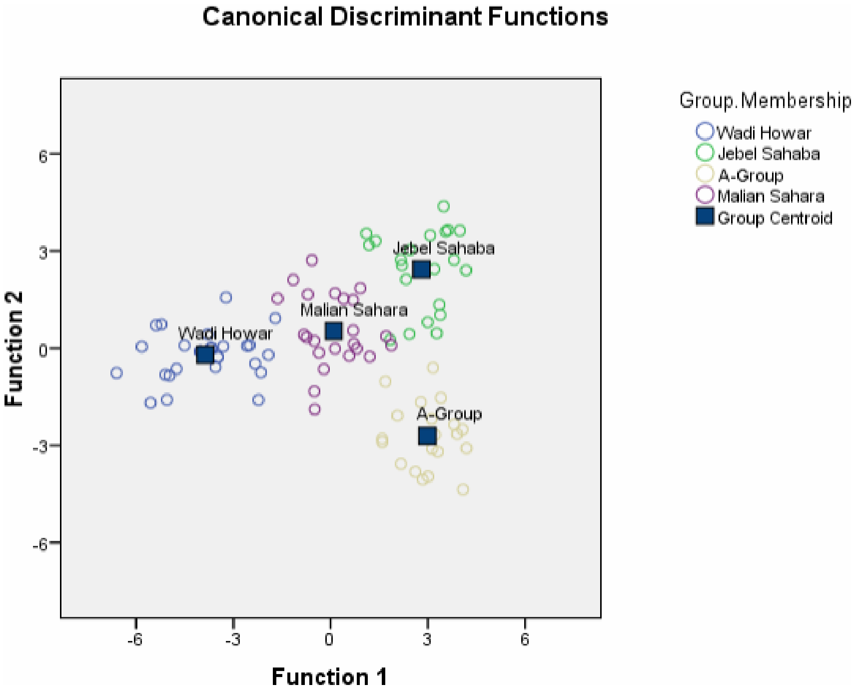
3.A.III.1.c. Separate-groups covariance matrix: *100.0%*

3.A.III.1.d. Closest centroids: *Highest group (32 Wadi Howar), second highest group (32 Malian Sahara)*

3.A.III.2.a. Misclassifications (leave-one-out): *A-Group (1 Malian Sahara), Jebel Sahaba/Tushka (1 Malian Sahara), Malian Sahara (1 Wadi Howar, 1 Jebel Sahaba/Tushka)*

3.A.III.2.b. Misclassifications (separate-groups): *No misclassifications*

3.A.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.A.IV. Additional results

3.A.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 88.7%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (47)*

3.A.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (100.0%, 91.8%), separate-groups covariance matrix (99.0%), Box's M (Sig. .000), variables entered (19), F values for pairwise distances (Wadi Howar/A-Group: 34.064, Wadi Howar/Jebel Sahaba/Tushka: 30.222, Wadi Howar/Malian Sahara: 17.079, A-Group/Jebel Sahaba/Tushka: 15.211, A-Group/Malian Sahara: 13.037, Jebel Sahaba/Tushka/Malian Sahara: 11.852)*

3.A.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (99.0%, 91.8%), separate-groups covariance matrix (99.0%), Box's M (Sig. .000), variables entered (16), F values for pairwise distances (Wadi Howar/A-Group: 31.411, Wadi Howar/Jebel Sahaba/Tushka: 37.112, Wadi Howar/Malian Sahara: 19.238, A-Group/Jebel Sahaba/Tushka: 16.497, A-Group/Malian Sahara: 12.624, Jebel Sahaba/Tushka/Malian Sahara: 13.788)*

3.A.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - 97.4%, 92.2%; separate-groups covariance matrix - 99.1%), Box's M (test not possible), variables entered (23), F values for pairwise distances (Wadi Howar/A-Group: 21.628, Wadi Howar/Jebel Sahaba/Tushka: 22.924, Wadi Howar/Malian Sahara: 14.370, Wadi Howar/"Sudanese Hotchpotch": 48.810, A-Group/Jebel Sahaba/Tushka: 12.998, A-Group/Malian Sahara: 11.491, A-Group/"Sudanese Hotchpotch": 22.199, Jebel Sahaba/Tushka/Malian Sahara: 11.818, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 31.626, Malian Sahara/"Sudanese Hotchpotch": 28.938)*

3.A.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - 100.0%, 89.6%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (48)*
3.A.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.4%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (42), F values for pairwise distances (Wadi Howar/A-Group: 29.453, Wadi Howar/Jebel Sahaba/Tushka: 36.254, Wadi Howar/Malian Sahara: 27.573, Wadi Howar/"Sudanese Hotchpotch": 63.446, A-Group/Jebel Sahaba/Tushka: 17.512, A-Group/Malian Sahara: 19.488, A-Group/"Sudanese Hotchpotch": 24.423, Jebel Sahaba/Tushka/Malian Sahara: 17.660, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 40.092, Malian Sahara/"Sudanese Hotchpotch": 36.013)*
3.A.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 51.3%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (118)*

3.B.I. Summary

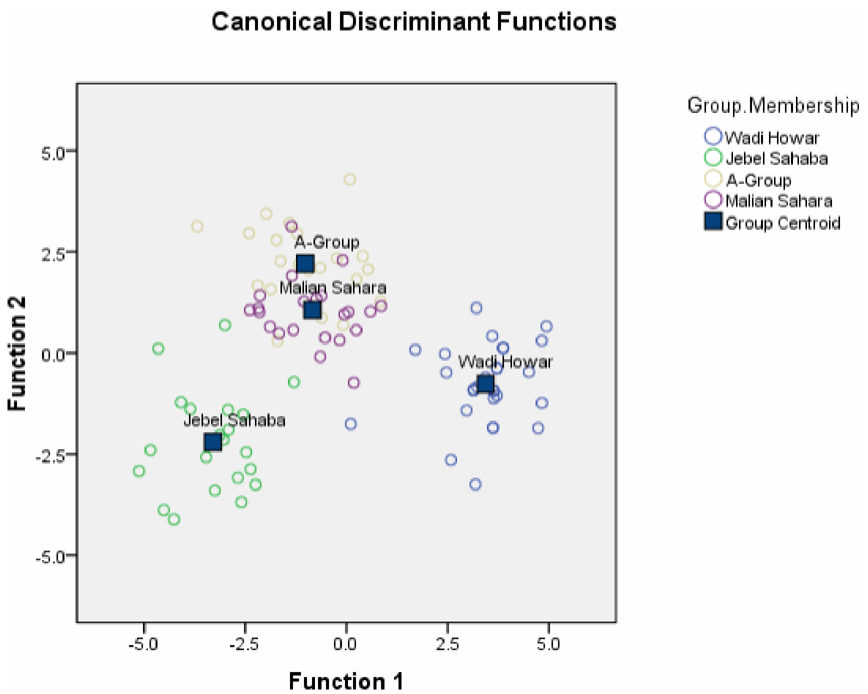
3.B.I.1. Group:	*Wadi Howar*
3.B.I.2. Comparative samples:	*A-Group, Jebel Sahaba/Tushka, Malian Sahara*
3.B.I.3. Data:	*Scaled cranial and dental measurements*
3.B.I.4. Classification:	*Highest group - 100.0% Wadi Howar; second highest group - 78.1% Malian Sahara*

3.B.II. Analysis overview

3.B.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.B.II.2.a. Variables in matrix:	*38*
3.B.II.2.b. Variables entered:	*19*
3.B.II.3. Best predictors:	*71a. Minimum ramus width (-.235), 81(1). Crown width LC (-.223), 62(a)3. 3rd internal dental arch length (mx) (.214), 30. Bregma-Lambda chord (.331 - Function 2), 48(1). Nasospinale-Prosthion height (.388 - Function 3)*
3.B.II.4.a. Wilks' Lambda:	*1 through 3: .015 (Sig. .000), 2 through 3: .118 (Sig. .000), 3: .433 (Sig. .000)*
3.B.II.4.b. Eigenvalues:	*1: 6.951 (r: .935), 2: 2.676 (r: .853), 3: 1.311 (r: .753)*
3.B.II.5. Prior classification probability:	*25.8% (prior prob. + 25%: 32.3%)*
3.B.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Wadi Howar - -143.100, A-Group - -116.619, Jebel Sahaba/Tushka - -116.837, Malian Sahara - -110.016), no outliers detected, no variables failed tolerance test*

3.B.III. Results

3.B.III.1.a. Within-groups covariance matrix:	*97.9%*
3.B.III.1.b. Within-groups covariance matrix (Leave-one-out):	*91.8%*
3.B.III.1.c. Separate-groups covariance matrix:	*99.0%*
3.B.III.1.d. Closest centroids:	*Highest group (32 Wadi Howar), second highest group (25 Malian Sahara, 6 A-Group, 1 Jebel Sahaba/Tushka)*
3.B.III.2.a. Misclassifications (leave-one-out):	*Wadi Howar (1 Jebel Sahaba/Tushka, 1 Malian Sahara), A-Group (1 Wadi Howar, 2 Malian Sahara), Jebel Sahaba/Tushka (1 A-Group, 1 Malian Sahara), Malian Sahara (1 A-Group)*
3.B.III.2.b. Misclassifications (separate-groups):	*Malian Sahara (1 A-Group)*
3.B.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.B.IV. Additional results

3.B.IV.1.a. Simultaneous: *Within-groups covariance matrix (97.9%, 85.6%), separate-groups covariance matrix (99.0%), Box's M (test not possible), variables entered (38)*

3.B.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (99.0%, 90.7%), separate-groups covariance matrix (97.9%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Wadi Howar/A-Group: 20.858, Wadi Howar/Jebel Sahaba/Tushka: 32.751, Wadi Howar/Malian Sahara: 22.004, A-Group/Jebel Sahaba/Tushka: 12.254, A-Group/Malian Sahara: 8.947, Jebel Sahaba/Tushka/Malian Sahara: 14.203)*

3.B.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (97.9%, 89.7%), separate-groups covariance matrix (97.9%), Box's M (Sig. .000), variables entered (18), F values for pairwise distances (Wadi Howar/A-Group: 18.825, Wadi Howar/Jebel Sahaba/Tushka: 31.158, Wadi Howar/Malian Sahara: 20.793, A-Group/Jebel Sahaba/Tushka: 12.901, A-Group/Malian Sahara: 8.944, Jebel Sahaba/Tushka/Malian Sahara: 14.165)*

3.B.IV.2.a. Alternative comparative prehistoric samples: *Mahalanobis distance (within-groups covariance matrix - 99.1%, 92.2%; separate-groups covariance matrix - 98.3%), Box's M (test not possible), variables entered (25), F values for pairwise distances (Wadi Howar/A-Group: 16.286, Wadi Howar/Jebel Sahaba/Tushka: 34.331, Wadi Howar/Malian Sahara: 20.680, Wadi Howar/"Sudanese Hotchpotch": 38.935, A-Group/Jebel Sahaba/Tushka: 14.388, A-Group/Malian Sahara: 7.845, A-Group/"Sudanese Hotchpotch": 20.543, Jebel Sahaba/Tushka/Malian Sahara: 13.361, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 40.926, Malian Sahara/"Sudanese Hotchpotch": 25.838)*

3.B.IV.2.b. Alternative comparative prehistoric samples: *Simultaneous (within-groups covariance matrix - 100.0%, 89.6%; separate-groups covariance matrix - 99.1%), Box's M (test not possible), variables entered (44)*

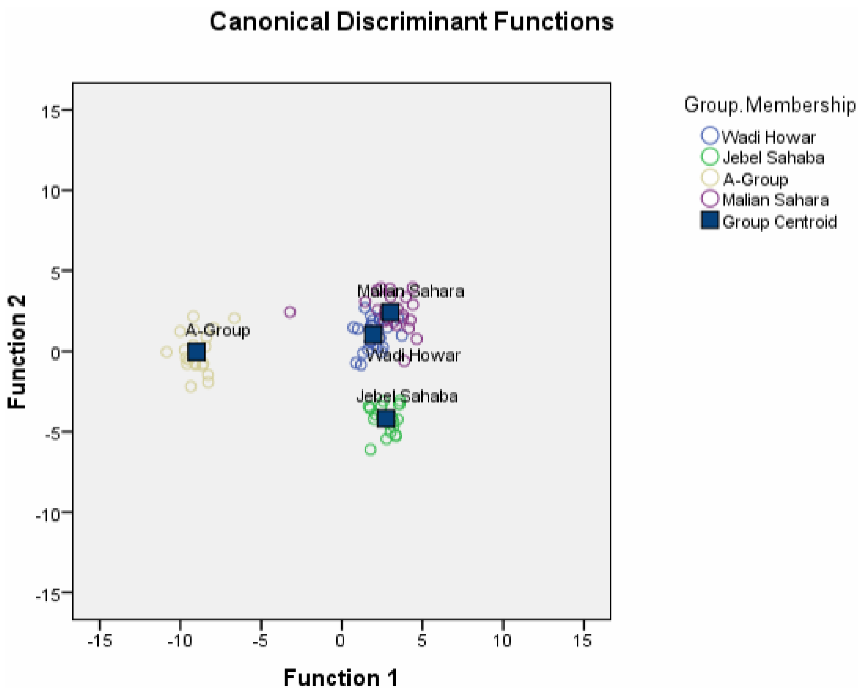
3.B.IV.3.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 99.1%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (40), F values for pairwise distances (Wadi Howar/A-Group: 21.870, Wadi Howar/Jebel Sahaba/Tushka: 32.157, Wadi Howar/Malian Sahara: 26.978, Wadi Howar/"Sudanese Hotchpotch": 48.576, A-Group/Jebel Sahaba/Tushka: 16.606, A-Group/Malian Sahara: 16.676, A-Group/"Sudanese Hotchpotch": 20.988, Jebel Sahaba/Tushka/Malian Sahara: 18.421, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 41.530, Malian Sahara/"Sudanese Hotchpotch": 39.668)*

3.B.IV.3.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 60.0%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (116)*

3.C.I. Summary
3.C.I.1. Group: *Wadi Howar*
3.C.I.2. Comparative samples: *A-Group, Jebel Sahaba/Tushka, Malian Sahara*
3.C.I.3. Data: *Non-metric cranial and dental traits*
3.C.I.4. Classification: *Highest group - 100.0% Wadi Howar; second highest group - 93.8% Malian Sahara*

3.C.II. Analysis overview
3.C.II.1. Method: *Mahalanobis distance, simultaneous entry*
3.C.II.2.a. Variables in matrix: *56*
3.C.II.2.b. Variables entered: *19*
3.C.II.3. Best predictors: *Distal accessory ridge UC (.597), Sella nasi (main) (-.173), Shovel UI1 (.166), Tuberculum dentale (.478 - Function 2), Protostylid LM1 (-.385)*
3.C.II.4.a. Wilks' Lambda: *1 through 3: .001 (Sig. .000), 2 through 3: .031 (Sig. .000), 3: .212 (Sig. .000)*
3.C.II.4.b. Eigenvalues: *1: 23.522 (r: .979), 2: 5.772 (r: .923), 3: 3.717 (r: .888)*
3.C.II.5. Prior classification probability: *25.8% (prior prob. + 25%: 32.3%)*
3.C.II.6. Remarks: *Box's M (test not possible: Wadi Howar - 'singular', A-Group - 'singular', Jebel Sahaba/Tushka - 'singular', Malian Sahara - 'singular'), no outliers detected, no variables failed tolerance test*

3.C.III. Results
3.C.III.1.a. Within-groups covariance matrix: *100.0%*
3.C.III.1.b. Within-groups covariance matrix (Leave-one-out): *95.9%*
3.C.III.1.c. Separate-groups covariance matrix: *100.0%*
3.C.III.1.d. Closest centroids: *Highest group (32 Wadi Howar), second highest group (30 Malian Sahara, 2 Jebel Sahaba/Tushka)*
3.C.III.2.a. Misclassifications (leave-one-out): *Wadi Howar (1 Malian Sahara), Malian Sahara (1 Wadi Howar, 1 A-Group, 1 Jebel Sahaba/Tushka)*
3.C.III.2.b. Misclassifications (separate-groups): *No misclassifications*
3.C.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.C.IV. Additional results
3.C.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 85.6%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (56)*
3.C.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (100.0%, 92.8%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (27), F values for pairwise distances (Wadi Howar/A-Group: 60.234, Wadi Howar/Jebel Sahaba/Tushka: 17.776, Wadi*

	Howar/Malian Sahara: 21.912, A-Group/Jebel Sahaba/Tushka: 61.926, A-Group/Malian Sahara: 48.134, Jebel Sahaba/Tushka/Malian Sahara: 28.586)
3.C.IV.1.c. Wilk's Lambda:	*Within-groups covariance matrix (99.0%, 94.8%), separate-groups covariance matrix (99.0%), Box's M (test not possible), variables entered (15), F values for pairwise distances (Wadi Howar/A-Group: 87.272, Wadi Howar/Jebel Sahaba/Tushka: 21.538, Wadi Howar/Malian Sahara: 18.938, A-Group/Jebel Sahaba/Tushka: 83.878, A-Group/Malian Sahara: 91.259, Jebel Sahaba/Tushka/Malian Sahara: 23.386)*
3.C.IV.2.a. Alternative comparative prehistoric samples:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 96.5%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (30), F values for pairwise distances (Wadi Howar/A-Group: 61.741, Wadi Howar/Jebel Sahaba/Tushka: 17.614, Wadi Howar/Malian Sahara: 18.521, Wadi Howar/"Sudanese Hotchpotch": 16.290, A-Group/Jebel Sahaba/Tushka: 69.610, A-Group/Malian Sahara: 57.653, A-Group/"Sudanese Hotchpotch": 58.242, Jebel Sahaba/Tushka/Malian Sahara: 22.560, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 13.399, Malian Sahara/"Sudanese Hotchpotch": 20.456)*
3.C.IV.2.b. Alternative comparative prehistoric samples:	*Simultaneous (within-groups covariance matrix - 100.0%, 88.7%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (56)*
3.C.IV.3.a. Raw matrix:	*Mahalanobis distance (within-groups covariance matrix - 100.0%, 98.3%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (34), F values for pairwise distances (Wadi Howar/A-Group: 81.954, Wadi Howar/Jebel Sahaba/Tushka: 48.140, Wadi Howar/Malian Sahara: 51.368, Wadi Howar/"Sudanese Hotchpotch": 29.875, A-Group/Jebel Sahaba/Tushka: 90.556, A-Group/Malian Sahara: 69.578, A-Group/"Sudanese Hotchpotch": 40.707, Jebel Sahaba/Tushka/Malian Sahara: 34.267, Jebel Sahaba/Tushka/"Sudanese Hotchpotch": 26.719, Malian Sahara/"Sudanese Hotchpotch": 25.623)*
3.C.IV.3.b. Raw matrix:	*Simultaneous (within-groups covariance matrix - 100.0%, 87.0%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (97)*

3.D.I. Summary

3.D.I.1. Group:	*Wadi Howar*
3.D.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.D.I.3. Data:	*Cranial and dental measurements*
3.D.I.4. Classification:	*Highest group - 100.0% Wadi Howar; second highest group - 56.3% Southern Sudan*

3.D.II. Analysis overview

3.D.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.D.II.2.a. Variables in matrix:	*31*
3.D.II.2.b. Variables entered:	*15*
3.D.II.3. Best predictors:	*80(4)c. 2nd premolar dental arch length (md) (.846), 80(4)a. Canine dental arch length (md) (.502), 81(1). Crown width UI2 (.404), 81. Crown length UI2 (.530 - Function 2), 81. Crown length LC (.481 - Function 3), 63(2)d. 4th internal dental arch breadth (md) (.549 - Function 4), 13a. Mastoid width (.485 - Function 5)*
3.D.II.4.a. Wilks' Lambda:	*1 through 5: .005 (Sig. .000), 2 through 5: .026 (Sig. .000), 3 through 5: .116 (Sig. .000), 4 through 5: .362 (Sig. .000), 5: .718 (Sig. .000)*
3.D.II.4.b. Eigenvalues:	*1: 4.705 (r: .908), 2: 3.414 (r: .879), 3: 2.119 (r: .824), 4: .984 (r: .704), 5: .394 (r: .531)*
3.D.II.5. Prior classification probability:	*17.2% (prior prob. + 25%: 21.5%)*
3.D.II.6. Remarks:	*Box's M (Sig. .000; Log determinants: Wadi Howar - -39.865, Southern Sudan - -23.493, Chad - -33.901, Mandinka - 'singular', Somalis - -27.103, Haya - -28.723), no outliers detected, no variables failed tolerance test*

3.D.III. Results

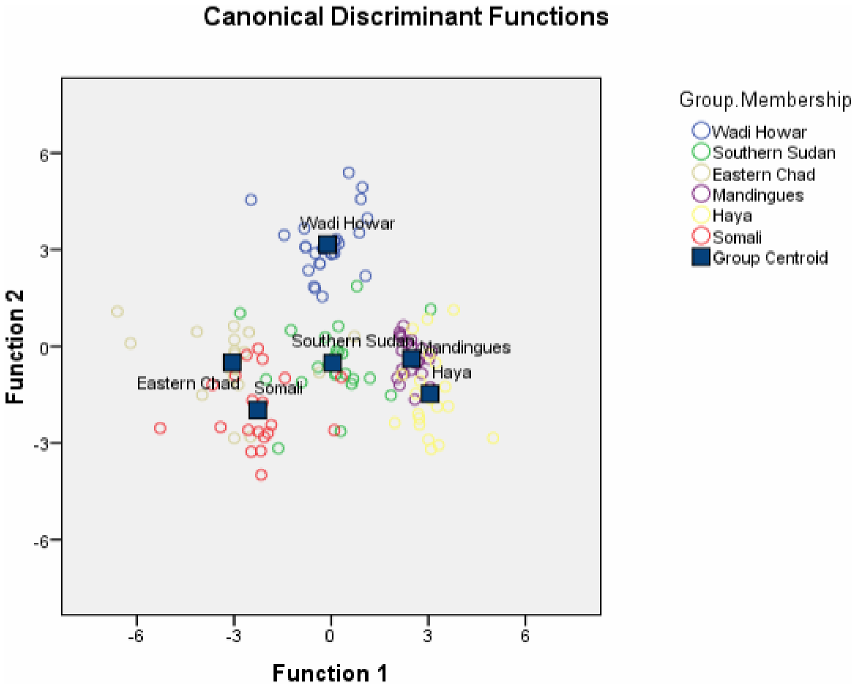
3.D.III.1.a. Within-groups covariance matrix:	*93.6%*
3.D.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.6%*
3.D.III.1.c. Separate-groups covariance matrix:	*99.3%*

3.D.III.1.d. Closest centroids: *Highest group (32 Wadi Howar), second highest group (18 Southern Sudan, 5 Chad, 7 Somalis, 2 Haya)*

3.D.III.2.a. Misclassifications (leave-one-out): *Southern Sudan (3 Chad, 4 Mandinka, 1 Haya), Chad (1 Southern Sudan, 2 Haya), Somalis (1 Southern Sudan, 2 Chad), Haya (1 Wadi Howar, 1 Southern Sudan)*

3.D.III.2.b. Misclassifications (separate-groups): *Somalis (1 Chad)*

3.D.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.D.IV. Additional results

3.D.IV.1.a. Simultaneous: *Within-groups covariance matrix (97.1%, 89.3%), separate-groups covariance matrix (98.6%), Box's M (test not possible), variables entered (31)*

3.D.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (95.7%, 88.6%), separate-groups covariance matrix (97.9%), Box's M (Sig. .000), variables entered (22), F values for pairwise distances (Wadi Howar/Southern Sudan: 12.164, Wadi Howar/Chad: 16.590, Wadi Howar/Mandinka: 20.034, Wadi Howar/Somalis: 18.989, Wadi Howar/Haya: 19.193, Southern Sudan/Chad: 7.568, Southern Sudan/Mandinka: 12.026, Southern Sudan/Somalis: 9.608, Southern Sudan/Haya: 10.628, Chad/Mandinka: 21.166, Chad/Somalis: 6.887, Chad/Haya: 21.294, Mandinka/Somalis: 14.757, Mandinka/Haya: 14.423, Somalis/Haya: 17.632)*

3.D.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (95.0%, 87.1%), separate-groups covariance matrix (98.6%), Box's M (Sig. .000), variables entered (15), F values for pairwise distances (Wadi Howar/Southern Sudan: 17.503, Wadi Howar/Chad: 22.485, Wadi Howar/Mandinka: 25.283, Wadi Howar/Somalis: 27.188, Wadi Howar/Haya: 28.332, Southern Sudan/Chad: 9.787, Southern Sudan/Mandinka: 11.384, Southern Sudan/Somalis: 11.755, Southern Sudan/Haya: 13.797, Chad/Mandinka: 27.429, Chad/Somalis: 7.859, Chad/Haya: 27.164, Mandinka/Somalis: 19.730, Mandinka/Haya: 16.670, Somalis/Haya: 24.399)*

3.D.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 97.9%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (46), F values for pairwise distances (Wadi Howar/Southern Sudan: 39.496, Wadi Howar/Chad: 59.460, Wadi Howar/Mandinka: 52.736, Wadi Howar/Somalis: 40.489, Wadi Howar/Haya: 111.711, Southern Sudan/Chad: 22.232, Southern Sudan/Mandinka: 22.698, Southern Sudan/Somalis: 21.075, Southern Sudan/Haya: 59.632, Chad/Mandinka: 20.502, Chad/Somalis: 17.840, Chad/Haya: 35.393,* *Mandinka/Somalis: 21.571, Mandinka/Haya: 41.662, Somalis/Haya: 52.336)*

3.D.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 77.9%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (118)*

3.E.I. Summary

3.E.I.1. Group: *Wadi Howar*

3.E.I.2. Comparative samples: *Southern Sudan, Chad, Mandinka, Somalis, Haya*

3.E.I.3. Data: *Scaled cranial and dental measurements*

3.E.I.4. Classification: *Highest group - 100.0% Wadi Howar; second highest group - 75.0% Chad*

3.E.II. Analysis overview

3.E.II.1. Method: *Mahalanobis distance, simultaneous entry*

3.E.II.2.a. Variables in matrix: *33*

3.E.II.2.b. Variables entered: *17*

3.E.II.3. Best predictors: *80(4)c. 2^{nd} premolar dental arch length (md) (.683), 80(1)c. 2^{nd} premolar dental arch breadth (md) (.372), 3. Glabello-Lambda length (.369), 80(4)c. 2^{nd} premolar dental arch length (md) (-.431 - Function 2), 80(1)c. 2^{nd} premolar dental arch breadth (md) (-.293 - Function 3), 54. Nasal breadth (.343 - Function 4), 3. Glabello-Lambda length (-.362 - Function 5)*

3.E.II.4.a. Wilks' Lambda: *1 through 5: .007 (Sig. .000), 2 through 5: .039 (Sig. .000), 3 through 5: .148 (Sig. .000), 4 through 5: .342 (Sig. .000), 5: .628 (Sig. .000)*

3.E.II.4.b. Eigenvalues: *1: 4.665 (r: .907), 2: 2.769 (r: .857), 3: 1.307 (r: .753), 4: .837 (r: .675), 5: .592 (r: .610)*

3.E.II.5. Prior classification probability: *17.2% (prior prob. + 25%: 21.5%)*

3.E.II.6. Remarks: *Box's M (Sig. .000; Log determinants: Wadi Howar - -154.933, Southern Sudan - -119.888, Chad - -127.204, Mandinka - -147.371, Somalis - -123.598, Haya - -126.626), no outliers detected, no variables failed tolerance test*

3.E.III. Results

3.E.III.1.a. Within-groups covariance matrix: *90.7%*

3.E.III.1.b. Within-groups covariance matrix (Leave-one-out): *85.7%*

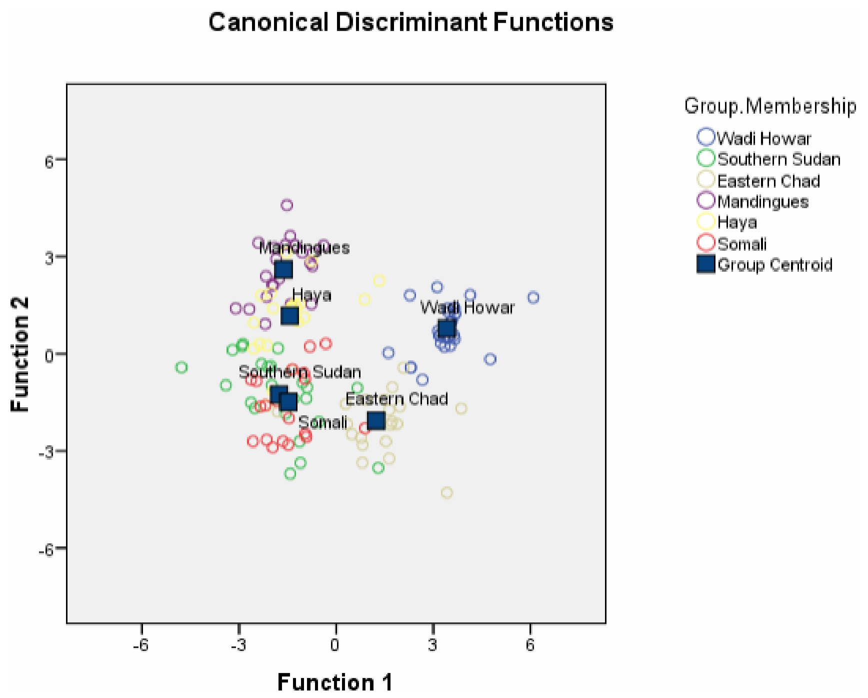
3.E.III.1.c. Separate-groups covariance matrix: *96.4%*

3.E.III.1.d. Closest centroids: *Highest group (32 Wadi Howar), second highest group (24 Chad, 5 Somalis, 3 Haya)*

3.E.III.2.a. Misclassifications (leave-one-out): *Wadi Howar (1 Haya), Southern Sudan (2 Chad, 1 Mandinka), Chad (2 Wadi Howar, 1 Southern Sudan, 1 Haya), Mandinka (1 Southern Sudan, 2 Haya), Somalis (1 Southern Sudan, 1 Chad, 2 Haya), Haya (2 Wadi Howar, 2 Southern Sudan, 1 Mandinka)*

3.E.III.2.b. Misclassifications (separate-groups): *Southern Sudan (1 Mandinka), Chad (1 Southern Sudan), Somalis (1 Southern Sudan), Haya (1 Southern Sudan, 1 Mandinka)*

3.E.III.3. All groups scatter plot: *Simultaneous entry, separate-groups covariance matrix*



3.E.IV. Additional results

3.E.IV.1.a. Simultaneous: *Within-groups covariance matrix (97.1%, 78.6%), separate-groups covariance matrix (98.6%), Box's M (test not possible), variables entered (33)*

3.E.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (91.4%, 83.6%), separate-groups covariance matrix (95.7%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Wadi Howar/Southern Sudan: 23.604, Wadi Howar/Chad: 12.185, Wadi Howar/Mandinka: 21.908, Wadi Howar/Somalis: 20.844, Wadi Howar/Haya: 19.188, Southern Sudan/Chad: 11.039, Southern Sudan/Mandinka: 10.701, Southern Sudan/Somalis: 7.522, Southern Sudan/Haya: 10.500, Chad/Mandinka: 20.089, Chad/Somalis: 9.066, Chad/Haya: 12.716, Mandinka/Somalis: 13.848, Mandinka/Haya: 7.591, Somalis/Haya: 8.304)*

3.E.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (91.4%, 83.6%), separate-groups covariance matrix (95.7%), Box's M (Sig. .000), variables entered (17), F values for pairwise distances (Wadi Howar/Southern Sudan: 23.604, Wadi Howar/Chad: 12.185, Wadi Howar/Mandinka: 21.908, Wadi Howar/Somalis: 20.844, Wadi Howar/Haya: 19.188, Southern Sudan/Chad: 11.039, Southern Sudan/Mandinka: 10.701, Southern Sudan/Somalis: 7.522, Southern Sudan/Haya: 10.500, Chad/Mandinka: 20.089, Chad/Somalis: 9.066, Chad/Haya: 12.716, Mandinka/Somalis: 13.848, Mandinka/Haya: 7.591, Somalis/Haya: 8.304)*

3.E.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 100.0%, 99.3%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (45), F values for pairwise distances (Wadi Howar/Southern Sudan: 33.675, Wadi Howar/Chad: 33.364, Wadi Howar/Mandinka: 48.167, Wadi Howar/Somalis: 46.704, Wadi Howar/Haya: 83.476, Southern Sudan/Chad: 33.755, Southern Sudan/Mandinka: 25.495, Southern Sudan/Somalis: 21.071, Southern Sudan/Haya: 64.785, Chad/Mandinka: 20.781, Chad/Somalis: 21.858, Chad/Haya: 29.471, Mandinka/Somalis: 25.720, Mandinka/Haya: 36.370, Somalis/Haya: 35.196)*

3.E.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 76.4%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (116)*

3.F.I. Summary

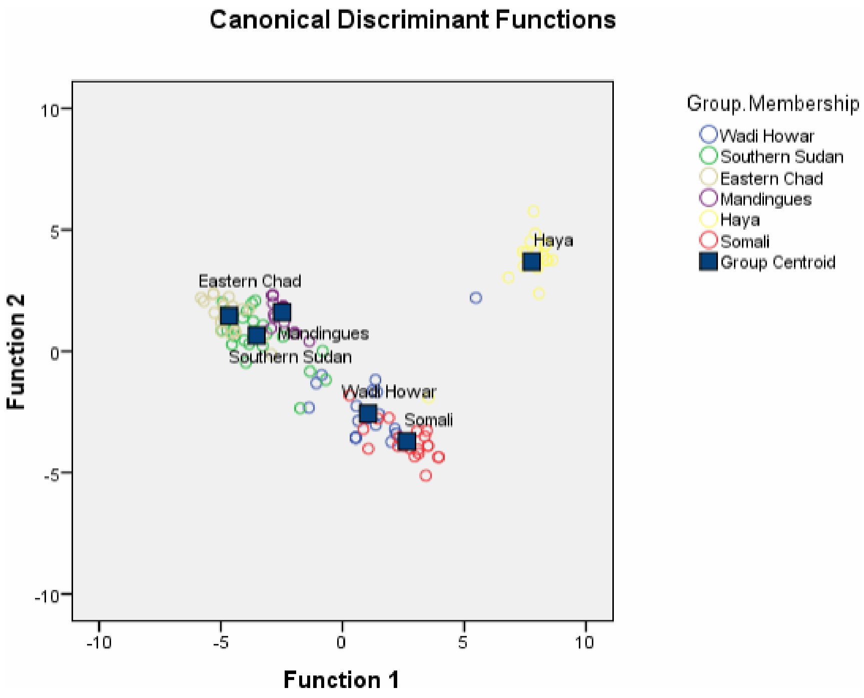
3.F.I.1. Group:	*Wadi Howar*
3.F.I.2. Comparative samples:	*Southern Sudan, Chad, Mandinka, Somalis, Haya*
3.F.I.3. Data:	*Non-metric cranial and dental traits*
3.F.I.4. Classification:	*Highest group - 100.0% Wadi Howar; second highest group - 93.8% Southern Sudan*

3.F.II. Analysis overview

3.F.II.1. Method:	*Mahalanobis distance, simultaneous entry*
3.F.II.2.a. Variables in matrix:	*59*
3.F.II.2.b. Variables entered:	*17*
3.F.II.3. Best predictors:	*Midline diastema (.541), Premolar mesial and distal accessory cusps UP1 (.489), Premolar mesial and distal accessory cusps UP2 (.385), Midline diastema (.647 - Function 2), Distal accessory ridge UC (.666 - Function 3), Tuberculum dentale UI2 (-.521 - Function 4), Interruption groove UI2 (.745 - Function 5)*
3.F.II.4.a. Wilks' Lambda:	*1 through 5: .000 (Sig. .000), 2 through 5: .003 (Sig. .000), 3 through 5: .020 (Sig. .000), 4 through 5: .109 (Sig. .000), 5: .411 (Sig. .000)*
3.F.II.4.b. Eigenvalues:	*1: 17.142 (r: .972), 2: 6.512 (r: .931), 3: 4.536 (r: .905), 4: 2.785 (r: .858), 5: 1.433 (r: .767)*
3.F.II.5. Prior classification probability:	*17.2% (prior prob. + 25%: 21.5%)*
3.F.II.6. Remarks:	*Box's M (test not possible: Wadi Howar - 'singular', Southern Sudan - 'singular', Chad - 'singular', Mandinka - 'singular', Somalis - 'singular', Haya - 'singular'), outliers - not removed: Wadi Howar - 02/1-3 (due to presence of midline diastema - D^2: 28.594; critical value: 27.587 - p 0.95, df 17) - analysis without 02/1-3 (within-groups covariance matrix: 96.4%, 89.6%, separate-groups covariance matrix: 98.6%; highest group: 100.0% Wadi Howar, second highest group: 100.0% Southern Sudan), no variables failed tolerance test*

3.F.III. Results

3.F.III.1.a. Within-groups covariance matrix:	*96.4%*
3.F.III.1.b. Within-groups covariance matrix (Leave-one-out):	*88.6%*
3.F.III.1.c. Separate-groups covariance matrix:	*99.3%*
3.F.III.1.d. Closest centroids:	*Highest group (32 Wadi Howar), second highest group (30 Southern Sudan, 1 Somali, 1 Haya)*
3.F.III.2.a. Misclassifications (leave-one-out):	*Wadi Howar (1 Southern Sudan, 2 Mandinka, 1 Haya), Southern Sudan (2 Wadi Howar, 3 Chad, 1 Somali), Chad (2 Southern Sudan, 1 Mandinka), Mandinka (1 Chad), Somalis (1 Wadi Howar), Haya (1 Somali)*
3.F.III.2.b. Misclassifications (separate-groups):	*Chad (1 Southern Sudan)*
3.F.III.3. All groups scatter plot:	*Simultaneous entry, separate-groups covariance matrix*



3.F.IV. Additional results

3.F.IV.1.a. Simultaneous: *Within-groups covariance matrix (100.0%, 89.3%), separate-groups covariance matrix (100.0%), Box's M (test not possible), variables entered (59)*

3.F.IV.1.b. Mahalanobis distance: *Within-groups covariance matrix (97.9%, 90.7%), separate-groups covariance matrix (99.3%), Box's M (test not possible), variables entered (25), F values for pairwise distances (Wadi Howar/Southern Sudan: 32.617, Wadi Howar/Chad: 38.778, Wadi Howar/Mandinka: 31.455, Wadi Howar/Somalis: 23.747, Wadi Howar/Haya: 52.998, Southern Sudan/Chad: 10.971, Southern Sudan/Mandinka: 14.492, Southern Sudan/Somalis: 33.613, Southern Sudan/Haya: 66.852, Chad/Mandinka: 18.533, Chad/Somalis: 37.197, Chad/Haya: 72.237, Mandinka/Somalis: 35.422, Mandinka/Haya: 57.121, Somalis/Haya: 38.749)*

3.F.IV.1.c. Wilk's Lambda: *Within-groups covariance matrix (97.9%, 90.0%), separate-groups covariance matrix (99.3%), Box's M (test not possible), variables entered (23), F values for pairwise distances (Wadi Howar/Southern Sudan: 36.328, Wadi Howar/Chad: 42.969, Wadi Howar/Mandinka: 33.028, Wadi Howar/Somalis: 26.461, Wadi Howar/Haya: 53.679, Southern Sudan/Chad: 11.388, Southern Sudan/Mandinka: 16.574, Southern Sudan/Somalis: 33.918, Southern Sudan/Haya: 69.347, Chad/Mandinka: 19.786, Chad/Somalis: 37.259, Chad/Haya: 74.759, Mandinka/Somalis: 36.140, Mandinka/Haya: 60.058, Somalis/Haya: 40.601)*

3.F.IV.2.a. Raw matrix: *Mahalanobis distance (within-groups covariance matrix - 99.3%, 93.6%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (29), F values for pairwise distances (Wadi Howar/Southern Sudan: 45.804, Wadi Howar/Chad: 58.467, Wadi Howar/Mandinka: 74.343, Wadi Howar/Somalis: 36.065, Wadi Howar/Haya: 62.958, Southern Sudan/Chad: 17.890, Southern Sudan/Mandinka: 30.046, Southern Sudan/Somalis: 33.879, Southern Sudan/Haya: 54.077, Chad/Mandinka: 34.112, Chad/Somalis: 44.385, Chad/Haya: 70.054, Mandinka/Somalis: 48.385, Mandinka/Haya: 56.555, Somalis/Haya: 40.733)*

3.F.IV.2.b. Raw matrix: *Simultaneous (within-groups covariance matrix - 100.0%, 87.9%; separate-groups covariance matrix - 100.0%), Box's M (test not possible), variables entered (97)*

Appendix XXV.A.2. Results

Appendix XXV.A.2.a. Classifications

Appendix XXV.A.2.a.1. Classification frequencies

Appendix XXV.A.2.a.1.a. Wadi Howar individuals

1. Individual classification frequencies by analysis type (for the whole Wadi Howar sample)

1.a. Overall

Prehistoric comparative samples:

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	8	1
Malian Sahara	20	15
All	28	16

Modern comparative samples:

	All individuals	Reliable individuals
Southern Sudan	12	9
Chad	10	7
Mandinka	0	0
Somalis	0	0
Haya	6	0
All	28	16

1.b. Classification frequencies by data type

1.b.1. Metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	1	0
Jebel Sahaba/Tushka	9	1
Malian Sahara	17	15
All	27	16

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	12	8
Chad	8	8
Mandinka	0	0
Somalis	1	0
Haya	4	0
All	25	16

1.b.2. Scaled metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	3	0
Jebel Sahaba/Tushka	5	3
Malian Sahara	18	13
All	26	16

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	8	5
Chad	11	8
Mandinka	2	0
Somalis	0	0
Haya	3	0
All	24	13

1.b.3. Non-metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	2	1
Jebel Sahaba/Tushka	12	6
Malian Sahara	14	10
All	28	17

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	11	10
Chad	5	2
Mandinka	6	3
Somalis	1	1
Haya	5	1
All	28	17

2. Individual classification frequencies by group

2.a. Wadi Howar

Prehistoric comparative samples:

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	8	1
Malian Sahara	20	15
All	28	16

Modern comparative samples:

	All individuals	Reliable individuals
Southern Sudan	12	9
Chad	10	7
Mandinka	0	0
Somalis	0	0
Haya	6	0
All	28	16

2.b. Occupation phases

2.b.1. pre-Leiterband

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	1	0
Malian Sahara	6	4
All	7	4

	All individuals	Reliable individuals
Southern Sudan	3	2
Chad	3	2
Mandinka	0	0
Somalis	0	0
Haya	1	0
All	7	4

2.b.2. Leiterband

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	6	1
Malian Sahara	13	11
All	19	12

	All individuals	Reliable individuals
Southern Sudan	9	7
Chad	7	5
Mandinka	0	0
Somalis	0	0
Haya	3	0
All	19	12

2.b.3. Handessi

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	1	0
Malian Sahara	1	0
All	2	0

	All individuals	Reliable individuals
Southern Sudan	0	0
Chad	0	0
Mandinka	0	0
Somalis	0	0
Haya	2	0
All	2	0

2.c. Sites

2.c.1. Abu Tabari 02/1

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	0	0
Malian Sahara	5	3
All	5	3

	All individuals	Reliable individuals
Southern Sudan	2	1
Chad	2	2
Mandinka	0	0
Somalis	0	0
Haya	1	0
All	5	3

2.c.2. Abu Tabari 02/28

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	3	1
Malian Sahara	10	9
All	13	10

	All individuals	Reliable individuals
Southern Sudan	7	6
Chad	5	4
Mandinka	0	0
Somalis	0	0
Haya	1	0
All	13	10

2.c.3. Djabarona 96/120

	All individuals	Reliable individuals
A-Group	0	0
Jebel Sahaba/Tushka	1	0
Malian Sahara	1	0
All	2	0

	All individuals	Reliable individuals
Southern Sudan	0	0
Chad	0	0
Mandinka	0	0
Somalis	0	0
Haya	2	0
All	2	0

3. Analysis by analysis classification frequencies by group

3.a. Wadi Howar

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	6	1
Jebel Sahaba/Tushka	26	10
Malian Sahara	49	38
All	81	49

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	31	23
Chad	24	18
Mandinka	8	3
Somalis	2	1
Haya	12	1
All	77	46

3.b. Occupation phases

3.b.1. pre-Leiterband

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	1	0
Jebel Sahaba/Tushka	6	1
Malian Sahara	14	11
All	21	12

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	8	5
Chad	8	6
Mandinka	2	1
Somalis	0	0
Haya	2	0
All	20	12

3.b.2. Leiterband

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	3	1
Jebel Sahaba/Tushka	18	9
Malian Sahara	33	27
All	54	37

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	23	18
Chad	16	12
Mandinka	5	2
Somalis	1	1
Haya	8	1
All	53	34

3.b.3. Handessi

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	2	0
Jebel Sahaba/Tushka	2	0
Malian Sahara	2	0
All	6	0

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	0	0
Chad	0	0
Mandinka	1	0
Somalis	1	0
Haya	2	0
All	4	0

3.c. Sites

3.c.1. Abu Tabari 02/1

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	0	0
Jebel Sahaba/Tushka	4	1
Malian Sahara	11	8
All	15	9

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	4	3
Chad	7	6
Mandinka	1	0
Somalis	0	0
Haya	2	0
All	14	9

3.c.2. Abu Tabari 02/28

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	3	1
Jebel Sahaba/Tushka	12	8
Malian Sahara	23	21
All	38	30

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	18	14
Chad	12	10
Mandinka	2	2
Somalis	1	1
Haya	4	1
All	37	28

3.c.3. Djabarona 96/120

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	2	0
Jebel Sahaba/Tushka	2	0
Malian Sahara	2	0
All	6	0

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	0	0
Chad	0	0
Mandinka	1	0
Somalis	1	0
Haya	2	0
All	4	0

Appendix XXV.A.2.a.1.b. Wadi Howar mean individuals

1. Individual classification frequencies by analysis type

1.a. Overall

Prehistoric comparative samples:

	All mean individuals	Reliable mean individuals
A-Group	0	0
Jebel Sahaba/Tushka	0	0
Malian Sahara	7	5
All	7	5

Modern comparative samples:

	All mean individuals	Reliable mean individuals
Southern Sudan	4	4
Chad	1	1
Mandinka	0	0
Somalis	0	0
Haya	2	0
All	7	5

1.b. Classification frequencies by data type

1.b.1. Metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	2	0
Jebel Sahaba/Tushka	0	0
Malian Sahara	5	5
All	7	5

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	4	4
Chad	1	1
Mandinka	0	0
Somalis	2	0
Haya	0	0
All	7	5

1.b.2. Scaled metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	0	0
Jebel Sahaba/Tushka	0	0
Malian Sahara	7	5
All	7	5

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	0	0
Chad	5	5
Mandinka	0	0
Somalis	0	0
Haya	2	0
All	7	5

1.b.3. Non-metric data

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	0	0
Jebel Sahaba/Tushka	1	1
Malian Sahara	6	4
All	7	5

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	5	5
Chad	0	0
Mandinka	0	0
Somalis	0	0
Haya	2	0
All	7	5

2. Analysis by analysis classification frequencies

Prehistoric comparative samples:

	All analyses	Reliable analyses
A-Group	2	0
Jebel Sahaba/Tushka	1	1
Malian Sahara	18	14
All	21	15

Modern comparative samples:

	All analyses	Reliable analyses
Southern Sudan	9	9
Chad	6	6
Mandinka	0	0
Somalis	2	0
Haya	4	0
All	21	15

Appendix XXV.A.2.a.2. Analysis by analysis overviews

Appendix XXV.A.2.a.2.a. Wadi Howar individuals

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Prehistoric series - Mixed data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data	Modern series - Mixed data
Abu Tabari 95/2-3	-	-	[**Jebel Sahaba/Tushka** 41.5% (D^2: 3.935), Malian Sahara (D^2: 6.095)]	-	-	-	[**Haya** 29.6% (D^2: 3.288), Somalis (D^2: 3.616)]	-
Abu Tabari 02/1-2	**Malian Sahara** 98.5% (D^2: 5.143), Jebel Sahaba/Tushka (D^2: 53.313)	**Malian Sahara** 98.5% (D^2: .290), A-Group (D^2: 16.641)	**Malian Sahara** 93.8% (D^2: 2.252), A-Group (D^2: 12.432)	-	**Chad** 98.1% (D^2: 28.60), Southern Sudan (D^2: 41.336)	**Chad** 97.2% (D^2: 6.633), Southern Sudan (D^2: 27.795)	**Chad** 86.1% (D^2: 5.122), Mandinka (D^2: 12.631)	-
Abu Tabari 02/1-3	**Malian Sahara** 100.0% (D^2: 4.250), Jebel Sahaba/Tushka (D^2: 9.087)	**Jebel Sahaba/Tushka** 95.4% (D^2: 2.926), Malian Sahara (D^2: 10.265)	**Malian Sahara** 89.2% (D^2: 5.911), Jebel Sahaba/Tushka (D^2: 5.951)	-	**Chad** 96.3% (D^2: 6.946), Somalis (D^2: 7.771)	**Chad** 90.7% (D^2: 5.101), Haya (D^2: 11.264)	**Chad** 84.3% (D^2: 8.894), Haya (D^2: 15.498)	-
Abu Tabari 02/1-5	(**Jebel Sahaba/Tushka** 65.0% (D^2: 5.561), Malian Sahara (D^2: 9.058))	(**Jebel Sahaba/Tushka** 58.5% (D^2: .232), A-Group (D^2: .835))	(**Malian Sahara** 70.8% (D^2: .993), A-Group (D^2: 2.664))	(**Malian Sahara** 92.3% (D^2: .398), Jebel Sahaba/Tushka (D^2: 11.471))	[**Haya** 48.5% (D^2: 2.474), Southern Sudan (D^2: 7.588)]	-	(**Haya** 62.6% (D^2: 1.261), Somalis (D^2: 3.290))	(**Haya** 78.7% (D^2: 5.592), Southern Sudan (D^2: 10.085))
Abu Tabari 02/1-6	-	-	-	-	-	-	-	-
Abu Tabari 02/1-7	(**Jebel Sahaba/Tushka** 61.5% (D^2: 1.431), Malian Sahara (D^2: 1.663))	[**Malian Sahara** 47.7% (D^2: 1.699), A-Group (D^2: 3.895)]	(**Malian Sahara** 64.6% (D^2: 1.275), Jebel Sahaba/Tushka (D^2: 2.239))	(**Malian Sahara** 80.0% (D^2: 2.063), Jebel Sahaba/Tushka (D^2: 17.244))	(**Southern Sudan** 66.0% (D^2: 9.164), Haya (D^2: 19.784))	(**Chad** 62.9% (D^2: 7.299), Haya (D^2: 5.861))	(**Mandinka** 52.3% (D^2: 1.890), Chad (D^2: 5.062))	(**Southern Sudan** 74.1% (D^2: 4.255), Haya (D^2: 5.147))
Abu Tabari 02/1-8	**Malian Sahara** 93.8% (D^2: 3.167), A-Group (D^2: 20.951)	**Malian Sahara** 95.4% (D^2: 3.645), A-Group (D^2: 23.041)	**Malian Sahara** 96.9% (D^2: .850), A-Group (D^2: 13.732)	-	**Southern Sudan** 88.9% (D^2: 12.735), Chad (D^2: 61.712)	**Southern Sudan** 77.8% (D^2: 2.163), Mandinka (D^2: 6.662)	**Southern Sudan** 97.2% (D^2: 10.066), Somalis (D^2: 17.379)	-
Abu Tabari 02/28-2	**Malian Sahara** 96.9% (D^2: 12.664), Jebel Sahaba/Tushka (D^2: 20.155)	**Malian Sahara** 86.2% (D^2: .365), A-Group (D^2: 8.084)	**Jebel Sahaba/Tushka** 96.9% (D^2: 11.916), A-Group (D^2: 34.984)	-	**Southern Sudan** 94.3% (D^2: 42.848), Somalis (D^2: 153.322)	**Chad** 85.2% (D^2: 12.297), Mandinka (D^2: 12.333)	**Southern Sudan** 95.4% (D^2: 34.689), Somalis (D^2: 43.862)	-
Abu Tabari 02/28-3	**Malian Sahara** 96.9% (D^2: 2.357), Jebel Sahaba/Tushka (D^2: 6.879)	**Jebel Sahaba/Tushka** 96.9% (D^2: 1.886), A-Group (D^2: 6.631)	**Malian Sahara** 100.0% (D^2: .117), A-Group (D^2: 32.677)	-	**Chad** 89.8% (D^2: 22.152), Haya (D^2: 26.717)	**Chad** 77.8% (D^2: 6.990), Southern Sudan (D^2: 8.132)	**Mandinka** 94.4% (D^2: 7.431), Somalis (D^2: 18.315)	-
Abu Tabari 02/28-4	-	-	-	-	-	-	-	-
Abu Tabari 02/28-5	**Malian Sahara** 98.5% (D^2: .210), Jebel Sahaba/Tushka (D^2: 31.100)	**Malian Sahara** 100.0% (D^2: 5.580), Jebel Sahaba/Tushka (D^2: 17.541)	**Jebel Sahaba/Tushka** 96.9% (D^2: 3.140), A-Group (D^2: 15.775)	-	**Southern Sudan** 97.2% (D^2: 5.664), Chad (D^2: 15.812)	**Southern Sudan** 91.7% (D^2: 8.172), Haya (D^2: 11.514)	**Southern Sudan** 96.3% (D^2: 4.290), Somalis (D^2: 13.840)	-

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Prehistoric series - Mixed data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data	Modern series - Mixed data
Abu Tabari 02/28-7	***Malian Sahara*** *95.4% (D^2: 9.135), A-Group (D^2: 9.574)*	***Malian Sahara*** *90.8% (D^2: 12.520), A-Group (D^2: 15.275)*	***Jebel Sahaba/Tushka*** *95.4% (D^2: 7.121), Malian Sahara (D^2: 10.756)*	-	***Southern Sudan*** *87.0% (D^2: 4.927), Mandinka (D^2: 31.339)*	*(**Southern Sudan** 66.4% (D^2: 5.078), Somalis (D^2: 6.691))*[2]	***Southern Sudan*** *96.3% (D^2: 13.360), Chad (D^2: 38.228)*	-
Abu Tabari 02/28-8	***Malian Sahara*** *100.0% (D^2: 15.492), A-Group (D^2: 22.401)*	***Malian Sahara*** *93.8% (D^2: 8.287), A-Group (D^2: 15.503)*	***Malian Sahara*** *98.5% (D^2: 10.198), Jebel Sahaba/Tushka (D^2: 9.333)*	-	***Southern Sudan*** *87.0% (D^2: 9.132), Somalis (D^2: 16.916)*	***Southern Sudan*** *73.1% (D^2: 1.845), Chad (D^2: 6.514)*	***Southern Sudan*** *92.6% (D^2: 8.360), Somalis (D^2: 10.387)*	-
Abu Tabari 02/28-11	*(**Jebel Sahaba/Tushka** 73.8% (D^2: .015), Malian Sahara (D^2: 1.973))*	*[**Malian Sahara** 54.1% (D^2: .001), A-Group (D^2: .118)]*	*(**Jebel Sahaba/Tushka** 61.5% (D^2: 5.361), Malian Sahara (D^2: 5.684))*	*(**Jebel Sahaba/Tushka** 70.8% (D^2: 5.410), A-Group (D^2: 7.911))*	*[**Haya** 28.3% (D^2: 4.933), Chad (D^2: 7.798)]*	*[**Haya** 28.6% (D^2: 4.268), Chad (D^2: 5.585)]*	*[**Haya** 57.5% (D^2: 6.105), Southern Sudan (D^2: 11.769)]*	*(**Haya** 58.9% (D^2: 12.141), Southern Sudan (D^2: 22.198))*
Abu Tabari 02/28-13	*(**Malian Sahara** 66.1% (D^2: .000), Jebel Sahaba/Tushka (D^2: .046))*	-	*(**Jebel Sahaba/Tushka** 60.9% (D^2: .390), Malian Sahara (D^2: 3.097))*	*(**Jebel Sahaba/Tushka** 73.8% (D^2: .754), Malian Sahara (D^2: 1.780))*	-	-	*[**Southern Sudan** 42.6% (D^2: 3.100), Haya (D^2: 3.524)]*	*[**Haya** 64.8% (D^2: 6.847), Southern Sudan (D^2: 18.746)]*
Abu Tabari 02/28-14	***Malian Sahara*** *96.9% (D^2: 7.302), Jebel Sahaba/Tushka (D^2: 8.764)*	***Malian Sahara*** *96.9% (D^2: 5.900), A-Group (D^2: 19.251)*	***Malian Sahara*** *100.0% (D^2: 4.143), A-Group (D^2: 136.904)*	-	***Southern Sudan*** *91.7% (D^2: 66.666), Chad (D^2: 146.539)*	*(**Southern Sudan** 79.6% (D^2: 1.169), Somalis (D^2: 5.259))*[2]	***Southern Sudan*** *97.2% (D^2: 26.106), Somalis (D^2: 32.683)*	-
Abu Tabari 02/28-15	***Malian Sahara*** *100.0% (D^2: 2.034), A-Group (D^2: 12.972)*	***Malian Sahara*** *100.0% (D^2: 7.653), A-Group (D^2: 8.607)*	***Jebel Sahaba/Tushka*** *96.9% (D^2: 5.197), A-Group (D^2: 13.422)*	-	***Chad*** *99.1% (D^2: 1.941), Southern Sudan (D^2: 5.391)*	***Southern Sudan*** *89.8% (D^2: 1.143), Chad (D^2: 9.383)*	***Southern Sudan*** *100.0% (D^2: 5.204), Chad (D^2: 28.037)*	-
Abu Tabari 02/28-20	*(**Jebel Sahaba/Tushka** 86.2% (D^2: 10.520), Malian Sahara (D^2: 11.037))*	*(**A-Group** 75.8% (D^2: 2.570), Malian Sahara (D^2: 5.572))*	*(**A-Group** 73.8% (D^2: .451), Malian Sahara (D^2: 99.679))*	*(**Malian Sahara** 100.0% (D^2: 2.276), A-Group (D^2: 17.687))*	*[**Southern Sudan** 51.5% (D^2: 3.640), Mandinka (D^2: 4.424)]*	*[**Chad** 35.9% (D^2: .002), Southern Sudan (D^2: .380)]*	*(**Chad** 76.0% (D^2: 16.203), Southern Sudan (D^2: 79.258))*	*(**Chad** 82.4% (D^2: 14.110), Haya (D^2: 26.425))*
Abu Tabari 02/28-21	***Malian Sahara*** *100.0% (D^2: 4.490), A-Group (D^2: 39.364)*	***Malian Sahara*** *98.5% (D^2: 3.051), A-Group (D^2: 15.669)*	***Malian Sahara*** *98.5% (D^2: 17.449), A-Group (D^2: 39.088)*	-	***Chad*** *99.1% (D^2: 3.186), Somalis (D^2: 38.769)*	***Chad*** *96.3% (D^2: 6.212), Southern Sudan (D^2: 6.089)*	***Mandinka*** *94.4% (D^2: 7.064), Somalis (D^2: 7.790)*	-
Abu Tabari 02/28-22	***Malian Sahara*** *100.0% (D^2: 2.050), A-Group (D^2: 6.494)*	***Malian Sahara*** *100.0% (D^2: 1.729), Jebel Sahaba/Tushka (D^2: 9.994)*	***A-Group*** *98.5% (D^2: .955), Jebel Sahaba/Tushka (D^2: 41.468)*	-	***Chad*** *96.3% (D^2: 12.848), Somalis (D^2: 41.012)*	***Chad*** *94.4% (D^2: 17.361), Southern Sudan (D^2: 34.858)*	***Haya*** *91.7% (D^2: 3.409), Somalis (D^2: 11.305)*	-
Abu Tabari 02/28-23	***Jebel Sahaba/Tushka*** *100.0% (D^2: 3.300), Malian Sahara (D^2: 14.097)*	***Jebel Sahaba/Tushka*** *98.5% (D^2: 4.706), Malian Sahara (D^2: 41.973)*	***Jebel Sahaba/Tushka*** *100.0% (D^2: 14.428), A-Group (D^2: 23.226)*	-	***Chad*** *94.4% (D^2: 1.070), Southern Sudan (D^2: 8.641)*	***Chad*** *92.6% (D^2: 5.414), Mandinka (D^2: 15.965)*	***Somalis*** *96.3% (D^2: 1.804), Haya (D^2: 49.763)*	-

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Prehistoric series - Mixed data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data	Modern series - Mixed data
Abu Tabari 03/31	-	-	-	-	-	-	-	-
Abu Tabari 03/34-1	**Malian Sahara** 98.5% (D^2: 5.450), A-Group (D^2: 18.870)	**Malian Sahara** 95.4% (D^2: 11.236), A-Group (D^2: 32.506)	**Malian Sahara** 100.0% (D^2: .226), A-Group (D^2: 220.968)	-	**Southern Sudan** 93.5% (D^2: 5.114), Chad (D^2: 12.987)	(**Haya** 77.8% (D^2: 6.437), Somalis (D^2: 4.650))	**Southern Sudan** 97.2% (D^2: 22.062), Somalis (D^2: 26.423)	-
Conical Hill 95/4	**Malian Sahara** 98.5% (D^2: 12.199), Jebel Sahaba/Tushka (D^2: 15.377)	**Malian Sahara** 98.5% (D^2: 3.193), Jebel Sahaba/Tushka (D^2: 5.703)	**Malian Sahara** 100.0% (D^2: 2.325), Jebel Sahaba/Tushka (D^2: 340.307)	-	**Southern Sudan** 99.1% (D^2: 133.357), Chad (D^2: 207.323)	**Southern Sudan** 88.9% (D^2: 14.128), Chad (D^2: 16.952)	**Mandinka** 98.1% (D^2: 2.775), Southern Sudan (D^2: 24.256)	-
Conical Hill 95/4-1	(**Jebel Sahaba/Tushka** 70.9% (D^2: .741), Malian Sahara (D^2: .122))	[**A-Group** 50.0% (D^2: 2.846), Malian Sahara (D^2: 4.157)]	[**Jebel Sahaba/Tushka** 49.2% (D^2: 1.048), A-Group (D^2: 9.048)]	(**Jebel Sahaba/Tushka** 64.6% (D^2: 5.596), Malian Sahara (D^2: 8.662))	[**Southern Sudan** 49.0% (D^2: 3.080), Haya (D^2: 6.941)]	[**Southern Sudan** 44.6% (D^2: .003), Mandinka (D^2: .477)]	[**Chad** 50.0% (D^2: .445), Southern Sudan (D^2: 9.334)]	(**Chad** 68.6% (D^2: 14.335), Southern Sudan (D^2: 26.215))
Conical Hill 02/3-4	(**Jebel Sahaba/Tushka** 80.0% (D^2: .866), A-Group (D^2: 2.167))	(**Jebel Sahaba/Tushka** 64.6% (D^2: 3.409), A-Group (D^2: 3.260))	**Jebel Sahaba/Tushka** 87.7% (D^2: 1.828), Malian Sahara (D^2: 2.184)	(**Jebel Sahaba/Tushka** 95.4% (D^2: 1.990), Malian Sahara (D^2: 3.294))	(**Southern Sudan** 66.7% (D^2: 2.300), Somalis (D^2: 2.664))	(**Mandinka** 60.2% (D^2: 8.956), Haya (D^2: 9.841))	**Southern Sudan** 81.5% (D^2: 2.795), Haya (D^2: 4.141)	(**Southern Sudan** 87.0% (D^2: 2.900), Somalis (D^2: 5.706))
Djabarona 96/1-1	**Malian Sahara** 100.0% (D^2: 36.285), A-Group (D^2: 59.060)	**Malian Sahara** 100.0% (D^2: 3.450), A-Group (D^2: 17.238)	**Malian Sahara** 100.0% (D^2: 5.727), Jebel Sahaba/Tushka (D^2: 18.686)	-	**Chad** 92.6% (D^2: 51.442), Southern Sudan (D^2: 126.891)	**Chad** 97.2% (D^2: 75.548), Southern Sudan (D^2: 87.027)	**Southern Sudan** 96.3% (D^2: 7.508), Somalis (D^2: 21.781)	-
Djabarona 96/1-2	(**Malian Sahara** 76.9% (D^2: 1.010), Jebel Sahaba/Tushka (D^2: 5.247))	[**Malian Sahara** 54.7% (D^2: .117), A-Group (D^2: .081)]	(**Malian Sahara** 60.0% (D^2: 1.339), Jebel Sahaba/Tushka (D^2: 1.159))	(**Malian Sahara** 81.5% (D^2: 1.940), Jebel Sahaba/Tushka (D^2: 3.055))	[**Haya** 50.0% (D^2: 7.594), Southern Sudan (D^2: 8.348)]	[**Mandinka** 35.6% (D^2: .852), Haya (D^2: 1.331)]	(**Mandinka** 64.8% (D^2: 4.370), Haya (D^2: 3.044))	(**Haya** 76.9% (D^2: 15.264), Somalis (D^2: 22.692))
Djabarona 96/4	(**Jebel Sahaba/Tushka** 69.8% (D^2: .013), Malian Sahara (D^2: .991))	[**Malian Sahara** 63.9% (D^2: 1.312), Jebel Sahaba/Tushka (D^2: 2.383)]	[**Jebel Sahaba/Tushka** 67.7% (D^2: 2.566), A-Group (D^2: 12.163)]	(**Jebel Sahaba/Tushka** 80.0% (D^2: .416), A-Group (D^2: 13.654))	[**Haya** 52.9% (D^2: 1.200), Chad (D^2: 1.335)]	[**Chad** 40.2% (D^2: 1.124), Haya (D^2: 1.161)]	[**Chad** 42.6% (D^2: 2.993), Haya (D^2: 5.982)]	(**Chad** 63.9% (D^2: 1.115), Haya (D^2: 2.603))
Djabarona 96/120-3	-	-	-	-	-	-	-	-
Djabarona 96/120-4	(**Jebel Sahaba/Tushka** 68.3% (D^2: .001), Malian Sahara (D^2: .399))	[**A-Group** 51.7% (D^2: 6.606), Jebel Sahaba/Tushka (D^2: 8.185)]	[**Jebel Sahaba/Tushka** 52.3% (D^2: 1.421), Malian Sahara (D^2: 2.975)]	(**Jebel Sahaba/Tushka** 59.0% (D^2: .052), Malian Sahara (D^2: .674))	-	-	[**Haya** 41.1% (D^2: 3.530), Southern Sudan (D^2: 5.701)]	[**Haya** 51.9% (D^2: .769), Chad (D^2: 1.604)]
Djabarona 96/120-5	(**A-Group** 69.2% (D^2: 9.554), Malian Sahara (D^2: 19.482))	(**Malian Sahara** 61.5% (D^2: .476), Jebel Sahaba/Tushka (D^2: .499))	(**Malian Sahara** 69.2% (D^2: .435), Jebel Sahaba/Tushka (D^2: 3.151))	(**Jebel Sahaba/Tushka** 81.5% (D^2: 1.545), Malian Sahara (D^2: 2.822))	(**Somalis** 61.7% (D^2: 7.675), Haya (D^2: 11.171))	(**Haya** 59.3% (D^2: 6.650), Somalis (D^2: 9.200))	[**Mandinka** 50.0% (D^2: 5.148), Haya (D^2: 3.601)]	(**Haya** 74.1% (D^2: 7.633), Mandinka (D^2: 8.691))

Bold: classification; normal: classification accuracy; in brackets: squared Mahalanobis distance to nearest centroid; fine: second closest centroid; fine and in brackets: squared Mahalanobis distance to second closest centroid; whole result in square brackets: unreliable; whole result in round brackets: reliability uncertain

Appendix XXV.A.2.a.2.b. Mean individuals

Appendix XXV.A.2.a.2.b.1. Wadi Howar

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data
Abu Tabari 02/1	***Malian Sahara*** *100.0% (D^2: 14.359), A-Group (D^2: 72.197)*	***Malian Sahara*** *98.5% (D^2: 3.627), A-Group (D^2: 5.554)*	***Jebel Sahaba/Tushka*** *100.0% (D^2: 20.763), Malian Sahara (D^2: 53.939)*	***Chad*** *99.1% (D^2: 16.212), Southern Sudan (D^2: 31.909)*	***Chad*** *96.3% (D^2: 6.159), Southern Sudan (D^2: 18.544)*	***Southern Sudan*** *100.0% (D^2: 10.750), Somalis (D^2: 17.103)*
Abu Tabari 02/28	***Malian Sahara*** *98.5% (D^2: .012), Jebel Sahaba/Tushka (D^2: 29.984)*	***Malian Sahara*** *100.0% (D^2: 2.577), A-Group (D^2: 6.661)*	***Malian Sahara*** *100.0% (D^2: .994), A-Group (D^2: 250.058)*	***Southern Sudan*** *99.1% (D^2: 14.964), Chad (D^2: 24.940)*	***Chad*** *100.0% (D^2: 21.376), Southern Sudan (D^2: 26.234)*	***Southern Sudan*** *99.1% (D^2: 18.160), Somalis (D^2: 41.393)*
Djabarona 96/120	*(**A-Group** 70.8% (D^2: 10.857), Malian Sahara (D^2: 20.845))*	*(**Malian Sahara** 64.6% (D^2: .138), Jebel Sahaba/Tushka (D^2: 1.981))*	*(**Malian Sahara** 72.3% (D^2: 1.067), Jebel Sahaba/Tushka (D^2: 3.415))*	*(**Somalis** 63.0% (D^2: 7.299), Haya (D^2: 10.075))*	*(**Haya** 60.2% (D^2: 5.427), Somalis (D^2: 8.546))*	*(**Haya** 57.4% (D^2: 1.959), Chad (D^2: 4.079))*
pre-Leiterband	***Malian Sahara*** *100.0% (D^2: 50.687), Jebel Sahaba/Tushka (D^2: 145.108)*	***Malian Sahara*** *98.5% (D^2: .726), A-Group (D^2: 9.822)*	***Malian Sahara*** *100.0% (D^2: .368), Jebel Sahaba/Tushka (D^2: 173.160)*	***Southern Sudan*** *99.1% (D^2: 40.528), Chad (D^2: 51.940)*	***Chad*** *98.1% (D^2: 16.242), Mandinka (D^2: 16.314)*	***Southern Sudan*** *100.0% (D^2: 29.298), Somalis (D^2: 33.143)*
Leiterband	***Malian Sahara*** *98.5% (D^2: 4.574), A-Group (D^2: 13.329)*	***Malian Sahara*** *100.0% (D^2: 1.501), A-Group (D^2: 10.126)*	***Malian Sahara*** *100.0% (D^2: .234), A-Group (D^2: 225.225)*	***Southern Sudan*** *100.0% (D^2: 19.313), Chad (D^2: 20.952)*	***Chad*** *100.0% (D^2: 42.504), Mandinka (D^2: 46.914)*	***Southern Sudan*** *99.1% (D^2: 18.160), Somalis (D^2: 41.393)*
Handessi	*(**A-Group** 70.8% (D^2: 10.857), Malian Sahara (D^2: 20.845))*	*(**Malian Sahara** 64.6% (D^2: .138), Jebel Sahaba/Tushka (D^2: 1.981))*	*(**Malian Sahara** 72.3% (D^2: 1.067), Jebel Sahaba/Tushka (D^2: 3.415))*	*(**Somalis** 63.0% (D^2: 7.299), Haya (D^2: 10.075))*	*(**Haya** 60.2% (D^2: 5.427), Somalis (D^2: 8.546))*	*(**Haya** 57.4% (D^2: 1.959), Chad (D^2: 4.079))*
Wadi Howar	***Malian Sahara*** *98.5% (D^2: .498), Jebel Sahaba/Tushka (D^2: 36.538)*	***Malian Sahara*** *100.0% (D^2: 1.831), A-Group (D^2: 9.137)*	***Malian Sahara*** *100.0% (D^2: .234), A-Group (D^2: 225.225)*	***Southern Sudan*** *100.0% (D^2: 24.297), Haya (D^2: 24.342)*	***Chad*** *100.0% (D^2: 18.055), Southern Sudan (D^2: 32.504)*	***Southern Sudan*** *99.1% (D^2: 18.160), Somalis (D^2: 41.393)*

Appendix XXV.A.2.a.2.b.2. Prehistoric comparative samples

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data
Jebel Sahaba	***Malian Sahara*** *97.4% (D^2: .926), A-Group (D^2: 15.249)*	***Malian Sahara*** *96.1% (D^2: 1.129), A-Group (D^2: 9.115)*	***Wadi Howar*** *100.0% (D^2: 8.222), Malian Sahara (D^2: 21.415)*	***Southern Sudan*** *98.1% (D^2: 8.225), Chad (D^2: 14.018)*	***Chad*** *97.2% (D^2: 4.981), Somalis (D^2: 15.310)*	***Southern Sudan*** *98.1% (D^2: 14.771), Chad (D^2: 30.414)*
A-Group	***Malian Sahara*** *98.7% (D^2: .541), Jebel Sahaba/Tushka (D^2: 24.335)*	***Malian Sahara*** *98.7% (D^2: 4.864), Jebel Sahaba/Tushka (D^2: 7.826)*	***Jebel Sahaba/Tushka*** *100.0% (D^2: 28.219), Malian Sahara (D^2: 31.549)*	***Somalis*** *98.1% (D^2: 15.774), Chad (D^2: 14.412)*	***Somalis*** *97.2% (D^2: 8.704), Chad (D^2: 13.714)*	***Somalis*** *98.1% (D^2: 31.679), Southern Sudan (D^2: 62.470)*
Malian Sahara	***Jebel Sahaba/Tushka*** *100.0% (D^2: 1.980), A-Group (D^2: 12.873)*	***A-Group*** *100.0% (D^2: 1.801), Jebel Sahaba/Tushka (D^2: 18.705)*	***Wadi Howar*** *100.0% (D^2: 3.017), A-Group (D^2: 56.966)*	***Southern Sudan*** *98.1% (D^2: 6.915), Chad (D^2: 12.599)*	***Chad*** *97.2% (D^2: 1.834), Southern Sudan (D^2: 12.630)*	***Somalis*** *98.1% (D^2: 8.588), Southern Sudan (D^2: 22.567)*
"Sudanese Hotchpotch"	***A-Group*** *99.0% (D^2: 2.688), Malian Sahara (D^2: 23.821)*	***A-Group*** *97.9% (D^2: 6.010), Malian Sahara (D^2: 20.233)*	***Wadi Howar*** *100.0% (D^2: 8.090), Jebel Sahaba/Tushka (D^2: 12.927)*	***Chad*** *95.4% (D^2: 2.930), Somalis (D^2: 10.991)*	***Somalis*** *90.7% (D^2: 6.528), Southern Sudan (D^2: 7.255)*	***Southern Sudan*** *83.3% (D^2: 5.418), Somalis (D^2: 9.909)*

Bold: classification; normal: classification accuracy; in brackets: squared Mahalanobis distance to nearest centroid; fine: second closest centroid; fine and in brackets: squared Mahalanobis distance to second closest centroid; whole result in round brackets: reliability uncertain

Appendix XXV.A.2.a.2.c. Wadi Howar sub-samples and sample as a whole

	Prehistoric series - Metric data	Prehistoric series - Scaled metric data	Prehistoric series - Non-metric data	Modern series - Metric data	Modern series - Scaled metric data	Modern series - Non-metric data
Abu Tabari 02/1	*100.0% 02/1; 83.3%* ***Malian Sahara****; 100.0%*	*100.0% 02/1; 83.3%* ***Malian Sahara****; 98.9%*	*100.0% 02/1; 100.0%* ***Jebel Sahaba/Tushka****; 96.6%*	*100.0% 02/1; 100.0%* ***Southern Sudan****; 99.2%*	*100.0% 02/1; 83.3%* ***Haya****; 97.7%*	*100.0% 02/1; 83.3%* ***Southern Sudan****; 96.2%*
Abu Tabari 02/28	*100.0% 02/28; 85.7%* ***Malian Sahara****; 100.0%*	*100.0% 02/28; 78.6%* ***Malian Sahara****; 98.9%*	*100.0% 02/28; 57.1%* ***Malian Sahara****; 96.6%*	*100.0% 02/28; 71.4%* ***Southern Sudan****; 99.2%*	*100.0% 02/28; 92.9%* ***Haya****; 97.7%*	*85.7% 02/28; 85.7%* ***02/1****; 96.2%*
Djabarona 96/120	*[100.0% 96/120; 100.0%* ***02/28****]; 100.0%*	*[100.0% 96/120; 100.0%* ***02/28****]; 98.9%*	*[100.0% 02/28; 100.0%* ***Malian Sahara****]; 96.6%*	*[100.0% 96/120; 100.0%* ***Chad****]; 99.2%*	*[100.0% 96/120; 100.0%* ***Haya****]; 97.7%*	*[100.0% 02/1; 100.0%* ***02/28****]; 96.2%*
pre-Leiterband	*100.0% pre-Leiterband; 87.5%* ***Malian Sahara****; 100.0%*	*100.0% pre-Leiterband; 100.0%* ***Malian Sahara****; 99.0%*	*100.0% pre-Leiterband; 100.0%* ***Malian Sahara****; 96.9%*	*100.0% pre-Leiterband; 62.5%* ***Southern Sudan****; 100.0%*	*100.0% pre-Leiterband; 100.0%* ***Chad****; 98.6%*	*100.0% pre-Leiterband; 87.5%* ***Southern Sudan****; 97.9%*
Leiterband	*100.0% Leiterband; 100.0%* ***Malian Sahara****; 100.0%*	*100.0% Leiterband; 100.0%* ***Malian Sahara****; 99.0%*	*100.0% Leiterband; 81.0%* ***Malian Sahara****; 96.9%*	*100.0% Leiterband; 81.0%* ***Southern Sudan****; 100.0%*	*100.0% Leiterband; 76.2%* ***Somali****; 98.6%*	*100.0% Leiterband; 81.0%* ***Southern Sudan****; 97.9%*
Handessi	*[100.0% Handessi; 100.0%* ***Leiterband****]; 100.0%*	*[100.0% Handessi; 100.0%* ***Malian Sahara****]; 99.0%*	*[100.0% Malian Sahara; 100.0%* ***Leiterband****]; 96.9%*	*[100.0% Handessi; 100.0%* ***Southern Sudan****]; 100.0%*	*[100.0% Handessi; 100.0%* ***Somali****]; 98.6%*	*[100.0% Leiterband; 100.0%* ***Southern Sudan****]; 97.9%*
Wadi Howar	*100.0% Wadi Howar; 100.0%* ***Malian Sahara****; 100.0%*	*100.0% Wadi Howar; 78.1%* ***Malian Sahara****; 99.0%*	*100.0% Wadi Howar; 93.8%* ***Malian Sahara****; 100.0%*	*100.0% Wadi Howar; 56.3%* ***Southern Sudan****; 99.3%*	*100.0% Wadi Howar; 75.0%* ***Chad****; 96.4%*	*100.0% Wadi Howar; 93.8%* ***Southern Sudan****; 99.3%*

Fine: percentage of individuals closest to the most frequent “highest group”, most frequent “highest group”; normal: percentage of individuals closest to the most frequent “second highest group”, bold: most frequent “second highest group”; normal: classification accuracy of the analysis; whole result in square brackets: unreliable

Appendix XXV.A.2.a.3. Affinities between Wadi Howar individuals and the “Sudanese Hotchpotch” sample

Appendix XXV.A.2.a.3.a. Results of additional analyses of core analyses with results which were considered reliable

Abu Tabari 02/1-8

Non-metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 97.6%, 96.4% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 100.0%, variables entered **(13)**

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 97.6%, 96.4% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 100.0%, variables entered **(13)**

Abu Tabari 02/28-2

Non-metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 97.6%, 92.8% (leave-one-out); separate-groups covariance matrix - Jebel Sahaba/Tushka, 97.6%, variables entered **(14)**

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 98.8%, 96.4% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(19)**

Abu Tabari 02/28-5

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 95.2% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(21)**

Abu Tabari 02/28-8

Scaled metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 95.2%, 81.9% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 95.2%, variables entered **(14)**

Scaled metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 94.0% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(18)**

Non-metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 97.6%, 92.8% (leave-one-out); separate-groups covariance matrix - A-Group, 100.0%, variables entered **(17)**

Abu Tabari 02/28-14

Scaled metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 94.0% (leave-one-out); separate-groups covariance matrix - Jebel Sahaba/Tushka, 100.0%, variables entered **(17)**

Abu Tabari 02/28-15

Scaled metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 94.0% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(17)**

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 96.4%; separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(18)**

Abu Tabari 02/28-23

Non-metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 98.8%, 94.0% (leave-one-out); separate-groups covariance matrix - A-Group, 98.8%, variables entered **(20)**

Abu Tabari 03/34-1

Metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 97.6% (leave-one-out); separate-groups covariance matrix – **“Sudanese Hotchpotch”**, 100.0%, variables entered **(23)**

Conical Hill 95/4

Scaled metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 98.8%, 91.6% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 98.8%, variables entered **(18)**

Djabarona 96/1-1

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, 94.0% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 100.0%, variables entered **(23)**

Appendix XXV.A.2.a.3.b. Results of additional analyses of core analyses with results which were not considered reliable

Abu Tabari 02/1-5

Non-metric data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 68.7%, 67.5% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 69.9%, variables entered **(4)**

Non-metric data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 50.6%, 44.6% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 72.3%, variables entered **(5)**

Mixed data: within-groups covariance matrix - **“Sudanese Hotchpotch”**, 84.3%, 80.7% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 88.0%, variables entered **(9)**

Mixed data (raw): within-groups covariance matrix - **“Sudanese Hotchpotch”**, 78.3%, 68.7% (leave-one-out); separate-groups covariance matrix - **“Sudanese Hotchpotch”**, 79.5%, variables entered **(8)**

Abu Tabari 02/1-7

Scaled metric data: within-groups covariance matrix - **"Sudanese Hotchpotch"**, 65.1%, 60.0% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 69.9%, variables entered **(3)**

Scaled metric data (raw): within-groups covariance matrix - **"Sudanese Hotchpotch"**, 66.3%, 61.4% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 77.1%, variables entered **(5)**

Non-metric data (raw): within-groups covariance matrix - **"Sudanese Hotchpotch"**, 65.1%, 56.6% (leave-one-out); separate-groups covariance matrix - Malian Sahara, 62.7%, variables entered **(5)**

Abu Tabari 02/28-11

Mixed data (raw): within-groups covariance matrix - **"Sudanese Hotchpotch"**, 65.1%, 61.4% (leave-one-out); separate-groups covariance matrix - Jebel Sahaba/Tushka, 79.5%, variables entered **(6)**

Abu Tabari 02/28-13

Non-metric data: within-groups covariance matrix - **"Sudanese Hotchpotch"**, 48.2%, 48.2% (leave-one-out); separate-groups covariance matrix - Jebel Sahaba/Tushka, 43.4%, variables entered **(3)**

Non-metric data (raw): within-groups covariance matrix - **"Sudanese Hotchpotch"**, 63.9%, 62.7% (leave-one-out); separate-groups covariance matrix - Jebel Sahaba/Tushka, 60.2%, variables entered **(4)**

Djabarona 96/1-2

Non-metric data: within-groups covariance matrix - Jebel Sahaba/Tushka, 51.8%, 38.6% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 44.6%, variables entered **(3)**

Djabarona 96-4

Non-metric (raw): within-groups covariance matrix - Malian Sahara, 47.0%, 47.0% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 42.2%, variables entered **(3)**

Mixed data (raw): within-groups covariance matrix - **"Sudanese Hotchpotch"**, 68.7%, 60.2% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 67.5%, variables entered **(5)**

Djabarona 96/120-4

Metric data: within-groups covariance matrix - A-Group, 55.4%, 51.8% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 57.8%, variables entered **(2)**

Metric data (raw): within-groups covariance matrix - A-Group, 56.6%, 53.0% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 50.6%, variables entered **(2)**

Scaled metric data (raw): within-groups covariance matrix - Malian Sahara, 43.4%, 48.2% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 41.0%, variables entered **(2)**

Non-metric data: within-groups covariance matrix - Malian Sahara, 39.8%, 39.8% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 36.1%, variables entered **(1)**

Djabarona 96/120-5

Scaled metric data: within-groups covariance matrix - **"Sudanese Hotchpotch"**, 31.3%, 30.1% (leave-one-out); separate-groups covariance matrix - **"Sudanese Hotchpotch"**, 41.0%, variables entered **(1)**

Appendix XXV.A.2.b. Classification accuracies

Appendix XXV.A.2.b.1. Overviews

Appendix XXV.A.2.b.1.a. Wadi Howar individuals

1. Mean overall individual by individual classification accuracies

		All individuals	Reliable individuals
Prehistoric comparative samples	classification[1]	**84.29%**	**97.50%**
	leave-one-out	**78.16%**	**91.18%**
Modern comparative samples	classification	**75.77%**	**91.56%**
	leave-one-out	**65.68%**	**79.90%**

2. Mean overall analysis by analysis classification accuracies

		All analyses	Reliable analyses
Prehistoric comparative samples	classification	**84.07%**	**97.30%**
	leave-one-out	**77.93%**	**90.98%**
Modern comparative samples	classification	**76.46%**	**92.34%**
	leave-one-out	**65.86%**	**79.72%**

3. Mean classification accuracies by data type

3.a. Mean classification accuracies of the analyses using metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**87.47%**	**98.37%**
	within-groups covariance matrix	87.08%	98.18%
	leave-one-out	**82.67%**	**93.36%**
	separate-groups covariance matrix	87.30%	98.37%
Modern comparative samples	**classification**	**79.16%**	**94.03%**
	within-groups covariance matrix	76.92%	90.61%
	leave-one-out	**70.25%**	**81.33%**
	separate-groups covariance matrix	78.84%	94.03%

3.b. Mean classification accuracies of the analyses using scaled metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**81.82%**	**96.55%**
	within-groups covariance matrix	81.58%	96.07%
	leave-one-out	**75.67%**	**87.88%**
	separate-groups covariance matrix	81.82%	96.55%
Modern comparative samples	**classification**	**72.66%**	**88.67%**
	within-groups covariance matrix	69.21%	84.06%
	leave-one-out	**60.46%**	**72.22%**
	separate-groups covariance matrix	73.53%	88.02%

3.c. Mean classification accuracies of the analyses using non-metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**82.88%**	**97.01%**
	within-groups covariance matrix	82.61%	95.93%
	leave-one-out	**78.16%**	**91.68%**
	separate-groups covariance matrix	82.89%	97.01%
Modern comparative samples	**classification**	**77.30%**	**93.63%**
	within-groups covariance matrix	75.22%	90.40%
	leave-one-out	**69.36%**	**83.33%**
	separate-groups covariance matrix	77.30%	93.63%

4. Mean classification accuracies of the analyses using metric and non-metric data

		All analyses
Prehistoric comparative samples	**classification**	**79.90%**
	within-groups covariance matrix	78.57%
	leave-one-out	**71.03%**
	separate-groups covariance matrix	79.90%
Modern comparative samples	**classification**	**71.03%**
	within-groups covariance matrix	67.00%
	leave-one-out	**58.75%**
	separate-groups covariance matrix	71.03%

[1] The term “classification” was used to refer to the accepted result, i.e. the within-groups covariance matrix classification, if Box’s M test had been passed, or the separate-groups covariance matrix classification, if Box’s M test had been failed.

Appendix XXV.A.2.b.1.b. Mean individuals

Appendix XXV.A.2.b.1.b.1. Wadi Howar

1. Mean overall individual classification accuracies

		All individuals	Reliable individuals
Prehistoric comparative samples	classification	**90.85%**	**99.50%**
	leave-one-out	**87.25%**	**97.12%**
Modern comparative samples	classification	**88.10%**	**99.28%**
	leave-one-out	**78.82%**	**90.47%**

2. Mean overall analysis by analysis classification accuracies

		All analyses	Reliable analyses
Prehistoric comparative samples	classification	**90.85%**	**99.50%**
	leave-one-out	**87.25%**	**97.12%**
Modern comparative samples	classification	**88.10%**	**99.28%**
	leave-one-out	**78.82%**	**90.47%**

3. Mean classification accuracies by data type

3.a. Mean classification accuracies of the analyses using metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**91.01%**	**99.10%**
	within-groups covariance matrix	91.01%	99.10%
	leave-one-out	**86.39%**	**98.18%**
	separate-groups covariance matrix	91.01%	99.10%
Modern comparative samples	**classification**	**89.04%**	**99.46%**
	within-groups covariance matrix	88.79%	99.10%
	leave-one-out	**78.04%**	**89.62%**
	separate-groups covariance matrix	90.36%	99.46%

3.b. Mean classification accuracies of the analyses using scaled metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**89.46%**	**99.40%**
	within-groups covariance matrix	89.46%	99.40%
	leave-one-out	**85.91%**	**96.28%**
	separate-groups covariance matrix	89.46%	99.40%
Modern comparative samples	**classification**	**87.83%**	**98.88%**
	within-groups covariance matrix	86.61%	97.18%
	leave-one-out	**77.10%**	**87.94%**
	separate-groups covariance matrix	88.89%	98.88%

3.c. Mean classification accuracies of the analyses using non-metric data

		All analyses	Reliable analyses
Prehistoric comparative samples	**classification**	**92.09%**	**100.0%**
	within-groups covariance matrix	92.09%	100.0%
	leave-one-out	**89.44%**	**96.9%**
	separate-groups covariance matrix	92.09%	100.0%
Modern comparative samples	**classification**	**87.44%**	**99.46%**
	within-groups covariance matrix	85.81%	98.30%
	leave-one-out	**81.33%**	**93.86%**
	separate-groups covariance matrix	87.44%	99.46%

Appendix XXV.A.2.b.1.b.2. Prehistoric comparative samples

1. Mean overall individual classification accuracies

Prehistoric comparative samples	classification	**98.98%**
	leave-one-out	**93.60%**
Modern comparative samples	classification	**95.80%**
	leave-one-out	**86.37%**

2. Mean overall analysis by analysis classification accuracies

Prehistoric comparative samples	classification	**98.98%**
	leave-one-out	**93.60%**
Modern comparative samples	classification	**95.80%**
	leave-one-out	**86.37%**

3. Mean classification accuracies by data type
3.a. Mean classification accuracies of the analyses using metric data

Prehistoric comparative samples	**classification**	**98.78%**
	within-groups covariance matrix	98.68%
	leave-one-out	**93.98%**
	separate-groups covariance matrix	98.78%
Modern comparative samples	**classification**	**97.43%**
	within-groups covariance matrix	96.25%
	leave-one-out	**86.83%**
	separate-groups covariance matrix	97.43%

3.b. Mean classification accuracies of the analyses using scaled metric data

Prehistoric comparative samples	**classification**	**98.18%**
	within-groups covariance matrix	98.43%
	leave-one-out	**91.08%**
	separate-groups covariance matrix	98.18%
Modern comparative samples	**classification**	**95.58%**
	within-groups covariance matrix	94.90%
	leave-one-out	**85.90%**
	separate-groups covariance matrix	95.58%

3.c. Mean classification accuracies of the analyses using non-metric data

Prehistoric comparative samples	**classification**	**100.00%**
	within-groups covariance matrix	99.75%
	leave-one-out	**95.75%**
	separate-groups covariance matrix	100.00%
Modern comparative samples	**classification**	**94.40%**
	within-groups covariance matrix	93.03%
	leave-one-out	**86.38%**
	separate-groups covariance matrix	94.40%

Appendix XXV.A.2.b.1.c. Wadi Howar sub-samples and sample as a whole

1. Mean overall group classification accuracies

Prehistoric comparative samples	classification	**98.93%**
	leave-one-out	**94.09%**
Modern comparative samples	classification	**98.29%**
	leave-one-out	**88.22%**

2. Mean overall analysis by analysis classification accuracies

Prehistoric comparative samples	classification	**98.93%**
	leave-one-out	**94.09%**
Modern comparative samples	classification	**98.29%**
	leave-one-out	**88.22%**

3. Mean classification accuracies by data type
3.a. Mean classification accuracies of the analyses using metric data

Prehistoric comparative samples	**classification**	**100.00%**
	within-groups covariance matrix	100.00%
	leave-one-out	**95.40%**
	separate-groups covariance matrix	100.00%
Modern comparative samples	**classification**	**99.50%**
	within-groups covariance matrix	94.63%
	leave-one-out	**88.03%**
	separate-groups covariance matrix	99.50%

3.b. Mean classification accuracies of the analyses using scaled metric data

Prehistoric comparative samples	**classification**	**98.97%**
	within-groups covariance matrix	98.60%
	leave-one-out	**91.87%**
	separate-groups covariance matrix	98.97%
Modern comparative samples	**classification**	**97.57%**
	within-groups covariance matrix	92.70%
	leave-one-out	**84.63%**
	separate-groups covariance matrix	97.57%

3.c. Mean classification accuracies of the analyses using non-metric data

Prehistoric comparative samples	**classification**	**97.83%**
	within-groups covariance matrix	100.0%
	leave-one-out	**95.00%**
	separate-groups covariance matrix	97.83%
Modern comparative samples	**classification**	**97.80%**
	within-groups covariance matrix	97.83%
	leave-one-out	**92.00%**
	separate-groups covariance matrix	97.80%

Appendix XXV.A.2.b.2. Analysis by analysis overviews

Appendix XXV.A.2.b.2.a. Wadi Howar individuals

	Prehistoric series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - mixed data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
95/2-3									**[41.5]**	41.5	21.5	43.1				
02/1-2	**98.5**	98.5	96.9	98.5	**98.5**	96.9	92.3	98.5	**93.8**	93.8	87.7	93.8				
02/1-3	**100.0**	100.0	95.4	100.0	**95.4**	95.4	89.2	95.4	**89.2**	89.2	80.0	89.2				
02/1-5	**[65.0]**	65.0	60.0	71.7	**[58.5]**	58.5	56.9	60.0	**[70.8]**	70.8	70.8	70.8	**[92.3]**	92.3	86.2	92.3
02/1-6																
02/1-7	**[61.5]**	61.5	60.0	61.5	**[47.7]**	47.7	56.9	46.2	**[64.6]**	64.6	52.3	64.6	**[80.0]**	76.9	72.3	80.0
02/1-8	**93.8**	95.4	93.8	93.8	**95.4**	95.4	81.5	95.4	**96.9**	95.4	83.1	96.9				
02/28-2	**96.9**	95.4	81.5	96.9	**86.2**	86.2	83.1	86.2	**96.9**	96.9	95.4	96.9				
02/28-3	**96.9**	96.9	90.8	96.9	**96.9**	95.4	87.7	96.9	**100.0**	95.4	90.8	100.0				
02/28-4																
02/28-5	**98.5**	98.5	95.4	98.5	**100.0**	100.0	93.8	100.0	**96.9**	96.9	93.8	96.9				
02/28-7	**95.4**	93.8	84.6	95.4	**90.8**	89.2	69.2	90.8	**95.4**	92.3	92.3	95.4				
02/28-8	**100.0**	98.5	90.8	100.0	**93.8**	93.8	87.7	93.8	**98.5**	98.5	90.8	98.5				
02/28-11	**[73.8]**	76.9	76.9	73.8	**[54.1]**	54.1	54.1	54.1	**[61.5]**	66.2	61.5	61.5	**[70.8]**	64.6	58.5	70.8
02/28-13	**[66.1]**	66.1	66.1	64.5					**[60.9]**	60.9	60.9	59.4	**[73.8]**	63.1	56.9	73.8
02/28-14	**96.9**	96.9	93.8	96.9	**96.9**	96.9	80.0	96.9	**100.0**	98.5	93.8	100.0				
02/28-15	**100.0**	100.0	95.4	100.0	**100.0**	98.5	93.8	100.0	**96.9**	96.9	95.4	96.9				
02/28-20	**[86.2]**	86.2	83.1	86.2	**[75.8]**	75.8	74.2	72.6	**[73.8]**	72.3	66.2	73.8	**[100.0]**	100.0	92.3	100.0
02/28-21	**100.0**	100.0	95.4	100.0	**98.5**	98.5	95.4	98.5	**98.5**	96.9	95.4	98.5				
02/28-22	**100.0**	100.0	96.9	100.0	**100.0**	98.5	90.8	100.0	**98.5**	95.4	95.4	98.5				
02/28-23	**100.0**	100.0	96.9	100.0	**98.5**	98.5	89.2	98.5	**100.0**	100.0	95.4	100.0				
03/31																
03/34-1	**98.5**	98.5	93.8	98.5	**95.4**	95.4	83.1	95.4	**100.0**	98.5	95.4	100.0				
95/4	**98.5**	98.5	96.9	98.5	**98.5**	98.5	93.8	98.5	**100.0**	98.5	96.9	100.0				
95/4-1	**[70.9]**	61.8	61.8	70.9	**[50.0]**	50.0	48.4	40.3	**[49.2]**	49.2	49.2	49.2	**[64.6]**	64.6	64.6	64.6
02/3-4	**[80.0]**	80.0	67.7	80.0	**[64.6]**	66.2	53.8	64.6	**87.7**	87.7	81.5	87.7	**[95.4]**	95.4	83.1	95.4
96/1-1	**100.0**	100.0	95.4	100.0	**100.0**	100.0	95.4	100.0	**100.0**	100.0	95.4	100.0				
96/1-2	**[76.9]**	75.4	67.7	76.9	**[54.7]**	54.7	59.4	62.5	**[60.0]**	63.1	58.5	60.0	**[81.5]**	80.0	66.2	81.5
96-4	**[69.8]**	69.8	69.8	68.3	**[63.9]**	63.9	60.7	60.7	**[67.7]**	67.7	67.7	67.7	**[80.0]**	80.0	70.8	80.0
96/120-3																
96/120-4	**[68.3]**	68.3	66.7	58.7	**[51.7]**	51.7	44.8	55.2	**[52.3]**	56.9	56.9	52.3	**[59.0]**	68.9	68.9	59.0
96/120-5	**[69.2]**	69.2	58.5	70.8	**[61.5]**	61.5	52.3	66.2	**[69.2]**	69.2	64.6	69.2	**[81.5]**	78.5	61.5	81.5

	Modern series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - mixed data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
95/2-3									**[29.6]**	29.6	25.9	29.6				
02/1-2	**98.1**	98.1	88.9	98.1	**97.2**	95.4	80.6	97.2	**86.1**	85.2	82.4	86.1				
02/1-3	**96.3**	94.4	89.8	96.3	**90.7**	89.8	83.3	90.7	**84.3**	77.8	66.7	84.3				
02/1-5	**[48.5]**	53.0	56.0	48.5					**[62.6]**	58.3	56.5	62.6	**[78.7]**	66.7	58.3	78.7
02/1-6																
02/1-7	**[66.0]**	61.1	55.6	66.0	**[62.9]**	59.0	49.5	62.9	**[52.3]**	52.8	46.3	52.3	**[74.1]**	66.7	51.9	74.1
02/1-8	**88.9**	83.3	74.1	88.9	**77.8**	72.2	65.7	77.8	**97.2**	95.4	88.9	97.2				
02/28-2	**94.3**	83.3	80.6	94.3	**85.2**	80.6	60.2	85.2	**95.4**	92.6	87.0	95.4				
02/28-3	**89.8**	87.0	78.7	89.8	**77.8**	71.3	66.7	77.8	**94.4**	93.5	89.8	94.4				
02/28-4																
02/28-5	**97.2**	92.6	86.1	97.2	**91.7**	92.6	71.3	91.7	**96.3**	91.7	88.9	96.3				
02/28-7	**87.0**	80.6	63.0	87.0	**[66.4]**	57.0	48.6	66.4	**96.3**	91.7	85.2	96.3				
02/28-8	**87.0**	82.4	70.4	87.0	**73.1**	70.4	50.9	73.1	**92.6**	86.1	84.3	92.6				
02/28-11	**[28.3]**	28.3	31.1	27.4	**[28.6]**	28.6	30.5	35.2	**[57.5]**	58.5	50.9	57.5	**[58.9]**	52.3	43.9	58.9
02/28-13									**[42.6]**	37.0	35.2	42.6	**[64.8]**	52.8	49.1	64.8
02/28-14	**91.7**	85.2	76.9	91.7	**[79.6]**	68.5	58.3	79.6	**[97.2]**	96.3	92.6	97.2				
02/28-15	**99.1**	97.2	88.9	99.1	**89.8**	87.0	75.9	89.8	**100.0**	99.1	88.9	100.0				
02/28-20	**[51.5]**	51.5	56.3	44.7	**[35.9]**	31.1	29.1	35.9	**[76.0]**	75.0	75.0	76.0	**[82.4]**	83.3	76.9	82.4
02/28-21	**99.1**	98.1	88.9	99.1	**96.3**	91.7	82.4	96.3	**94.4**	93.5	87.0	94.4				
02/28-22	**96.3**	95.4	89.8	96.3	**94.4**	91.7	80.6	94.4	**91.7**	81.5	63.9	91.7				
02/28-23	**94.4**	93.5	85.2	94.4	**92.6**	90.7	81.5	92.6	**96.3**	92.6	87.0	96.3				
03/31																
03/34-1	**93.5**	89.8	75.0	93.5	**[77.8]**	72.2	65.7	77.8	**97.2**	96.3	92.6	97.2				
95/4	**99.1**	96.3	84.3	99.1	**88.9**	83.3	75.0	88.9	**98.1**	98.1	89.8	98.1				
95/4-1	**[49.0]**	49.0	54.8	45.2	**[44.6]**	44.6	44.6	43.6	**[50.0]**	52.8	51.9	50.0	**[68.6]**	73.5	72.5	68.6
02/3-4	**[66.7]**	65.7	51.9	66.7	**[60.2]**	56.5	46.3	60.2	**81.5**	77.8	63.9	81.5	**[87.0]**	83.3	72.2	87.0
96/1-1	**92.6**	92.6	80.6	92.6	**97.2**	91.7	78.7	97.2	**96.3**	93.5	87.0	96.3				
96/1-2	**[50.0]**	50.0	46.9	45.9	**[35.6]**	35.6	34.7	46.5	**[64.8]**	65.7	52.8	64.8	**[76.9]**	74.1	63.9	76.9
96-4	**[52.9]**	52.9	52.9	56.7	**[40.2]**	40.2	37.3	37.3	**[42.6]**	42.6	42.6	42.6	**[63.9]**	66.7	60.2	63.9
96/120-3																
96/120-4									**[41.1]**	41.1	37.4	41.1	**[51.9]**	46.3	41.7	51.9
96/120-5	**[61.7]**	61.7	49.5	65.4	**[59.3]**	59.3	53.7	66.7	**[50.0]**	50.0	41.7	50.0	**[74.1]**	71.3	55.6	74.1

Accuracies in %; result in square brackets: not reliable (including connected accuracies)

Appendix XXV.A.2.b.2.b. Mean individuals

Appendix XXV.A.2.b.2.b.1. Wadi Howar

	Prehistoric series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Abu Tabari 02/1	**100.0**	100.0	98.5	100.0	**98.5**	98.5	93.8	98.5	**100.0**	100.0	96.9	100.0
Abu Tabari 02/28	**98.5**	98.5	98.5	98.5	**100.0**	100.0	96.9	100.0	**100.0**	100.0	96.9	100.0
Djabarona 96/120	**[70.8]**	70.8	56.9	70.8	**[64.6]**	64.6	60.0	64.6	**[72.3]**	72.3	70.8	72.3
pre-Leiterband	**100.0**	100.0	96.9	100.0	**98.5**	98.5	96.9	98.5	**100.0**	100.0	96.9	100.0
Leiterband	**98.5**	98.5	98.5	98.5	**100.0**	100.0	96.9	100.0	**100.0**	100.0	96.9	100.0
Handessi	**[70.8]**	70.8	56.9	70.8	**[64.6]**	64.6	60.0	64.6	**[72.3]**	72.3	70.8	72.3
Wadi Howar	**98.5**	98.5	98.5	98.5	**100.0**	100.0	96.9	100.0	**100.0**	100.0	96.9	100.0

	Modern series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Abu Tabari 02/1	**99.1**	99.1	90.7	99.1	**96.3**	93.5	89.8	96.3	**100.0**	99.1	92.6	100.0
Abu Tabari 02/28	**99.1**	99.1	90.7	99.1	**100.0**	98.1	87.0	100.0	**99.1**	98.1	94.4	99.1
Djabarona 96/120	**[63.0]**	63.0	49.1	67.6	**[60.2]**	60.2	50.0	63.9	**[57.4]**	54.6	50.0	57.4
pre-Leiterband	**99.1**	99.1	90.7	99.1	**98.1**	98.1	88.9	98.1	**100.0**	98.1	93.5	100.0
Leiterband	**100.0**	99.1	88.0	100.0	**100.0**	98.1	87.0	100.0	**99.1**	98.1	94.4	99.1
Handessi	**[63.0]**	63.0	49.1	67.6	**[60.2]**	60.2	50.0	63.9	**[57.4]**	54.6	50.0	57.4
Wadi Howar	**100.0**	99.1	88.0	100.0	**100.0**	98.1	87.0	100.0	**99.1**	98.1	94.4	99.1

Accuracies in %; result in square brackets: not reliable (including connected accuracies)

Appendix XXV.A.2.b.2.b.2. Prehistoric comparative samples

	Prehistoric series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Scaled metric data – classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Jebel Sahaba	**97.4**	97.4	93.4	97.4	**96.1**	94.7	88.2	96.1	**100.0**	100.0	98.7	100.0
A-Group	**98.7**	98.7	93.4	98.7	**98.7**	100.0	90.8	98.7	**100.0**	100.0	98.7	100.0
Malian Sahara	**100.0**	98.6	97.3	100.0	**100.0**	100.0	94.6	100.0	**100.0**	100.0	100.0	100.0
“Sudanese Hotchpotch”	**99.0**	100.0	91.8	99.0	**97.9**	99.0	90.7	97.9	**100.0**	99.0	85.6	100.0

	Modern series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Jebel Sahaba	**98.1**	98.1	88.9	98.1	**97.2**	97.2	88.9	97.2	**98.1**	97.2	91.7	98.1
A-Group	**98.1**	98.1	88.9	98.1	**97.2**	97.2	88.9	97.2	**98.1**	98.1	91.7	98.1
Malian Sahara	**98.1**	98.1	88.9	98.1	**97.2**	97.2	88.9	97.2	**98.1**	97.2	91.7	98.1
“Sudanese Hotchpotch”	**95.4**	90.7	80.6	95.4	**90.7**	88.0	76.9	90.7	**83.3**	79.6	70.4	83.3

Accuracies in %; result in square brackets: not reliable (including connected accuracies)

Appendix XXV.A.2.b.2.c. Wadi Howar sub-samples and sample as a whole

	Prehistoric series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Prehistoric series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Sites	***100.0***	*100.0*	*95.5*	*100.0*	***98.9***	*98.9*	*92.0*	*98.9*	***96.6***	*100.0*	*93.2*	*96.6*
Phases	***100.0***	*100.0*	*94.8*	*100.0*	***99.0***	*99.0*	*91.8*	*99.0*	***96.9***	*100.0*	*95.9*	*96.9*
WH	***100.0***	*100.0*	*95.9*	*100.0*	***99.0***	*97.9*	*91.8*	*99.0*	***100.0***	*100.0*	*95.9*	*100.0*

	Modern series - Metric data - classification	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Scaled metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix	**Modern series - Non-metric data - classification**	within-groups covariance matrix	leave-one-out	separate-groups covariance matrix
Sites	***99.2***	*92.4*	*85.5*	*99.2*	***97.7***	*92.4*	*83.2*	*97.7*	***96.2***	*98.5*	*92.4*	*96.2*
Phases	***100.0***	*97.9*	*90.0*	*100.0*	***98.6***	*95.0*	*85.0*	*98.6*	***97.9***	*98.6*	*95.0*	*97.9*
WH	***99.3***	*93.6*	*88.6*	*99.3*	***96.4***	*90.7*	*85.7*	*96.4*	***99.3***	*96.4*	*88.6*	*99.3*

Accuracies in %

Appendix XXV.B. χ^2 tests

Appendix XXV.B.1. Results

A. Prehistoric comparative samples

A.I. Individual by individual classification frequencies

A.I.1. Reliable and unreliable classifications

A.I.1.a. Pearson's χ^2

A.I.1.a.1. pre-Leiterband vs. Leiterband - not significant
A.I.1.a.2. Leiterband vs. Handessi - not significant

A.I.1.b. Yates's χ^2

A.I.1.b.1. pre-Leiterband vs. Leiterband - not significant
A.I.1.b.2. Leiterband vs. Handessi - not significant

A.I.2. Reliable classifications only

A.I.2.a. Pearson's χ^2

A.I.2.a.1. pre-Leiterband vs. Leiterband - not significant
A.I.2.a.2. Leiterband vs. Handessi - test not possible

A.I.2.b. Yates's χ^2

A.I.2.b.1. pre-Leiterband vs. Leiterband - not significant
A.I.2.b.2. Leiterband vs. Handessi - test not possible

A.II. Analysis by analysis classification frequencies

A.II.1.Reliable and unreliable classifications

A.II.1.a. Pearson's χ^2

A.II.1.a.1. pre-Leiterband vs. Leiterband - not significant
A.II.1.a.2. Leiterband vs. Handessi - **significant**

A.II.1.b. Yates's χ^2

A.II.1.b.1. pre-Leiterband vs. Leiterband - not significant
A.II.1.b.2. Leiterband vs. Handessi - not significant

A.II.2.Reliable classifications only

A.II.2.a. Pearson's χ^2

A.II.2.a.1. pre-Leiterband vs. Leiterband - not significant
A.II.2.a.2. Leiterband vs. Handessi - test not possible

A.II.2.b. Yates's χ^2

A.II.2.b.1. pre-Leiterband vs. Leiterband - not significant
A.II.2.b.2. Leiterband vs. Handessi - test not possible

B. Modern comparative samples

B.I. Individual by individual classification frequencies

B.I.1. Reliable and unreliable classifications

B.I.1.a. Pearson's χ^2

B.I.1.a.1. pre-Leiterband vs. Leiterband - not significant
B.I.1.a.2. Leiterband vs. Handessi - **very significant**

B.I.1.b. Yates's χ^2

B.I.1.b.1. pre-Leiterband vs. Leiterband - not significant
B.I.1.b.2. Leiterband vs. Handessi - not significant

B.I.2.Reliable classifications only

B.I.2.a. Pearson's χ^2

B.I.2.a.1. pre-Leiterband vs. Leiterband - not significant
B.I.2.a.2. Leiterband vs. Handessi - test not possible

B.I.2.b. Yates's χ^2

B.I.2.b.1. pre-Leiterband vs. Leiterband - not significant
B.I.2.b.2. Leiterband vs. Handessi - test not possible

B.II. Analysis by analysis classification frequencies

B.II.1. Reliable and unreliable classifications

B.II.1.a. Pearson's χ^2

B.II.1.a.1. pre-Leiterband vs. Leiterband - not significant
B.II.1.a.2. Leiterband vs. Handessi - **very significant**

B.II.1.b. Yates's χ^2

B.II.1.b.1. pre-Leiterband vs. Leiterband - not significant
B.II.1.b.2. Leiterband vs. Handessi - not significant

B.II.2.Reliable classifications only

B.II.2.a. Pearson's χ^2

B.II.2.a.1. pre-Leiterband vs. Leiterband - not significant
B.II.2.a.2. Leiterband vs. Handessi - test not possible

B.II.2.b. Yates's χ^2

B.II.2.b.1. pre-Leiterband vs. Leiterband - not significant
B.II.2.b.2. Leiterband vs. Handessi - test not possible

Appendix XXV.B.2. Reports

A. Prehistoric comparative samples

A.I. Individual by individual classification frequencies

A.I.1. Reliable and unreliable classifications

A.I.1.a. Pearson's χ^2

A.I.1.a.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):
$\chi^2 = ((1 – 2.212)^2 / 2.212) + ((6 – 4.788)^2 / 4.788) = 0.664 + 0.307 = 0.971$
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)
not significant (classification frequencies do not differ significantly), remarks: both expected frequencies are under 5
A.I.1.a.2. Leiterband vs. Handessi
expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):
$\chi^2 = ((1 – 0.632)^2 / 0.632) + ((1 – 1.368)^2 / 1.368) = 0.214 + 0.099 = 0.313$
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)
not significant (classification frequencies do not differ significantly), remarks: both expected frequencies are under 5
Individual by individual classification frequencies - pre-Leiterband:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.143
Malian Sahara	6	0.857
All	7	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	2.212	(7 · 0.316 = 2.212)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	4.788	(7 · 0.684 = 4.788)

Individual by individual classification frequencies - Leiterband:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	6	0.316
Malian Sahara	13	0.684
All	19	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	2.717	(19 · 0.143 = 2.717)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	16.283	(19 · 0.857 = 16.283)

Individual by individual classification frequencies - Handessi:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.500
Malian Sahara	1	0.500
All	2	1.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.632	(2 · 0.316 = 0.632)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	1.368	(2 · 0.684 = 1.368)

A.I.1.b. Yates's χ^2

A.I.1.b.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):
$\chi^2 = ((|1 – 2.212| – 0.5)^2 / 2.212) + ((|6 – 4.788| – 0.5)^2 / 4.788) = 0.229 + 0.106 = 0.335$
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)
not significant (classification frequencies do not differ significantly)
A.I.1.b.2. Leiterband vs. Handessi
expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):
$\chi^2 = ((|1 – 0.632| – 0.5)^2 / 0.632) + ((|1 – 1.368| – 0.5)^2 / 1.368) = 0.028 + 0.013 = 0.041$
df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)
not significant (classification frequencies do not differ significantly)
Individual by individual classification frequencies - pre-Leiterband:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.143
Malian Sahara	6	0.857
All	7	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	2.212	(7 · 0.316 = 2.212)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	4.788	(7 · 0.684 = 4.788)

Individual by individual classification frequencies - Leiterband:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	6	0.316
Malian Sahara	13	0.684
All	19	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	2.717	(19 · 0.143 = 2.717)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	16.283	(19 · 0.857 = 16.283)

Individual by individual classification frequencies - Handessi:

	All individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.500
Malian Sahara	1	0.500
All	2	1.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.632	(2 · 0.316 = 0.632)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	1.368	(2 · 0.684 = 1.368)

A.I.2. Reliable classifications only

A.I.2.a. Pearson's χ^2

A.I.2.a.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):

$\chi^2 = ((0 – 0.332)^2 / 0.332) + ((4 – 3.668)^2 / 3.668) = 0.332 + 0.030 = 0.362$

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)

not significant (classification frequencies do not differ significantly), remarks: both expected frequencies are under 5)

A.I.2.a.2. Leiterband vs. Handessi

test not possible – no reliable Handessi classifications

Individual by individual classification frequencies - pre-Leiterband:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	4	1.000
All	4	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	0.332	(4 · 0.083 = 0.332)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	3.668	(4 · 0.917 = 3.668)

Individual by individual classification frequencies - Leiterband:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.083
Malian Sahara	11	0.917
All	12	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	12.000	(12 · 1.000 = 12.000)

Individual by individual classification frequencies - Handessi:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	0	0.000
All	0	0.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.083 = 0.000)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.917 = 0.000)

A.I.2.b. Yates's χ^2

A.I.2.b.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), A-Group not included (frequency = 0):

$\chi^2 = ((|0 – 0.332| – 0.5)^2 / 0.332) + ((|4 – 3.668| – 0.5)^2 / 3.668) = 0.085 + 0.008 = 0.093$

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)

not significant (classification frequencies do not differ significantly)

A.I.2.b.2. Leiterband vs. Handessi

test not possible – no reliable Handessi classifications

Individual by individual classification frequencies - pre-Leiterband:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	4	1.000
All	4	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	0.332	(4 · 0.083 = 0.332)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	3.668	(4 · 0.917 = 3.668)

Individual by individual classification frequencies - Leiterband:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.083
Malian Sahara	11	0.917
All	12	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	12.000	(12 · 1.000 = 12.000)

Individual by individual classification frequencies - Handessi:

	Reliable individuals	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	0	0.000
All	0	0.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.083 = 0.000)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.917 = 0.000)

A.II. Analysis by analysis classification frequencies

A.II.1.Reliable and unreliable classifications

A.II.1.a. Pearson's χ^2

A.II.1.a.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample):

$\chi^2 = ((1 - 1.176)^2 / 1.176) + ((6 - 7.014)^2 / 7.014) + ((14 - 12.831)^2 / 12.831) = 0.026 + 0.147 + 0.107 = 0.280$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

not significant (classification frequencies do not differ significantly), remarks: one expected frequency is under 5

A.II.1.a.2. Leiterband vs. Handessi

expected frequencies based on Leiterband frequencies (larger sample):

$\chi^2 = ((2 - 0.336)^2 / 0.336) + ((2 - 2.004)^2 / 2.004) + ((2 - 3.666)^2 / 3.666) = 8.241 + 0.000 + 0.757 = 8.998$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

significant (classification frequencies do differ significantly), remarks: all expected frequencies are under 5

Analysis by analysis classification frequencies - pre-Leiterband:

Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	1	0.048
Jebel Sahaba/Tushka	6	0.286
Malian Sahara	14	0.667
All	21	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	1.176	(21 · 0.056 = 1.176)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	7.014	(21 · 0.334 = 7.014)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	12.831	(21 · 0.611 = 12.831)

Analysis by analysis classification frequencies - Leiterband:

Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	3	0.056
Jebel Sahaba/Tushka	18	0.334
Malian Sahara	33	0.611
All	54	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	2.592	(54 · 0.048 = 2.592)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	15.444	(54 · 0.286 = 15.444)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	36.018	(54 · 0.667 = 36.018)

Analysis by analysis classification frequencies - Handessi:
Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	2	0.333
Jebel Sahaba/Tushka	2	0.333
Malian Sahara	2	0.333
All	6	1.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.336	(6 · 0.056 = 0.336)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	2.004	(6 · 0.334 = 2.004)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	3.666	(6 · 0.611 = 3.666)

A.II.1.b. Yates's χ^2

A.II.1.b.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|1 - 1.176| - 0.5)^2 / 1.176) + ((|6 - 7.014| - 0.5)^2 / 7.014) + ((|14 - 12.831| - 0.5)^2 / 12.831) = 0.089 + 0.038 + 0.035 = 0.162$
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
A.II.1.b.2. Leiterband vs. Handessi
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|2 - 0.336| - 0.5)^2 / 0.336) + ((|2 - 2.004| - 0.5)^2 / 2.004) + ((|2 - 3.666| - 0.5)^2 / 3.666) = 4.032 + 0.123 + 0.371 = 4.526$
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
Analysis by analysis classification frequencies - pre-Leiterband:
Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	1	0.048
Jebel Sahaba/Tushka	6	0.286
Malian Sahara	14	0.667
All	21	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	1.176	(21 · 0.056 = 1.176)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	7.014.	(21 · 0.334 = 7.014)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	12.831	(21 · 0.611 = 12.831)

Analysis by analysis classification frequencies - Leiterband:
Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	3	0.056
Jebel Sahaba/Tushka	18	0.334
Malian Sahara	33	0.611
All	54	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	2.592	(54 · 0.048 = 2.592)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	15.444	(54 · 0.286 = 15.444)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	36.018	(54 · 0.667 = 36.018)

Analysis by analysis classification frequencies - Handessi:
Prehistoric comparative samples:

	All analyses	
	f	p
A-Group	2	0.333
Jebel Sahaba/Tushka	2	0.333
Malian Sahara	2	0.333
All	6	1.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.336	(6 · 0.056 = 0.336)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	2.004	(6 · 0.334 = 2.004)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	3.666	(6 · 0.611 = 3.666)

A.II.2.Reliable classifications only

A.II.2.a. Pearson's χ^2

A.II.2.a.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((0 - 0.324)^2 / 0.324) + ((1 - 2.916)^2 / 2.916) + ((11 - 8.760)^2 / 8.760) = 0.324 + 1.259 + 0.573 = 2.156$
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)
not significant (classification frequencies do not differ significantly), remarks: two expected frequencies are under 5
A.II.2.a.2. Leiterband vs. Handessi
test not possible – no reliable Handessi classifications

Analysis by analysis classification frequencies - pre-Leiterband:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.083
Malian Sahara	11	0.917
All	12	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.324	(12 · 0.027 = 0.324)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	2.916	(12 · 0.243 = 2.916)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	8.760	(12 · 0.730 = 8.760)

Analysis by analysis classification frequencies - Leiterband:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	1	0.027
Jebel Sahaba/Tushka	9	0.243
Malian Sahara	27	0.730
All	37	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(37 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	3.071	(37 · 0.083 = 3.071)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	33.929	(37 · 0.917 = 33.929)

Analysis by analysis classification frequencies - Handessi:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	0	0.000
All	0	0.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.027 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.243 = 0.000)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.730 = 0.000)

A.II.2.b. Yates's χ^2

A.II.2.b.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|0 - 0.324| - 0.5)^2 / 0.324) + ((|1 - 2.916| - 0.5)^2 / 2.916) + ((|11 - 8.760| - 0.5)^2 / 8.760) = 0.096 + 0.688 + 0.346 = 1.130$
df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
A.II.2.b.2. Leiterband vs. Handessi
test not possible – no reliable Handessi classifications
Analysis by analysis classification frequencies - pre-Leiterband:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	1	0.083
Malian Sahara	11	0.917
All	12	1.000

expected A-Group frequency for pre-Leiterband based on Leiterband frequency:	0.324	(12 · 0.027 = 0.324)
expected J. Sahaba/Tushka frequency for pre-Leiterband based on Leiterband frequency:	2.916	(12 · 0.243 = 2.916)
expected Malian Sahara frequency for pre-Leiterband based on Leiterband frequency:	8.760	(12 · 0.730 = 8.760)

Analysis by analysis classification frequencies - Leiterband:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	1	0.027
Jebel Sahaba/Tushka	9	0.243
Malian Sahara	27	0.730
All	37	1.000

expected A-Group frequency for Leiterband based on pre-Leiterband frequency:	0.000	(37 · 0.000 = 0.000)
expected J. Sahaba/Tushka frequency for Leiterband based on pre-Leiterband frequency:	3.071	(37 · 0.083 = 3.071)
expected Malian Sahara frequency for Leiterband based on pre-Leiterband frequency:	33.929	(37 · 0.917 = 33.929)

Analysis by analysis classification frequencies - Handessi:
Prehistoric comparative samples:

	Reliable analyses	
	f	p
A-Group	0	0.000
Jebel Sahaba/Tushka	0	0.000
Malian Sahara	0	0.000
All	0	0.000

expected A-Group frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.027 = 0.000)
expected J. Sahaba/Tushka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.243 = 0.000)
expected Malian Sahara frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.730 = 0.000)

B. Modern comparative samples

B.I. Individual by individual classification frequencies

B.I.1. Reliable and unreliable classifications

B.I.1.a. Pearson's χ^2

B.I.1.a.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), Mandinka and Somalis not included (frequencies = 0):

$\chi^2 = ((3 - 3.318)^2 / 3.318) + ((3 - 2.576)^2 / 2.576) + ((1 - 1.106)^2 / 1.106) = 0.030 + 0.070 + 0.010 = 0.110$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

not significant (classification frequencies do not differ significantly), remarks: all expected frequencies are under 5

B.I.1.a.2. Leiterband vs. Handessi

expected frequencies based on Leiterband frequencies (larger sample), Mandinka and Somalis not included (frequencies = 0):

$\chi^2 = ((0 - 0.948)^2 / 0.948) + ((0 - 0.736)^2 / 0.736) + ((2 - 0.316)^2 / 0.316) = 0.948 + 0.736 + 8.974 = 10.658$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

very significant (classification frequencies do differ very significantly), remarks: all expected frequencies are under 5

Individual by individual classification frequencies - pre-Leiterband:

	All individuals	
	f	p
Southern Sudan	3	0.429
Chad	3	0.429
Mandinka	0	0.000
Somalis	0	0.000
Haya	1	0.143
All	7	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	3.318	(7 · 0.474 = 3.318)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	2.576	(7 · 0.368 = 2.576)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	1.106	(7 · 0.158 = 1.106)

Individual by individual classification frequencies - Leiterband:

	All individuals	
	f	p
Southern Sudan	9	0.474
Chad	7	0.368
Mandinka	0	0.000
Somalis	0	0.000
Haya	3	0.158
All	19	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	8.151	(19 · 0.429 = 8.151)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	8.151	(19 · 0.429 = 8.151)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	2.717	(19 · 0.143 = 2.717)

Individual by individual classification frequencies - Handessi:

	All individuals	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	2	1.000
All	2	1.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.948	(2 · 0.474 = 0.948)
expected Chad frequency for Handessi based on Leiterband frequency:	0.736	(2 · 0.368 = 0.736)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.316	(2 · 0.158 = 0.316)

B.I.1.b. Yates's χ^2

B.I.1.b.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), Mandinka and Somalis not included (frequencies = 0):

$\chi^2 = ((|3 - 3.318| - 0.5)^2 / 3.318) + ((|3 - 2.576| - 0.5)^2 / 2.576) + ((|1 - 1.106| - 0.5)^2 / 1.106) = 0.010 + 0.002 + 0.140 = 0.152$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table

B.I.1.b.2. Leiterband vs. Handessi

expected frequencies based on Leiterband frequencies (larger sample), Mandinka and Somalis not included (frequencies = 0):

$\chi^2 = ((|0 - 0.948| - 0.5)^2 / 0.948) + ((|0 - 0.736| - 0.5)^2 / 0.736) + ((|2 - 0.316| - 0.5)^2 / 0.316) = 0.212 + 0.076 + 4.436 = 4.724$

df = 2, critical values = 4.605 (p .1), 5.991 (p .05), 9.210 (p .01)

not significant (classification frequencies do not differ significantly but show a tendency to differ), remarks: not a 2x2 table

Individual by individual classification frequencies - pre-Leiterband:

	All individuals	
	f	p
Southern Sudan	3	0.429
Chad	3	0.429
Mandinka	0	0.000
Somalis	0	0.000
Haya	1	0.143
All	7	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	3.318	(7 · 0.474 = 3.318)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	2.576	(7 · 0.368 = 2.576)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.000	(7 · 0.000 = 0.000)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	1.106	(7 · 0.158 = 1.106)

Individual by individual classification frequencies - Leiterband:

	All individuals	
	f	p
Southern Sudan	9	0.474
Chad	7	0.368
Mandinka	0	0.000
Somalis	0	0.000
Haya	3	0.158
All	19	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	8.151	(19 · 0.429 = 8.151)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	8.151	(19 · 0.429 = 8.151)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(19 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	2.717	(19 · 0.143 = 2.717)

Individual by individual classification frequencies - Handessi:

	All individuals	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	2	1.000
All	2	1.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.948	(2 · 0.474 = 0.948)
expected Chad frequency for Handessi based on Leiterband frequency:	0.736	(2 · 0.368 = 0.736)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(2 · 0.000 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.316	(2 · 0.158 = 0.316)

B.I.2.Reliable classifications only

B.I.2.a. Pearson's χ^2

B.I.2.a.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), Mandinka, Somalis and Haya not included (frequencies = 0):

$\chi^2 = ((2 - 2.332)^2 / 2.332) + ((2 - 1.668)^2 / 1.668) = 0.047 + 0.066 = 0.113$

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)

not significant (classification frequencies do not differ significantly), remarks: both expected frequencies are under 5

B.I.2.a.2. Leiterband vs. Handessi

test not possible – no reliable Handessi classifications

Individual by individual classification frequencies - pre-Leiterband:

	Reliable individuals	
	f	p
Southern Sudan	2	0.500
Chad	2	0.500
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	4	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	2.332	(4 · 0.583 = 2.332)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	1.668	(4 · 0.417 = 1.668)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)

Individual by individual classification frequencies - Leiterband:

	Reliable individuals	
	f	p
Southern Sudan	7	0.583
Chad	5	0.417
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	12	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	6.000	(12 · 0.500 = 6.000)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	6.000	(12 · 0.500 = 6.000)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)

Individual by individual classification frequencies - Handessi:

	Reliable individuals	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	0	0.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.583 = 0.000)
expected Chad frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.417 = 0.000)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)

B.I.2.b. Yates's χ^2

B.I.2.b.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample), Mandinka, Somalis and Haya not included (frequencies = 0):

$\chi^2 = ((|2 - 2.332| - 0.5)^2 / 2.332) + ((|2 - 1.668| - 0.5)^2 / 1.668) = 0.012 + 0.017 = 0.029$

df = 1, critical values = 2.706 (p .1), 3.841 (p .05), 6.635 (p .01)

not significant (classification frequencies do not differ significantly)

B.I.2.b.2. Leiterband vs. Handessi

test not possible – no reliable Handessi classifications

Individual by individual classification frequencies - pre-Leiterband:

	Reliable individuals	
	f	p
Southern Sudan	2	0.500
Chad	2	0.500
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	4	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	2.332	(4 · 0.583 = 2.332)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	1.668	(4 · 0.417 = 1.668)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	0.000	(4 · 0.000 = 0.000)

Individual by individual classification frequencies - Leiterband:

	Reliable individuals	
	f	p
Southern Sudan	7	0.583
Chad	5	0.417
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	12	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	6.000	(12 · 0.500 = 6.000)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	6.000	(12 · 0.500 = 6.000)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	0.000	(12 · 0.000 = 0.000)

Individual by individual classification frequencies - Handessi:

	Reliable individuals	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	0	0.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.583 = 0.000)
expected Chad frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.417 = 0.000)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.000 = 0.000)

B.II. Analysis by analysis classification frequencies

B.II.1. Reliable and unreliable classifications

B.II.1.a. Pearson's χ^2

B.II.1.a.1. pre-Leiterband vs. Leiterband

expected frequencies based on Leiterband frequencies (larger sample):

$\chi^2 = ((8 – 8.680)^2 / 8.680) + ((8 – 6.040)^2 / 6.040) + ((2 – 1.880)^2 / 1.880) + ((0 – 0.380)^2 / 0.380) + ((2 – 3.020)^2 / 3.020) = 0.053 + 0.636 + 0.008 + 0.380 + 0.344 = 1.421$

df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01)

not significant (classification frequencies do not differ significantly), remarks: three expected frequencies are under 5

B.II.1.a.2. Leiterband vs. Handessi

expected frequencies based on Leiterband frequencies (larger sample):

$\chi^2 = ((0 – 1.736)^2 / 1.736) + ((0 – 1.208)^2 / 1.208) + ((1 – 0.376)^2 / 0.376) + ((1 – 0.076)^2 / 0.076) + ((2 – 0.604)^2 / 0.604) = 1.736 + 1.208 + 1.036 + 11.234 + 3.227 = 18.441$

df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01), 18.467 (p .001)

very significant (classification frequencies do differ very significantly), remarks: all expected frequencies are under 5

Analysis by analysis classification frequencies - pre-Leiterband:

Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	8	0.400
Chad	8	0.400
Mandinka	2	0.100
Somalis	0	0.000
Haya	2	0.100
All	20	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	8.680	(20 · 0.434 = 8.680)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	6.040	(20 · 0.302 = 6.040)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	1.880	(20 · 0.094 = 1.880)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.380	(20 · 0.019 = 0.380)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	3.020	(20 · 0.151 = 3.020)

Analysis by analysis classification frequencies - Leiterband:

Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	23	0.434
Chad	16	0.302
Mandinka	5	0.094
Somalis	1	0.019
Haya	8	0.151
All	53	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	21.200	(53 · 0.400 = 21.200)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	21.200	(53 · 0.400 = 21.200)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	5.300	(53 · 0.100 = 5.300)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(53 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	5.300	(53 · 0.100 = 5.300)

Analysis by analysis classification frequencies - Handessi:

Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	1	0.250
Somalis	1	0.250
Haya	2	0.500
All	4	1.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	1.736	(4 · 0.434 = 1.736)
expected Chad frequency for Handessi based on Leiterband frequency:	1.208	(4 · 0.302 = 1.208)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.376	(4 · 0.094 = 0.376)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.076	(4 · 0.019 = 0.076)
expected Haya frequency for Handessi based on Leiterband frequency:	0.604	(4 · 0.151 = 0.604)

B.II.1.b. Yates's χ^2

B.II.1.b.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|8 - 8.680| - 0.5)^2 / 8.680) + ((|8 - 6.040| - 0.5)^2 / 6.040) + ((|2 - 1.880| - 0.5)^2 / 1.880) + ((|0 - 0.380| - 0.5)^2 / 0.380) + ((|2 - 3.020| - 0.5)^2 / 3.020) = 0.004 + 0.353 + 0.077 + 0.038 + 0.090 = 0.562$
df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
B.II.1.b.2. Leiterband vs. Handessi
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|0 - 1.736| - 0.5)^2 / 1.736) + ((|0 - 1.208| - 0.5)^2 / 1.208) + ((|1 - 0.376| - 0.5)^2 / 0.376) + ((|1 - 0.076| - 0.5)^2 / 0.076) + ((|2 - 0.604| - 0.5)^2 / 0.604) = 0.880 + 0.415 + 0.041 + 2.365 + 1.329 = 5.030$
df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
Analysis by analysis classification frequencies - pre-Leiterband:
Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	8	0.400
Chad	8	0.400
Mandinka	2	0.100
Somalis	0	0.000
Haya	2	0.100
All	20	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	8.680	(20 · 0.434 = 8.680)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	6.040	(20 · 0.302 = 6.040)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	1.880	(20 · 0.094 = 1.880)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.380	(20 · 0.019 = 0.380)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	3.020	(20 · 0.151 = 3.020)

Analysis by analysis classification frequencies - Leiterband:
Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	23	0.434
Chad	16	0.302
Mandinka	5	0.094
Somalis	1	0.019
Haya	8	0.151
All	53	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	21.200	(53 · 0.400 = 21.200)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	21.200	(53 · 0.400 = 21.200)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	5.300	(53 · 0.100 = 5.300)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(53 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	5.300	(53 · 0.100 = 5.300)

Analysis by analysis classification frequencies - Handessi:
Modern comparative samples:

	All analyses	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	1	0.250
Somalis	1	0.250
Haya	2	0.500
All	4	1.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	1.736	(4 · 0.434 = 1.736)
expected Chad frequency for Handessi based on Leiterband frequency:	1.208	(4 · 0.302 = 1.208)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.376	(4 · 0.094 = 0.376)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.076	(4 · 0.019 = 0.076)
expected Haya frequency for Handessi based on Leiterband frequency:	0.604	(4 · 0.151 = 0.604)

B.II.2.Reliable classifications only

B.II.2.a. Pearson's χ^2

B.II.2.a.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((5 - 6.348)^2 / 6.348) + ((6 - 4.236)^2 / 4.236) + ((1 - 0.708)^2 / 0.708) + ((0 - 0.348)^2 / 0.348) + ((0 - 0.348)^2 / 0.348) = 0.286 + 0.735 + 0.120 + 0.348 + 0.348 = 1.837$
df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01)
not significant (classification frequencies do not differ significantly), remarks: four expected frequencies are under 5
B.II.2.a.2. Leiterband vs. Handessi
test not possible – no reliable Handessi classifications

Analysis by analysis classification frequencies - pre-Leiterband:
Modern comparative samples:

	Reliable analyses	
	f	p
Southern Sudan	5	0.417
Chad	6	0.500
Mandinka	1	0.083
Somalis	0	0.000
Haya	0	0.000
All	12	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	6.348	(12 · 0.529 = 6.348)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	4.236	(12 · 0.353 = 4.236)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.708	(12 · 0.059 = 0.708)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.348	(12 · 0.029 = 0.348)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	0.348	(12 · 0.029 = 0.348)

Analysis by analysis classification frequencies - Leiterband:
Modern comparative samples:

	Reliable analyses	
	f	p
Southern Sudan	18	0.529
Chad	12	0.353
Mandinka	2	0.059
Somalis	1	0.029
Haya	1	0.029
All	34	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	14.178	(34 · 0.417 = 14.178)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	17.000	(34 · 0.500 = 17.000)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	2.822	(34 · 0.083 = 2.822)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(34 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	0.000	(34 · 0.000 = 0.000)

Analysis by analysis classification frequencies - Handessi:
Modern comparative samples:

	Reliable analyses	
	f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	0	0.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.529 = 0.000)
expected Chad frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.353 = 0.000)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.059 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.029 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.029 = 0.000)

B.II.2.b. Yates's χ^2

B.II.2.b.1. pre-Leiterband vs. Leiterband
expected frequencies based on Leiterband frequencies (larger sample):
$\chi^2 = ((|5 - 6.348| - 0.5)^2 / 6.348) + ((|6 - 4.236| - 0.5)^2 / 4.236) + ((|1 - 0.708| - 0.5)^2 / 0.708) + ((|0 - 0.348| - 0.5)^2 / 0.348) + ((|0 - 0.348| - 0.5)^2 / 0.348) = 0.113 + 0.377 + 0.061 + 0.066 + 0.066 = 0.683$
df = 4, critical values = 7.779 (p .1), 9.488 (p .05), 13.277 (p .01)
not significant (classification frequencies do not differ significantly), remarks: not a 2x2 table
B.II.2.b.2. Leiterband vs. Handessi
test not possible – no reliable Handessi classifications
Analysis by analysis classification frequencies - pre-Leiterband:
Modern comparative samples:

	Reliable analyses	
	f	p
Southern Sudan	5	0.417
Chad	6	0.500
Mandinka	1	0.083
Somalis	0	0.000
Haya	0	0.000
All	12	1.000

expected Southern Sudan frequency for pre-Leiterband based on Leiterband frequency:	6.348	(12 · 0.529 = 6.348)
expected Chad frequency for pre-Leiterband based on Leiterband frequency:	4.236	(12 · 0.353 = 4.236)
expected Mandinka frequency for pre-Leiterband based on Leiterband frequency:	0.708	(12 · 0.059 = 0.708)
expected Somalis frequency for pre-Leiterband based on Leiterband frequency:	0.348	(12 · 0.029 = 0.348)
expected Haya frequency for pre-Leiterband based on Leiterband frequency:	0.348	(12 · 0.029 = 0.348)

Analysis by analysis classification frequencies - Leiterband:
Modern comparative samples:

	Reliable analyses f	p
Southern Sudan	18	0.529
Chad	12	0.353
Mandinka	2	0.059
Somalis	1	0.029
Haya	1	0.029
All	34	1.000

expected Southern Sudan frequency for Leiterband based on pre-Leiterband frequency:	14.178	(34 · 0.417 = 14.178)
expected Chad frequency for Leiterband based on pre-Leiterband frequency:	17.000	(34 · 0.500 = 17.000)
expected Mandinka frequency for Leiterband based on pre-Leiterband frequency:	2.822	(34 · 0.083 = 2.822)
expected Somalis frequency for Leiterband based on pre-Leiterband frequency:	0.000	(34 · 0.000 = 0.000)
expected Haya frequency for Leiterband based on pre-Leiterband frequency:	0.000	(34 · 0.000 = 0.000)

Analysis by analysis classification frequencies - Handessi:
Modern comparative samples:

	Reliable analyses f	p
Southern Sudan	0	0.000
Chad	0	0.000
Mandinka	0	0.000
Somalis	0	0.000
Haya	0	0.000
All	0	0.000

expected Southern Sudan frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.529 = 0.000)
expected Chad frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.353 = 0.000)
expected Mandinka frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.059 = 0.000)
expected Somalis frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.029 = 0.000)
expected Haya frequency for Handessi based on Leiterband frequency:	0.000	(0 · 0.029 = 0.000)