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Short Fieldwork Report: Ghal-e-Kash, Tepe Lafoor & Molla Kheil (Iran), season 2009

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Ghal-e-Kash, Tepe Lafoor & Molla Kheil (Iran), season 2009

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In the spring of 2009, during the study of human remains from Gohar Tepe (see this volume), single skeletons from three other sites in the Mazandaran province were analysed. The first of these sites is Ghal-e-Kash, located some 7km east of Amol and 300m south of

the road from Amol to Sari (36°28'11"N 52°25'35"E). This small settlement was inhabited beginning in the Chalcolithic until the Islamic period, reaching its climax during the Bronze and Iron Ages. Excavations at Ghal-e-Kash were undertaken by an Iranian team directed by Ebrahim Amirkolaee in the early spring of 2009. Among the architectural remains recovered, one burial dating to the Iron Age II was found virtually intact with the skeleton of a male individual who died between the ages of 30–40 years (sex determination and age assessment carried out following Buikstra & Ubelaker 1994). Although the tibiae, scapulae and ossa coxae were damaged and many foot bones were missing, it was possible to take several metric measurements as well as to score nonmetric traits.

Figure 1. Healed fracture in the distal radius of the individual from Ghal-e-Kash: anterior view (a), distal view (b).

The bones of this individual were robust, with marked muscular attachments. Bilateral asymmetry was evident in most of the long bones, especially in the upper extremity. Not only was the right humerus slightly shorter compared to the left (maximum length $^{r}323$, $^{l}325.5$, all measurements in millimetres), but it was also more robust at the midshaft (maximum diameter at midshaft $^{r}24$, $^{l}21.5$) and had a broader distal end (epicondylar breadth $^{r}61$, $^{l}60$). Also, the left glenoid fossa was narrower compared to the right. However, the supinator crest was less prominent in the right ulna, although in general, the right ulna was more robust compared to the left (anterior-posterior diameter $^{r}16$, $^{l}17$; medial-lateral diameter $^{r}13$, $^{l}12$). Surprisingly, the right clavicle was shorter and less robust than the left (maximum length $^{r}145.5$, $^{l}151$; anterior-posterior midshaft diameter $^{r}12$, $^{l}12.5$). Asymmetry was also observed in the first metacarpals—the right was shorter but more robust (maximum length $^{r}45.5$, $^{l}47$; proximal epiphyseal breadth $^{r}13$, $^{l}11.5$; distal epiphyseal breadth $^{r}14.5$, $^{l}14$) and presented osteophytes at the proximal end. The right first metacarpal was curved abnormally. Initial degenerative joint disease was observed in the navicular, lunate, and trapezium of the right hand, but not on the left side. The apparent asymmetry in the upper extremities points to a high level of physical activity related to handedness. This conclusion is supported by the presence of a healed fracture in the distal end of the right radius. The styloid process together with the anterior part of the epiphysis and the metaphysis were broken off and the fracture healed with some displacement and subsequent degenerative joint disease (**Figure 1**).

In the lower extremities, the left femur and tibia were slightly more robust compared to those of the right leg. The naviculars had small osteophytes on their distal articular surfaces and the cuneiforms were missing. Only mild degenerative changes were observed in the spine, particularly in the lumbar vertebrae. The individual from Ghal-e-Kash presented no evidence of carious lesions, cribra orbitalia, or porotic hyperostosis. The dentition, however, exhibited marked dental calculus as well as enamel hypoplasia on the canines and premolars.

Remains of the second individual dated to the Iron Age III were excavated at Tepe Lafoor, a small cemetery located in the Elburs mountains, near Sabadkooh on the road from Sari to Firuzkooh (36°13'11"N 52°48'34"E). Rescue excavations at the site in 2004 were led by Mehdi Abedieni. Although 14 burials were recovered, only a fragmentary skull and atlas were available for examination (tag BB.66-G3). Robusticity of the mastoid processes, glabella, and mental protuberance together with rounded supraorbital margins suggest that the individual is male. Dental wear suggests the individual is a middle aged adult. The individual from Tepe Lafoor suffered from advanced carious lesions, 7 of the 8 preserved molars and 3 of the 7 preserved premolars were affected. Also, enamel hypoplasia was marked in several of the teeth, including the first and second molar. Dental measurements revealed asymmetry in the teeth (in M_2 mesiodistal diameters $^{r}11.4$, $^{l}11.2$; buccolingual diameters $^{r}11.1$, $^{l}10.5$).

The third individual was found at Molla Kheil, a cemetery dated to the Parthian period, located in the mountain forest some 30km south-east of Neka (36°30'21"N 53°29'05"E). The cemetery contained a minimum of 50 graves that were located in two clusters. Unfortunately, most of graves at Molla Kheil had been plundered recently. The Molla Kheil cemetery site was discovered in September 2007 by Serollah Ghasemi and Meysam Miri during a survey of the south-eastern part of the Mazandaran province. A few bones representing one individual were found in a robbed grave together with a potsherd (**Figure 2**). This skeleton consisted of a complete cranium, left os coxae, a slightly damaged right scapula and one complete thoracic vertebra. Some of the teeth were missing antemortem (right M^3, left P^2 and M^1) and postmortem (whole left side). The remaining teeth were heavily worn and presented several

carious lesions (all teeth from right canine to the second molar) and abscesses (right P^2 and M^1). The individual from Molla Kheil was a male over 40 years old.

Figure 2. Skeletal remains of the individual from Molla Kheil *in situ*. Photograph by Meysam Miri.

A small button osteoma was observed on the left frontal bone. Most notable, however, was a well-healed injury on the left parietal caused by a sharp tool (**Figure 3**). The lesion begins just behind the coronal suture, 48mm from bregma and 55mm from pterion, and continues for 54mm, with a maximum breadth of 8mm and a maximum depth of 5mm in the posterior part. The trauma was completely healed over and no trace of it could be palpated on the inner table of the parietal.

Because the crania from Ghal-e-Kash and Molla Kheil were complete and did not appear to be distorted, it was possible to examine how the craniofacial measurements compare to other Iranian cranial samples. Unfortunately, the comparative data are very scarce and after ruling out female crania and crania in which the complete set of measurements could not be taken from, it was possible to take into account only 13 measurements (see **Table 1**) of crania from two sites: Tepe Hissar and Shah Tepe. The sample from Tepe Hissar consists of 6 crania from Period II (~3000 BCE), 76 crania from Period III (~2500 BCE), and 2 crania from the Early Islamic period (~800 CE) (Krogman 1940). The 7 crania from Shah Tepe were dated to ~750-1000 CE (Fürst 1939). Principal Component Analysis (PCA) revealed five factors with eigenvalues greater than 1 (**Table 1**). The first factor, with all negative loadings, was related to size, others expressed various shape proportions. Factors 2 & 3 clearly differentiate between early crania (Tepe Hissar II and III) and Islamic crania, with the latter having negative scores for both factors (see **Figure 4**). The other three factors do not differentiate between the two comparative chronological samples.

The crania from Ghal-e-Kash and Molla Kheil cluster together with the Islamic crania, although they fall on the extreme sides of the variability in the late sample. The individual from Ghal-e-Kash has an extremely negative Factor 2 score, a factor that is related to long skull (high g-op value), broad nose (high al-al value), and broad interorbital area (high d-d value).

Figure 3. Healed trauma in the cranium from Molla Kheil: general view (a), detail (b).

The individual from Molla Kheil has an extremely negative score for Factor 3, with his narrow skull (low eu-eu value), large foramen magnum, and broad orbits (high d-ec value). In spite of these differences, both individuals more closely resemble the crania from the Islamic period than from the Early Bronze Age.

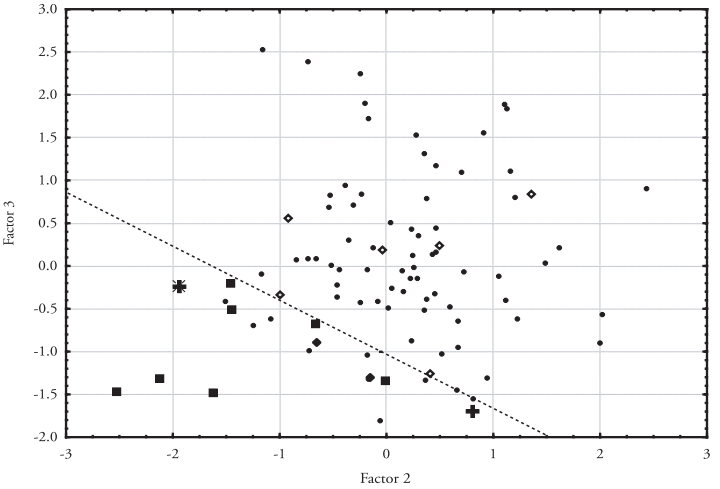

Figure 4. Biplot of Principal Components Analysis scores for Factors 2 & 3 extracted for Iranian craniofacial measurements. Outlined diamonds – Tepe Hissar II; dots – Tepe Hissar III; filled diamonds – Tepe Hissar, Islamic period; squares – Shah Tepe, star – Ghal-e-Kash, cross – Molla Kheil.

Table 1. Selected measurements of crania from Ghal-e-Kash and Molla Kheil as well as the PCA factor loadings for these measurements. Only factors with eigenvalues > 1 are considered, factor loadings >0.4 or <-0.4 are shaded.

Variable	Ghal-e-Kash	Molla Kheil	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
g-op	196.0	180.0	-0.42	0.28	0.62	-0.02	-0.18
eu-eu	144.0	127.0	-0.36	-0.57	0.08	0.47	0.11
ba-b	137.0	133.5	-0.57	-0.23	0.09	0.27	0.03
ba-n	106.0	105.0	-0.71	-0.05	0.12	-0.24	0.01
n-pr	75.5	68.0	-0.66	-0.25	-0.38	-0.23	-0.07
ft-ft	99.0	98.0	-0.52	-0.04	0.30	0.48	-0.15
n-ns	55.5	51.0	-0.75	-0.19	-0.29	-0.39	0.05
al-al	26.5	21.5	-0.04	-0.21	0.47	-0.61	-0.40
d-ec	38.0	40.0	-0.59	0.37	0.02	0.24	-0.49
orbital hg	35.0	35.0	-0.37	-0.09	-0.68	0.04	-0.10
d-d	23.0	19.0	-0.08	-0.61	0.47	-0.11	0.42
ba-o	33.5	34.0	-0.38	0.62	0.07	-0.03	0.42
for.mag.br	27.5	31.0	-0.53	0.41	0.07	-0.11	0.47
Eigenvalue			3.33	1.66	1.65	1.25	1.07
Variance explained (%)			25.58	12.78	12.66	9.58	8.23

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Gohar Tepe (Iran), season 2009

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Iranian excavations at Gohar Tepe (36°40'42"N 53°24'07"E) began in 2005. The main objective of these excavations was to trace settlement history in the area from the Chalcolithic period until the Early Iron Age. Five years of excavations at the site revealed the presence of a dense cemetery. There was an overall lack of architectural remains which was surprising when considering the general shape of the site—with its clear central mound and a circle of satellite mounds resembling remains of massive walls. In 2009, the Iranian team was joined by a German expedition directed by Christian Piller (University of Munich). Parallel excavations in the nearby Komishan Cave by Hamed Vahdatinasab have revealed that the region of Gohar Tepe was occupied during the Upper Paleolithic and Neolithic periods.

The remains of 29 individuals from Gohar Tepe and its satellite mound (Goldar Tepe) were studied in 2007 (Sołtysiak & Mahfroozi 2008). During the spring of 2009 an additional 58 skeletons were analysed, most of them had, at one point, been left *in situ* as part of an open air exhibition. These particular skeletons had been subject to a high degree of weathering despite being covered by a roof. The remaining dozen or so skeletons were transported to the dig house immediately following excavation. In addition to this sample of 58 studied individuals, ~40 skeletons were left *in situ* and as a result, only preliminary sex determinations