



بقایای انسانی محوطه زرد ساحل، کاشان، ایران آرکادیوش سولتسیساک

چکیده

در جریان بررسی‌های باستان‌شناسی پیرامون کاشان، مجموعه‌ای از دست افزارهای سنگی در محوطه زرد ساحل به دست آمد که همراه با شمار زیادی از قطعات استخوان انسانی و تعداد اندکی استخوان جانوری بود. بر اساس گونه‌شناسی دست افزارهای سنگی، این مجموعه به طور تقریبی به نوسنگی جدید تاریخ‌گذاری شده است. بیشتر بقایای انسانی در دمای نسبتاً بالای ثابتی سوزانده شده بودند و متعلق به چندین فرد بزرگسال و غیربزرگسال بودند. اگرچه این مجموعه روی سطح خاک قرار داشت و عوامل گوناگون تافونومی بر آن اثر گذاشته بودند، اما هنوز ردهایی از اُخرا (رنگ قرمز طبیعی) روی سطح سه قطعه قابل مشاهده بود. فراوانی بخش‌های به دست آمده با محوطه هم‌دوره آن در همان در نزدیکی، یعنی تپه سیلک، تفاوت‌هایی نشان می‌دهد که احتمالاً به دلیل ماهیت خورد شده یافته‌های محوطه زرد ساحل بوده است. هرچند آتش سپاری یا سوزاندن مردگان در خاور نزدیک رایج نبوده، اما این شیوه‌ی تدفین در دوره‌ی نوسنگی رایج‌تر از دوره‌های بعدی بوده است.

واژگان کلیدی: آتش‌سپاری، تافونومی، گل اُخرا، نوسنگی جدید، آیین‌های تدفینی.

<https://doi.org/10.22034/JINM.2025.2053754.1102>
© 2025 Iran National Museum. All rights reserved

Cremated human remains from Zard-e Sahel, Kashan, Iran Arkadiusz Soltysiak^a

Abstract

During the archaeological survey around Kashan, an assemblage of lithics was found at Zard-e Sahel together with many human and a few animal bone fragments. Based on the lithic typology, it was tentatively dated to the Late Neolithic. Most human remains were cremated at a relatively consistent high temperature and represented several adult and non-adult individuals. Although the assemblage was exposed on the soil surface and affected by various taphonomic agents, some traces of the red ochre were still visible on the surface of three elements. The frequencies of retrieved elements were somewhat different than at a nearby contemporary site of Tepe Sialk, likely due to the fragmentary character of the assemblage from Zard-e Sahel. Although cremation was not popular in the Near East, this burial custom was relatively more popular during the Neolithic than in the later periods.

Keywords: Cremation, Taphonomy, Red ochre, Late Neolithic, Burial customs.

a. Department of Bioarchaeology, Faculty of Archaeology, University of Warsaw, ul. Krakowskie Przedmieście 26/28, 00-927 Warszawa, Poland, email: a.soltysiak@uw.edu.pl

Introduction

In 2003, Fereidoun Biglari conducted a survey of Palaeolithic sites to the west and southwest of Kashan, as part of the Sialk Reconsideration Project (SRP) under the supervision of S.M. Shahmirzadi. A surface bone scatter and lithic artifacts were found on a travertine mound called Zard-e Sahel, southwest of Kashan (33°55'32.37"N, 51°23'45.27"E) (Fig. 1) (Biglari 2004). This mound is part of a cluster of three travertine mounds situated east of the Kashan-Isfahan Highway, at an elevation of approximately 1,050 meters above sea level. The other two mounds, Sefid-Ab and Kuh-e Sahel, also yielded lithic artifacts: Sefid-Ab produced an Upper Paleolithic surface assemblage (Biglari 2004; Shidrang 2009), while Kuh-e Sahel included only two lithic artifacts that could not be attributed to any specific cultural period.

Aside from the top of the Zard-e Sahel mound, which has a diameter of about 40 meters, other sections have been significantly destroyed by travertine quarrying activities. Biglari collected a total of 36 lithic artifacts from the mound's top, including cores, flakes, blades, bladelets, and nine retouched tools. Of these, one core is identified as a bladelet core. Among the retouched tools are three made from bladelets: a backed bladelet, a lunate, and a notched-denticulate tool. Similar lunates are commonly found among the chipped lithic artifacts from Sialk I and II on the northern mound of Sialk, roughly 5 km to the north-northeast of Zard-e Sahel (Biglari, 2003). Additionally, further surveys of a smaller mound on the northwestern edge of Zard-e Sahel yielded 20 chipped stone artifacts, several of which are retouched tools, including a lunate made on a bladelet.

The presence of these lunates in the lithic industry of Zard-e Sahel, along with other bladelet products and cores, suggests that the occupation of Zard-e Sahel was probably contemporary with the Sialk I–II periods at the northern mound of the Sialk site cluster (Biglari 2003). Another significant finding at Zard-e Sahel is the large number of broken bone fragments, primarily human, found on the surface of the mound. Some of the bones display traces

of red ocher and cremation, which may indicate the presence of possible 6th–early 5th millennium BCE burials at the top of the mound. This assemblage was taken to the National Museum in Iran and then studied there in June 2017.

Human remains

In total, there were 658 human bone fragments, including 613 (i.e. 93%) cremated. The total weight of the assemblage was 1199g including 734g of long bone fragments, 329g of skull fragments, 95g of other elements and 41g of subadult remains. This is much less than the expected weight of an average adult cremated skeleton, which is above 2000g according to several experiments (Ubelaker & Rife 2007), but the presence of elements with variable size and age-at-death clearly indicated that there were mixed elements of many individuals and any estimation of the number of individuals is impossible taking bone fragmentation and a low number of identified landmarks.

Two characteristics of every fragment were noted: (1) anatomical identification, if possible, and (2) colour in a simplified scale: W – white, LG – light grey, DG – dark grey, B – black, NC – non-cremated, i.e. ivory/yellowish; or a combination of two colours (McKinley 1994; Jaskulska 2020). The colour of cremains is correlated with a combination of time and temperature at the funeral pyre and in general bone turns black at the temperature of c. 300°C and then with the rise of temperature goes through dark gray and light gray to white above 800°C. This process of colour change is the effect of organic carbon oxidation (Walker *et al.* 2008), which may be not uniform across the whole skeleton and also across one element, depending on bone structure and exposure to heat.

Among all elements, 115 (17.5%) were too small to be identified with confidence, 474 (72%) represented adult individuals (Table 1) and 69 (10.5%) belonged to subadults of variable age-at-death (Table 2). No reliable indicators of sex were identified except two right supraorbital margins that were relatively thick (grade 4*, more likely male than female, after Buikstra & Ubelaker 1994) and one gracile fragment of the right mandibular body (height



Fig. 1. Location of the Zard-e Sahel at the southwest of Kashan (images by Fereidoun Biglari).

at the mandibular foramen 25.7, breadth 8.0) that belonged more likely to female than to male individual (Fig. 2).

Most cremains were white or light grey and only a small fraction was dark grey or black, indicating the relatively high and uniform temperature of the funeral pyre. There was some difference between adult and subadult cremains, the former more frequently darker, indicating that the process of carbon

oxidation was still not completed. Many adult fragments were not cremated at all, which did not occur in subadult remains (Fig. 3) and the frequency of unburned fragments was higher in long bones, compared to skulls (Fig. 4). However, the degree of fragmentation was similar in burned and unburned elements. At three cremated fragments (radial shaft and two pieces from pelvis) some staining by red ochre was present (Fig. 5).



Fig. 2. Cremated fragment of a mandible. The uniform white colour suggests that the cremation temperature was above 800°C. Photograph by Arkadiusz Soltysiak.

Cremation was not uncommon at the archaeological sites near Kashan. At Estark two pits filled with cremains were found in a grave dated to the Late Bronze Age / Iron Age (Soltysiak *et al.* 2016), which contained fragments representing at least 13 individuals (Hossein-zadeh *et al.* 2017). However, the most direct analogy to the cemetery at Zard-e Sahel is Tepe Sialk where the cremains of five individuals buried in vessels were found in one context

dated to the Late Neolithic (Soltysiak & Fazeli Nashli 2010). In four of them, variable quantities of red ochre were found as well.

The frequency of bones representing various body parts is different at Zard-e Sahel and in four adult individuals from Tepe Sialk (Soltysiak & Fazeli Nashli 2016). It seems clear that the assemblage from Zard-e Sahel is dominated by cranial fragments and pieces from long bone shafts (Fig. 6) and the elements from the axial skeleton, hands, feet, shoulder and pelvis are under-represented. However, this is likely the effect of taphonomic factors that affected the assemblage from Zard-e Sahel to a much higher extent than the cemetery at Tepe Sialk which was well protected by many metres of the subsequent strata.

Conclusion

Although heavily destroyed, the cemetery at Zard-e Sahel provides evidence that cremation at Tepe Sialk during the Late Neolithic was not an exception, and it could have been a common burial rite in the region. There are also some more distant contemporary cemeteries with

Table 1. Anatomical identification and colour of cremains, adult individuals.

Element	not cremated	W	W+LG	W+DG	W+B	LG	DG	B	Total
cranial vault	9	49	47	2	11	18	7	2	145
cranial base		2	1				1		4
cranial face		1							1
mandible		2	1			1			4
vertebrae		1				3			4
ribs		6				2			8
scapula	1		1				1		3
hand bones	1	2				2			5
pelvis		10	4						14
humerus	6	19	7			1			33
ulna	2	7	2	2			1		14
radius		7				1			8
femur	5	4	8			2		2	21
tibia	3	2	7			3			15
femur or tibia	9	6	5		1	7		1	29
fibula		6	5	4		1			16
fe + ti + hu	9	24	15	18	8			3	77
ul + ra + fi	3	33	7				3		46
long bones		11	8			5	2	1	27
Total	45	194	118	26	20	46	15	9	474

Table 1. Anatomical identification and colour of cremains, subadult individuals.

Element	Age-at-death	W	W+LG	LG	DG	Total
cranial vault	subadult	6	6			12
cranial vault	0-1 years	6				6
cranial face	0-1 years	1				1
vertebrae	subadult	1				1
long bones	0-1 years	7				7
long bones	1-7 years	18		11	1	30
long bones	subadult	10				10
femur	7-14 years	2				2
Total		51	6	11	1	69

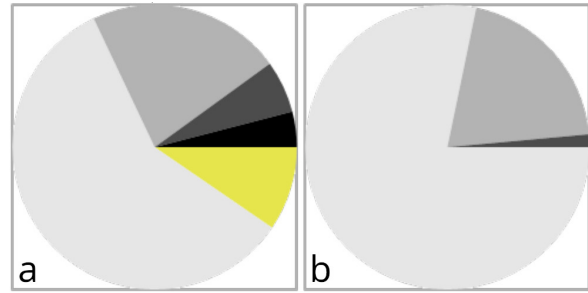


Fig. 3. Frequencies of colours in (a) adult and (b) subadult elements. Yellow denotes non-cremated fragments. Drawing by Arkadiusz Soltysiak.

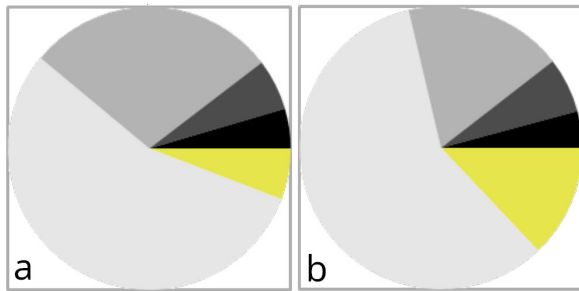


Fig. 4. Frequencies of colours in (a) cranium and (b) long bones of adult individuals. Yellow denotes non-cremated fragments. Drawing by Arkadiusz Soltysiak.

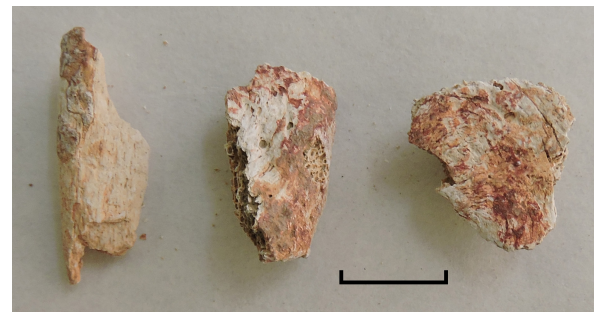


Fig. 5. Staining by red ochre on three cremated bone fragments from Zard-e Sahel. Photograph by Arkadiusz Soltysiak.

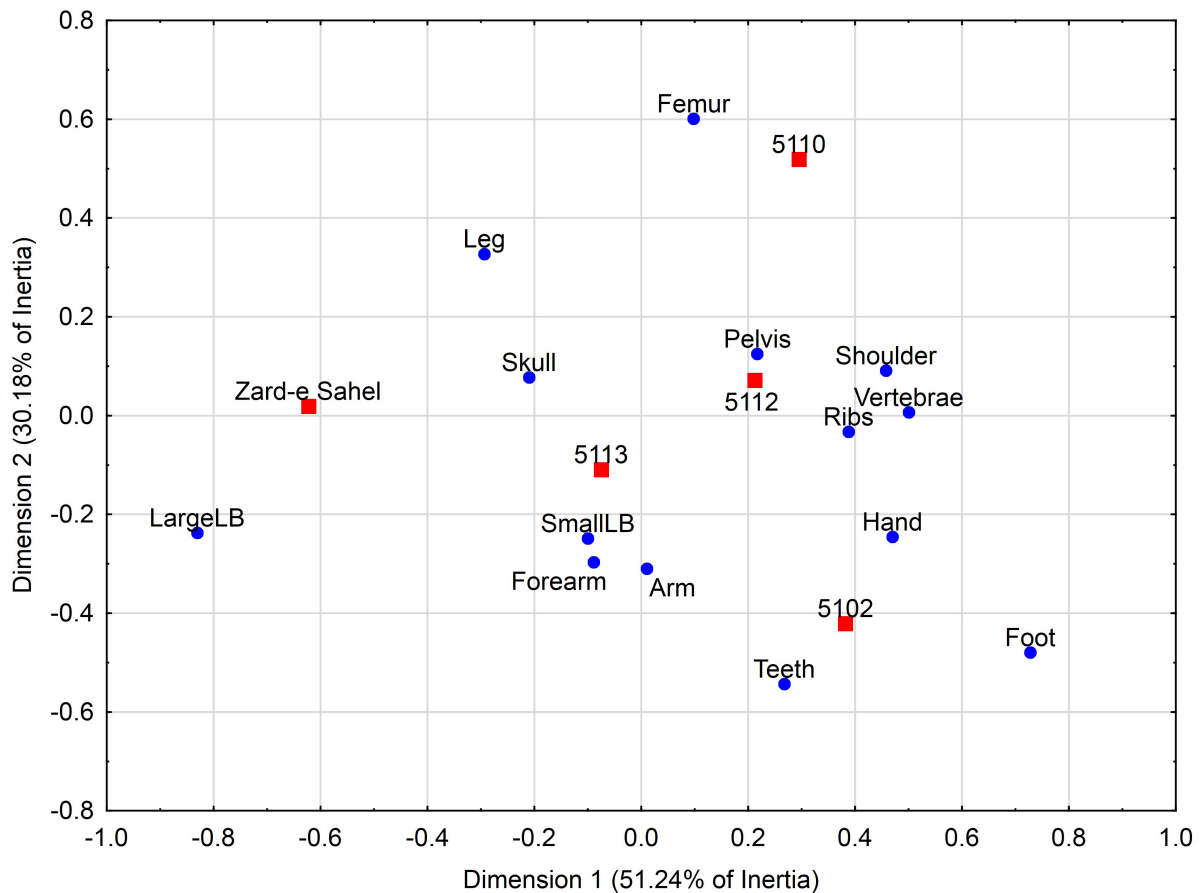


Fig. 6. Correspondence analysis biplot showing differences in body part distribution between Zard-e Sahel and four adult cremation burials at Tepe Sialk (data from Soltysiak & Fazeli Nashli 2016). Drawing by Arkadiusz Soltysiak.

multiple cases of cremation, at Yarim Tepe II in northern Iraq (Merpert & Munchaev 1987) and at Tell el-Kerkh in north-western Syria (Tsuneki 2011), therefore it seems that cremation may have been relatively popular in the whole Near East during the Late Neolithic.

Acknowledgements

This paper would not appear without the great support from Fereidoun Biglari from the National Museum of Iran who not only made the collection of human remains from Zard-e Sahel available for my research but also kindly provided a detailed description of the site and produced its preliminary dating based on the lithic material.

References

- Biglari, F.
2003 “Report on the chipped stone assemblages, Sialk Reconsideration Project, 2001”, In S. M. Shahmirzadi (ed.), *Ziggurat of Sialk. Report*, No. 1, pp. 143-168, Iranian Center for Archaeological Research, Iranian Cultural Heritage Organization, Tehran.
- 2004 “The Preliminary Survey of Paleolithic Sites in the Kashan region”, In S. M. Shahmirzadi (ed.), *The Silversmiths of Sialk (Sialk Reconsideration Project)*, Report No. 2: 151-168. Iranian Center for Archaeological Research, Iranian Cultural Heritage Organization, Tehran.
- Buikstra, J.A. and D.H. Ubelaker (Eds.)
1994 *Standards for data collection from human skeletal remains*, Fayetteville, AR USA: Arkansas Archaeological Survey.
- Hosseinzadeh, J.; M. Javeri, M. Montazerzohouri, A. Banitaba, R. Nouri Shadmahani, L. Makvandi and A. Soltysiak
2017 “A palimpsest grave at the Iron Age cemetery in Estark-Joshaqan, Iran”, *Antiquity* 91(359):e1.
- Jaskulska, E.
2020 *Analysis of human cremains*, Warsaw: Institute of Archaeology, University of Warsaw.
- McKinley, J.I.
1994 *The Anglo-Saxon cemetery at Spong Hill, North Elmham*. Part 8: The cremations, Dereham: Norfolk Museums Service.
- Merpert, N.Ya. and R. M. Munchaev
1987 “The earliest levels at Yarim Tepe I and Yarim Tepe II in Northern Iraq”, *Iraq* 49:1–36.
- Shidrang, S.
2009 “A typo-technological study of an Upper Paleolithic collection from Sefid-Ab, Central Iran”, In: M. Otte, F. Biglari, and J. Jaubert (eds), *Iran Palaeolithic*. pp. 47–56, Proceedings of the XV World Congress UISPP, Lisbonne, Vol. 28, BAR International Series 1968.
- Soltysiak, A. and H. Fazeli Nashli
2010 “Tepe Sialk (Iran), seasons 2008-2009”, *Bioarchaeology of the Near East* 4:69–73.
- 2016 “Evidence of Late Neolithic cremation at Tepe Sialk, Iran”, *Iranica Antiqua* 51:1–19.
- Soltysiak, A., J. Hosseinzadeh, M. Javeri and M. Montazerzohouri
2016 “Human remains from Estark, Iran, 2016”, *Bioarchaeology of the Near East* 10:75–81.
- Tsuneki, A.
2011 “A glimpse of human life from the Neolithic cemetery at Tell el-Kerkh, Northwest Syria”, *Documenta Praehistorica* 38:83–95.
- Ubelaker, D.H. and J. L. Rife
2007 “The practice of cremation in the Roman-era cemetery at Kenchreai, Greece. The perspective from archeology and forensic science”, *Bioarchaeology of the Near East* 1:35–57.
- Walker, P. L.; K.W.P. Miller and R. Richman
2008 “Time, temperature, and oxygen availability: An experimental study of the effects of environmental conditions on the color and organic content of cremated bone [in:] “The analysis of burned human remains,” C.W. Schmidt, S.A. Symes (eds.), London: *Academic Press*, pp. 129–138.