THE BYZANTINE CEMETERY AT KHIRBAT AS-SAMRĀ': PRELIMINARY HUMAN OSTEOLOGICAL ANALYSIS

by

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Introduction

The Byzantine cemetery at Khirbat as-Samrā' belongs to the ancient settlement's populations through the period from the fifth until the eighth century AD. It is one of numerous ancient cemeteries in Jordan that have suffered or are suffering disturbances and destructions still leaving little material for archaeological and biological studies. This has led to the loss of valuable information on human settlement in Jordan.

In the present study, the results of the anthropological examinations of the human skeletal remains excavated in the 1993 season from the Byzantine cemetery at Khirbat as-Samrā' are to be presented. The investigation presents a case study on the relevance of biological analysis to the osteological material from disturbed sites.

Material and Methods

22 single burials were excavated at site A of the Byzantine cemetery, which is dates to the sixth century AD. Human remains were salvaged from 18 tombs only. The obtained skeletal material from Tombs 16 and 18 was nearly complete. Only 30-50% of the original cranial and post cranial parts were secured from Burials 3, 4, 5, 7, 8, 10, 11, 14, 17, 19, 20 and 22. In Tombs 9, 12 and 21 only few bones or bone fragments remained. Burial 1 was intact but the salvaged material for analysis was very restricted, due to the extreme fragility of the bones. Any human bones found in tomb fills above the tomb slabs (as a result of robberies!) were excluded from the analysis.

The excavated human bones were mostly fragmented and fragile. Though the maxillary parts were missing in all examined cases, the skull from Tomb 16 was nearly intact. Reconstruction of the crania and long bones was restricted to the available fragments. Few bone samples were taken for microscopical examination. Relevant macroscopic methodologies were applied to determine age, sex (Brothwell 1981; Sjøvold 1990; Szilvássy 1990). As far as possible, age estimation was based on molar analysis, cranial suture and ossification of the long bones, while sex was determined according to the discriminating characters of the pelvis, skull, bone robustness and, if needed, with the aid of non-gender specific objects found in the burial, for example earrings and hairpins by females. Palaeopathologic diagnosis (Schultz 1984; While and Folkens 1991) was based on macroscopic examination. Epigenetic traits of the skull were determined according to Hauser and De Stefano (1989) and anthropometric measurements were taken in line with the modified terminology and techniques described by Bräuer (1988).

Results and Discussion

The deteriorated condition of the examined human skeletal remains, as macroscopically established, was substantiated by microscopic analysis. These failed to reveal recognizable bone tissue structures. This could be attributed to naturally induced fragility, as a result of climatic factors or root intrusions, and / or to destruction, resulting from multiple disturbances of the burials, as became apparent in the state of the excavated tombs. On some skulls, dark brownish spots were observed on the frontal and parietal cranial parts. These were found to be

traces of cloth, with which the individuals were wrapped before burial, thus indicating ceremonial burials. Similar observations were established on the skeletal material excavated from churches within the ancient settlement and dated to the seventh-eighth century AD.

The examined skeletal remains consisted of six children and 12 adults (Table 1). Child burials included two infants and four juveniles, from which only burial 22 could be determined as female. Among the adult ones, six females and four males were determined. Sex of burial 9 and 19 remains non definable. Individual 20 was classified as male due to the apparent muscularity, indicated by the muscle attachments on the long bones, while a number of factors, including artefacts found in the respective tombs, have indicated that burials 4 and 10 involved females.

Even after including the four empty tombs, whose form indicate infant or child burials, the sample size remains small (22) for detailed demographic analysis. Yet, the ancient population at Khirbat as-Samrā' appears to have suffered from high infant and child mortality (over 40 % of total deaths). The estimated average death age (21.9 years) and a mortality rate of 54.6 in 1000 indicates that population growth rate was very low or even zero. Furthermore, life expectancy was probably low (between 30 and 40 years) and seldom exceeded 50 years.

Palaeopathologic diagnosis were based on macroscopic observations. Traces of periostitis, bone outgrowth, were diagnosed on the ventral side of os sphenoidale and on the outer auriculo-temporal bones of the available crania. These may be related to common infectious diseases of the respiratory system. From seven possible cases, cribra orbitale was diagnosed in individual 18 only. Beside dental wear and age related loss of molars, as in individual 17, the teeth of the examined individuals were generally in a good condition. Dental infections were limited to the presence of abscess cavities alongside caries on the upper and lower jaws of individual 16, and the presence of dental caries in individual 3. Further indicators of diseases or premortal injuries were not detected on the available cranial material.

Stress related pathological features were observed to be more frequent and stronger on the upper than on the lower extremities, but weaker on the left side extremities than on the right ones. Joint attrisions, on the articulation surfaces of caput humeri and caput femor as well as on the cavitas glenoidalis of the pectoral bone, were diagnosed in three individuals: 16, 17 and 18. These were well developed in individual 16 (grade IV b on the right cavitas glenoidalis) and less manifested in individual 18 (grade IIa on both caput femori). Osteophytes and spondylophytes were diagnosed on the vertebrae of five individuals. They were detected on the thoracic and lumber vertebrae, especially on the second and third, of individuals 8, 17 and 18, and less developed on the lumber vertebrae of individuals 10 and 16. No pathological features were observed on the postcranial remains of burials 3 and 7. A sacralised sixth lumber vertebra was observed in individual 18 and can be considered as an epigenetic character.

Burial 1 represents an extreme pathological case. Periostitis, bone outgrowth, and probably periostosis, was diagnosed on all of its long bones. Based on dentition, the age of the child was estimated to be 12-18 months. Yet, the length of both femori (ca. 107 mm) was too short (109-152 mm)for the supposed age (Brothwell 1981). This may suggest that the child had suffered from a severe "infectious" disease, which had prevented normal development.

The incidence of cribra orbital and hypoplasias, among other pathologic features, are often related to malnutrition, which probably was common among ancient populations (Larsen 1987; Rösing 1990; Reshef and Smith 1993). The so far low rate of cribra or-

bitale and the absence of further malnutrition related pathologic features in the examined sample from Khirbat as-Samrā' suggest comparatively good nutritional conditions in the population concerned. The diagnosed dental condition of the individuals 3 and 16, which is often associated with a rich diet (Larsen 1987), strengthen these reflections. On the other hand, the previously mentioned high child mortality and the pathologic condition of individual 1 suggest a probable prevalence of infectious diseases in the population at that time. These speculations still have to be confirmed through further excavations and examinations.

The obtained anthropometric measurements are listed in Table 2. The cranial data indicate a wide range of biological variability among the ancient population of Khirbet es-Samra. This was well demonstrated by the estimated cephalic index values varying between 70% to 80%. Taking the high inter-correlations between cranial breadth measurements into consideration (Howells 1949, 1969), the sample under study appears to reflect more dolechocephalic, that is elongated, than brachycephalic, that is rounded, cranial features. Postcranial data indicate a medium stature. The expected means for males and females are (170 cm and (160 cm respectively. These results lay within the regional ranges of variation reported among similarly ancient (e.g. Henke and Wahl 1990) and more recent (e.g. Shanklin 1946; Field 1956) populations in Jordan.

Presently, a biologically defined ethnicity of the sixth century population at Khirbat as-Samrā' is not possible. This is less related to the small sample size but primarily to the absence of comparative and comprehensive anthropological studies on the ancient Jordanian and other neighbouring populations, and including the factors that may influence the observed distributions. Even then, anthropometric measurements alone, like any other type of biological methodologies, can only be applied as indicators of inter-and intra-population relationships and not as evidence of ethno-historic relationships.

The global distributions of the epigenetic traits can be described as population specific. Any two populations may display very similar or different frequencies for any such characters, regardless of their ethnic affiliation (Hauser and DeStefano 1989; Rösing 1990; Wiltschke-Schrotta 1992). Table 3 lists some of the observed epigenetic traits in the examined sample. These data do not permit any predictions on the distributions in the population concerned. Yet, the occurrence of ossicles at lambda, lambdaoid ossicles and infraorbital foramen indicate to be abundant. The same characters were also detected in the skeletal material from within the ancient settlement. Hence, epigenetic traits may prove to be useful in the characterisation and progression of the ancient population in Khirbat as-Samrā'.

To conclude, biological analysis on the skeletal remains from the Byzantine cemetery in Khirbat as-Samrā' indicates that the sixth century AD population of the settlement had enjoyed a relatively good living standard. Yet, health conditions were disadvantageous. The estimated high child mortality may be attributed to infectious diseases. This had kept population growth low. Some observed epigenetic traits may prove to be informative on the progression of the ancient population at Khirbat as-Samrā'. Any discussion on the population's ethnicity is momentary superfluous.

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Table 1. Age estimation and sex determination of the human remains from Khirbat as-Samrā'.

Burial no.	Age Estimation		Sex Determination	
	Age	Method	Sex	Method
Tomb 1	12-18 mos	dentition	?	
Tomb 3	20-25 yr.	molars and pelvis (os pubis)	Female	pelvis (sciatic notch)
Tomb 4	17-25 yr.	molars	Female ?	skull (proc. mastoideus)
Tomb 5	18-24 mos	dentition	?	
Tomb 7	20-25 yr.	Molars and cranial sutures	Male	pelvis (sciatic notch) and bone robusticity
Tomb 8	35-45 yr.	ossification and pelvis (os pubis)	Female	pelvis (sciatic notch)
Tomb 9	adult	bone ossification	?	
Tomb 10	45 yr.	bone ossification	female?	bone robusticity and tomb artefacts
Tomb 11	7-10 yr.	bone ossification	?	
Tomb 12	10-15 yr.	os lunatum size & shape	?	
Tomb 14	25-40 yr.	bone ossification	male	pelvis (sciatic notch)
Tomb 16	35-40 yr.	dentition, pelvis and cranial sutures	female	pelvis (sciatic notch) and skull features
Tomb 17	> 45 yr.	bone (os pubis)	female	pelvis (os pubis)
Tomb 18	35-39 yr.	dentition, pelvis and cranial sutures	male	pelvis (sciatic notch) and skull robusticity
Tomb 19	25-45 yr.	bone ossification	?	
Tomb 20	25-45 yr.	bone ossification	male?	bone robusticity
Tomb 21	< 17 yr.	bone ossification	?	
Tomb 22	10-15 yr.	bone ossification and development (vertebrae)	female	pelvis (sciatic notch)

Table 2. Anthropometric measurments (Bräuer 1988) on the human bones from Khirbat as-Samrā'. Postcranial measurements are for the left side. Right side ones are between brackets c).

Measurement		Individual						
No.		3	7	8	10	16	17	18
1	Maximum cranial length	173				186	184	174
5	Basion-nasion length					95		
8	Maximum cranial breadth	139	132			132		135
9	Least frontal breadth	100				96	91	95
11	Biauricular breadth					116		106
12	Biasterionic breadth					113		
13	Mastoid width					108		
17	Basion-bregma height					134		
26	Frontal longitudinal arc					134		138
27	Parietal longitudinal arc	138				138		142
28	Occipital sagittal arc					122		
29	Nasion-bregma chord	120						114
43(1)	Inner biorbital breadth					92		
23	Horizontal cranial cercomf.					549		
65	Bicondylar breadth	107				118		119
66	Bigonial breadth	80				102		94
69	Mandibular symphysis ht.	25				33	34	31
7	Foramen magnum length					37		
16	Foramen magnum width					32		
	Cephalic index (8/1x100)	80.34				70.97		77.59
C1	Clavicula maximal length			122		135		150
H1	Humerus maximalLänge							286
H2	Humerus total length							305
R1	Radius maximal length							232
F1	Femor maximal length							446
F2	Femor total length				398			431
P1	Patella maximal length	31	37				(37)	(41)
P2	Patella maximal width	37	38		(47)		39	(46)

Table 3. The observed epigenetic traits in the Khirbat as-Samrā' sample according to the definitions and classifications by Hauser and De Stefano (1989).

Trait	Individual 3	7	16	17	18
Median supraorbital foramen	-/+L	?	-	+R	+R/+L
supratrochlear foramen	-/-	?	-	+R/+L	+R/+L
Lateral suprafrontal groove	+R/-	?	-	-	-/+L
Infraorbital foramen	2R/3L	?	3R/2L	?	+R/+L
Ethmoid foramen	?	?	2R/?	?	?
Occipital foramen	-	+	+	-	-
Sagittal ossicle	-	-	+	-	-
coronal ossicle	-	-	1L	-	-
Ossicle at lambda	3 (c)	-	1 (c)	?	-
Lambdoid ossicle	2R/3L	1R/1L	4R/4L	?	-

+: trait observed ; -: trait not observed.
R / L: trait observed on the right /left half and their frequencies, given in numbers.
?: trait not verifiable due to missing parts.

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