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Short fieldwork report

Human remains from Estark 1 and 2, Iran, 2019

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The final season of excavations at two cemeteries situated in the village of Estark (near Kashan, Isfahan province) was conducted in August and September 2019. Research was carried out simultaneously at Estark 1, Trench D (34°01′24″N, 51°13′51″E) (**Figure 1**) and Estark 2, Trench B (34°01′29″N, 51°13′47″E) (**Figure 2**). Rescue excavations in the region have been conducted since 2016, including three seasons at Estark 1 (Sołtysiak et al. 2016; Sołtysiak et al. 2017; Hosseinzadeh et al. 2017; Szymczak et al. 2018) and one at Estark 2 (Szymczak 2018). Research conducted by the international team directed by Javad Hosseinzadeh resulted in establishing the chronological

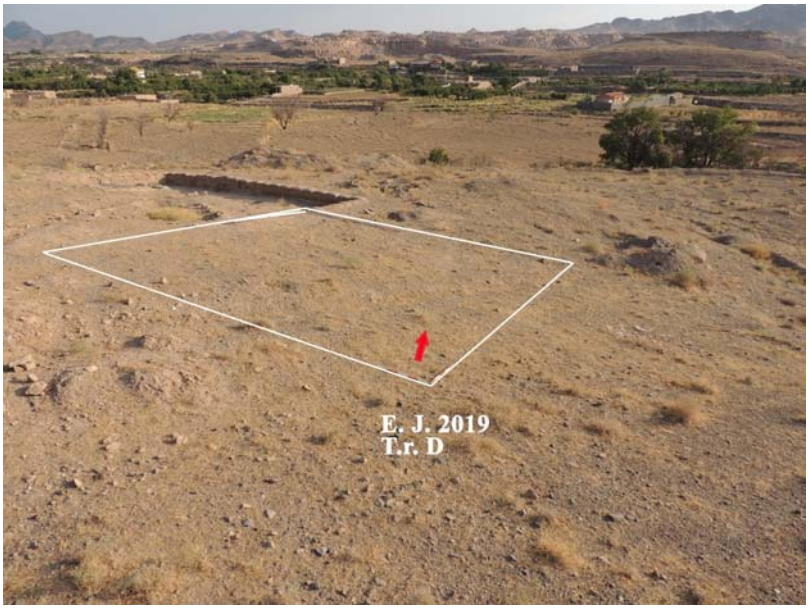

Figure 1. Location of Trench D at Estark 1, partially adhered to Trenches A and B excavated in 2016 and 2017.

Figure 2. Location of Trench B at Estark 2, west of Trench A, excavated in 2018.

framework of both sites, spanning from the Late Bronze Age (1800–1200 BCE) to the Iron Age II (1000–800 BCE) (cf. Helwing 2006).

During the 2019 season, human remains of at least 15 individuals were excavated from both sites: 13 individuals from Estark 1 (including 6 subadults and 7 adults) and 2 adult individuals from Estark 2 (**Table 1**). Skeletal remains from the commingled layer labeled as "Context 5" at Estark 2 were not included in the count of the minimum number of individuals (MNI) because they could have originated from the burial contexts destroyed during the looting activity.

Table 1. General register of human remains from Estark 1 and Estark 2, season 2019.

Site	Tr.	Grave	Sex	Age-at-death	Completeness	Preservation pattern
Estark 1	D	G1	?	adult	one element	fragment of left humerus
Estark 1	D	G2a	?	adult	a few fragments	disarticulated
Estark 1	D	G2b	?	child (c. 4 years)	one tooth	LM_2 germ
Estark 1	D	G2c	?	infant (c. 1 year)	one element	distal epiphysis of right tibia
Estark 1	D	G3	?	adult?	incomplete	disarticulated
Estark 1	D	G6	?	adult	a few fragments	partially articulated
Estark 1	D	G7	M???	adult	incomplete	disarticulated
Estark 1	D	G9a	?	child (c. 3 years)	a few fragments	disarticulated
Estark 1	D	G9b	?	child (c. 7 years)	a few fragments	disarticulated
Estark 1	D	G13	?	adult	a few fragments	disarticulated
Estark 1	D	G14		child (c. 6 years)	a few fragments	partially articulated
Estark 1	C	Looting pit	?	adult	one element	hand phalanx
Estark 1	C	Looting pit	?	child (c. 7 years)	a few fragments	disarticulated
Estark 2	B	G1	?	adult	incomplete	disarticulated
Estark 2	B	G2	?	young adult	incomplete	articulated
Estark 2	B	Context 5	?	adult	a few fragments	disarticulated

Human remains from both cemeteries were highly eroded and fragmented due to looting activity in the past and the unfavorable depositional environment. Trench D at Estark 1 is situated in the depression between the previously excavated Trenches A, B and C. This part of the cemetery was likely a place of rainwater retention, which led to increased humidity of the burial environment. On the other hand, the entire neighbourhood of Estark 2 is characterized by high concentrations of calcium carbonate and loose soil that allows for easy penetration of the burials by water. The destructive influence of the hydrological environment on human remains has been well studied; it impacts bone architecture, collagen integrity and leads to dissolving of bone minerals (Von Endt & Ortner 1984; Pike et al. 2001).

All graves from Estark 1 were oriented along a NE–SE axis, with some variability, and consisted of shaft and chamber constructions, a style typical for the cemetery of Estark (cf. Sołtysiak et al. 2017). Considering all burials excavated at Estark 1 since 2016, the stage of erosion of human remains from Trench D was the highest. Among fifteen excavated graves skeletal remains were found only in eight. In none of the burials were skeletal remains preserved in anatomical order. In the majority of graves only sparse bone fragments were present. In six out of eight burials human remains of only one individual were found, excluding Graves 2 and 9, in contrast to the previous seasons of excavations at the site when mainly collective graves were unearthed. Perhaps extremely poor state of preservation of human remains in Trench D could have led to underestimation of the MNI.

In Grave 1, there was only a fragment of the left humerus of an adult individual. In Grave 2, there were human remains of at least three individuals, including a temporal bone and three adult hand phalanges, the LM_2 tooth germ of an 4-year old child and the distal metaphysis of a newborn's right tibia. In Grave 3, about 30 fragments of long bone shafts were found, all of which were too eroded to determine either the sex or age-at-death of the individual(s).

In Grave 6, the remains of an adult individual were preserved in a disturbed anatomical order. Six long bone shafts, most probably ulna, radius and four metacarpals, were surrounded by a bronze bracelet and pieces of ochre (**Figure 3**). The other bone fragments were embedded in the soil without any order. Among the long bone shafts, there was a part of femur and most probably tibia and fibula, based on thickness and morphology of cortical structure. It was impossible to assess the side of either of these bones. Moreover, the signs of root activity and insect tunneling were present on the surface of multiple bones.

In Grave 7, human remains of another adult individual were found. They were highly fragmented and weathered, but several fragments of long bone shafts, cranial vault and pelvis were identifiable. The presence of a well-developed external occipital protuberance suggests that the burial may have belonged to a male individual, however

Figure 3. Radius and ulna surrounded by a bronze bracelet in Grave 6, Trench D at Estark 1.

a single feature is not enough to assess the sex with confidence. Moreover, the left femur of the individual buried in Grave 7 had an extremely developed linea aspera (anteroposterior diameter 38.1mm; mediolateral diameter 28.7mm).

Grave 9 belonged to at least two individuals. In the burial context there was a deciduous incisor as well as the LM^2 and RM_1 tooth germs of a c. 3-years old child, along with a canine germ of a c. 7-years old child. Moreover, multiple fragments of long bone shafts were found but they were extremely eroded and no identification was possible.

Grave 13 belonged to an adult individual as well. Only fragments of cranial vault and long bone shafts, including left ulna, were preserved. Insect activity and signs of trampling were readily visible. In Grave 14, the remains of a c. 6-years old child were found. Apart from four tooth germs, there were also two fragments of long bone shafts, perhaps radius and ulna; they were surrounded by a bronze ring, similarly to the case of remains from Grave 6 (**Figure 4**).

Furthermore, a new looting pit appeared at Estark 1 between the seasons of 2018 and 2019. In the loose soil surrounding the pit there were bone fragments of at least two individuals: a proximal phalanx of the thumb from an adult individual as well as a fractured iliac bone, ribs and deciduous lm^1 of a c. 7-years old child.

At Estark 2 only two graves were excavated, both of which contained remains of one individual. The NW–SE orientation of the shaft burials corresponds to the position of two graves excavated in the previous season in Trench A. One of the two excavated skeletons remained in anatomical position (Grave 2).

In Grave 1 there were fragmented bones of an adult individual, both from the cranial and postcranial skeleton. Among pathological changes observed, macroporos-

Figure 4. Long bone shafts accompanied by bronze objects in Grave 14, Trench D at Estark 1.

Figure 5. Grave 2, Trench B at Estark 2.

ity (>1mm) and small osteophytes (<3mm) were present on the proximal articular surface of a proximal foot phalanx, which suggests slight degeneration of the synovial joint with the metatarsal. A carious lesion was observed on the distal surface of RP_1, in the region of the cementoenamel junction. There were also lines of hypoplasia on the upper and lower right canines. Moreover, the left femur was compressed by solid pressure and its surface was discolored by brown and pink staining.

Grave 2 (**Figure 5**) belonged to an adult of undetermined sex. Based on the pattern of dental wear, the interred individual was relatively young. Linear enamel hypoplasia was observed on the upper right canine. Unfortunately, due to advanced erosion of the bones, no further information could have been derived from the osteological analysis. The individual was placed on the left side with lower limbs flexed at a sharp angle. The skull was located in the SE part of the burial pit. It was lying on the occipital bone facing north. The position of the skull, however, could have been altered by taphonomic processes. The skeleton with preserved anatomical order that was unearthed during the first season of excavations at Estark 2 (Grave 2) was also placed in a flexed position, but on the right side (Szymczak 2018). The head was similarly located in the SE part of the burial pit and faced north.

The final stage of excavations at Estark did not bring any new information to light about the studied Early Iron Age population due to the poor state of preservation of the human remains. It was crucial, however, from the archaeological perspective to confirm the chronology sequence and burial practice homogeneity at the studied cemetery.

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