

## Human remains from Estark, Iran, 2016

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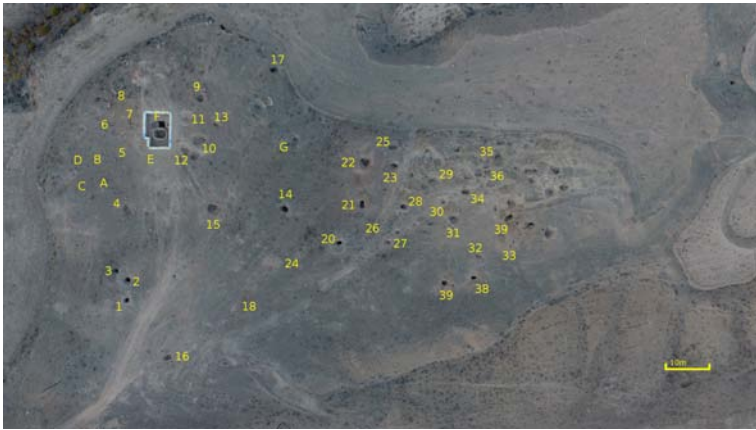
Located on a terrace near the modern village, Estark (34°01'24"N 51°13'51"E) is one of a few identified Iron Age cemeteries around a cluster of artesian oases located at the foot of the Zagros Mountains, c. 10km west of the city of Kashan. It covers less than one hectare, and some parts (especially in the south-eastern part) have been recently heavily looted and destroyed by bulldozing.

In the autumn of 2016, a small-scale rescue operation was carried out at the site, with two aims: to collect artifacts and bones from the surface and from the looting dumps, and to excavate a 5×5m trench near the northern limit of the site. All pottery, a few bronze objects and one cylindrical seal retrieved from the surface were consistent in chronology, suggesting that the cemetery was used for a relatively short period during the Iron Age II (c. 1000–800 BCE in regional chronology, according to Ghirshman 1938, 1939).

As all human remains found at Estark were heavily fragmented and affected by various taphonomical agents, the applied protocol included basic identification of every fragment, any possible measurements and observations of bone morphology, as well as description of any taphonomic alternations (following the methods referred to in Sołtysiak 2010).

For deposits of cremated human remains, the Minimum Number of Individuals (MNI) was calculated as the highest number of unequivocally identified anatomical bone features, irrespective of age-at-death (conservative estimation) or by using a combination of MNIs for three age classes (infants up to 3 years old, children up to 15 years old, adolescents together with adults). The following bones were included in the MNI calculation: frontal bone (lateral upper angle of the orbit), temporal bone (petrous part), occipital bone (area between the condyle and the hypoglossal canal), maxilla (alveolus with at least I<sup>1</sup> and I<sup>2</sup> sockets) zygomatic bone (fragment with fronto-zygomatic suture), and mandible (at least 2/3 of the condyle).

Human remains were collected from the dumps of 13 pits (out of c. 40 noted on the surface) and from one pottery scatter (called Scatter F) in the area that was later excavated in a systematic way (**Figure 1**). Bone elements and teeth were strongly eroded and fragmented, affected by weathering and trampling. Most of them belonged to adult individuals, but it is possible that subadult elements were more likely to have disappeared completely when exposed on the surface. In a few cases it was possible to estimate sex and age-at-death (**Table 1**). In this whole surface assemblage one fragment was cremated, but all other elements came from skeletons that had not been affected by burning. Taking into account the possibility that some elements from neighbouring pits were mixed, the number of individuals buried in one grave could not be estimated in a reliable way.



**Figure 1.** Aerial photograph showing the site of Estark during excavations and numbering of looting pits.

At the second stage, a small test trench (5×5m) was excavated in the north-western part of the cemetery, in an area with visible traces of bulldozing, but no evident looting pits. The subsurface 20cm layer was explored using 1×1m grids to provide insight into the distribution of bones and artifacts in the area of Scatter F. The northern part of the trench contained no graves, but in the southern part one large well-constructed grave (labelled as A) was discovered, and it was necessary to extend the trench by 2m in this area. The structure was oval, c. 3.5×2m, with all walls and floor carefully constructed of large stones (**Figure 2**). In the western part, a pit disturbed the grave and another pit was present outside the grave along the northern wall (**Figure 3**). The floor of the grave was not located on virgin soil as beneath it an additional archaeological layer was found. North-east to this complex another stone wall was observed, possibly a part of another grave (B) that was not excavated this season.



Figure 2. Aerial photograph showing the trench after excavations.

Table 1. Human remains retrieved from the looting pit dumps.

Pit	Fragments	Sex	Age-at-death	Cremation
2	4		adult?	–
	1		infant (0-7 years)	–
4	39		adult	–
5	1		adult	+
8	1		adult	–
10	3		adult	–
15	92	M	adult	–
	2		infant (0-7 years)	–
17	80	M??	adult	–
32	1		adult?	–
34	75		adult	–
35	18		adult	–
36	7			–
37	159	F	adult	–
		M	adult (over 40 years)	–
39	2		adult	–
Scatter F	4		subadult (over 7 years)	–
	3		adult	–

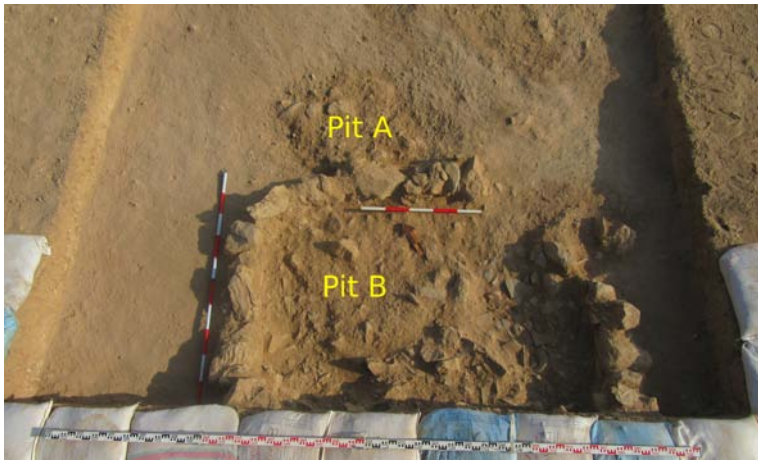


Figure 3. Stone structure and intrusive pits during the course of excavation.

Grave A and its surroundings contained many human remains. Along the western wall, part of a strongly eroded skeleton was discovered (Contexts 12, 14, 19, Individual A) with a skull, mandible, cervical and upper thoracic vertebrae, ribs, clavicles, left humerus and ulna as well as some hand bones, all articulated, with only slight distortion. All lower parts of this skeleton were missing due to a later pit cutting through this part of the burial chamber. Retrieved bones were gracile, suggesting that this skeleton belonged to female rather than to a male, although no reliable sex assessment was possible. The remains were from an aged individual, since a number of the preserved teeth exhibited a high degree of wear.

Although the eastern part of the burial chamber was not destroyed to such an extent, it contained mainly dense pottery scatter and a few eroded bone fragments including large pieces of femoral and fibular midshafts (Context 13). These elements were much more robust than bones found in the western part of the chamber (approximate circumference of the femoral midshaft was 101mm) and most likely belonged to a male individual (B). In the same context a small number of cremains was found—being highly fragmented and mostly black in colour.

Eroded and fragmented human elements were also found in the layer below the stone structure (Contexts 37 and 39). They were completely disarticulated and the assemblage contained mainly long bone shafts (femur, tibia, radius, ulna and fibula), as well as a fragment of the left frontal bone with rounded supraorbital margin, one lower permanent molar with slight wear and a fragment of another one. These elements were not only extremely eroded but also affected by trampling (Figure 4). Sex and age-at-death could not be reliably assessed, but—taking into account the stratigraphical position of this layer—it is likely that these bones represented a third

individual (C), buried there in a secondary context just before the construction of the stone burial chamber.



Figure 4. Scatter of bones, Context 39.

Eroded human bone fragments with no evidence of burning were also retrieved from both later pits and from the subsurface bone scatters (Grids A2, C2, D2, A3 just above the stone structure). They most likely represented the skeletons of Individuals A and B. However, another scatter of c. 20 eroded human bones was found together with a few stones in the northern part of the trench (Grids C5 and D5). They may be elements from the same context, moved there by a bulldozer together with a corner of the stone structure, or bones taken out of looting pits in the surrounding area.

Both pits that disturbed the stone structure were filled with stones, fragments of pottery and cremains (Table 2). If age-at-death is not taken into account to calculate MNI, the inner pit (B, Contexts 16 and 17) included the remains of at least 7 individuals. All cremains were retrieved from a deeper part of the pit, at the level where the pit cuts through the stone floor as well as slightly above. The upper part of the fill contained no human bones and only a few pottery sherds. On the other hand, cremains were scattered over the whole outer pit (A, Contexts 3 and 9, MNI=6), with no denser clusters present.

Some sherds from the Pit A and Pit B may be matched together, and it is therefore likely that some material from Pit B was moved to Pit A. If both assemblages are taken together, MNI is 13 (ten maxillae with permanent dentition and three infant frontal bones). Some elements from Pit A were scattered in the subsurface layer (Grids A2, B2, C2, D2, B3 and C3) and it is likely that the only cremated fragment retrieved from the dump of Pit 5 also came from the same context. Therefore, all these cremains seem

to represent one assemblage, originally deposited in Pit B and then partially moved to Pit A and scattered all over the area above the stone structure.

It is difficult to assess sex and age-at-death in mixed cremains of many individuals, but it seems that this assemblage contained adults of both sexes, at least one adolescent (epiphyses fully developed but not fused), at least one child (more than 3 years old) and at least three infants. Apart from human bones, there were also additional burned animal (mainly ovicaprid) bones.

Most cremains were white, occasionally with powdery surfaces, cracked, shrunken and distorted, in a few cases with cyan staining (Figure 5). However, some elements were black and the colours of most midshaft fragments were mixed, white on the surface and black inside. It suggests that the temperature of the funeral pyre was high, above 650°C (cf. Shipman et al. 1984), but the process of cremation was relatively short and not all carbon from the organic bone fraction had time to oxidize. Most fragments were large enough to recognize. Although cremains from Pit A were easy to clean, many elements from Pit B were covered by solid and highly mineralized crust, perhaps gypsum, which was also crystallized on some stones in that context.

The first season of excavations at Estark revealed puzzling evidence of use and re-use of burial space. The most probable scenario suggests that when a pit was dug for a grave, assorted bones of likely one individual were deposited at the bottom together with some grave goods and then above them a stone chamber was constructed to bury two bodies along with a large number of pots. Then the grave was re-opened by an intrusive pit that disturbed the western part of the structure. This pit was filled with cremains of at least 13 individuals. At the end, the grave was re-opened for the second time and perhaps then the pottery and bones in the western part were

Table 2. MNI estimated for cremains from various contexts.

Con- text	Frontal bone		Temporal bone		Occipital bone		Maxilla		Zygomatic bone		Mandible	
	R	L	R	L	R	L	R	L	R	L	R	L
G-B2							1					
G-C2			1	1			1		2	2	1	
G-D2									1			
C3	3	4	1	1		3	1		1	2	1	
C9	1(i)		1	1		1	3	2	1		1(i)	1
<b>Pit A</b>	4	4	3	3	0	4	6	2	5	4	3	1
C16A	1	2(i)	2				1		1	1	1	1
C16B	1(i)	4(iiiic)	4	1	1	1	3	1	1			3
C17	2(i)		1	3					2	2		1
<b>Pit B</b>	4	6	7	4	1	1	4	1	4	3	1	5
<b>Total</b>	8	10	10	7	1	5	10	3	9	7	5	6



Figure 5. Assorted cremains from Context 3.

scattered and cremains were partially removed to the outside pit together with some sherds and stones.

Apart from this complicated history of the structure itself, the presence of cremains was not expected. Previously a small cluster of vessels containing cremains was found at nearby Tepe Sialk (Sołtysiak & Fazeli Nashli 2016), but they were dated to the Neolithic, more than four millennia earlier, and these were individual and not collective burials. Here we have observed an unparalleled case of cremation dated to the Iron Age of Iran.

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