The foot of the hare, the tooth of the deer and the shell of the mollusc: Neolithic osseous ornaments from Aşıklı Höyük (Central Anatolia, Turkey)

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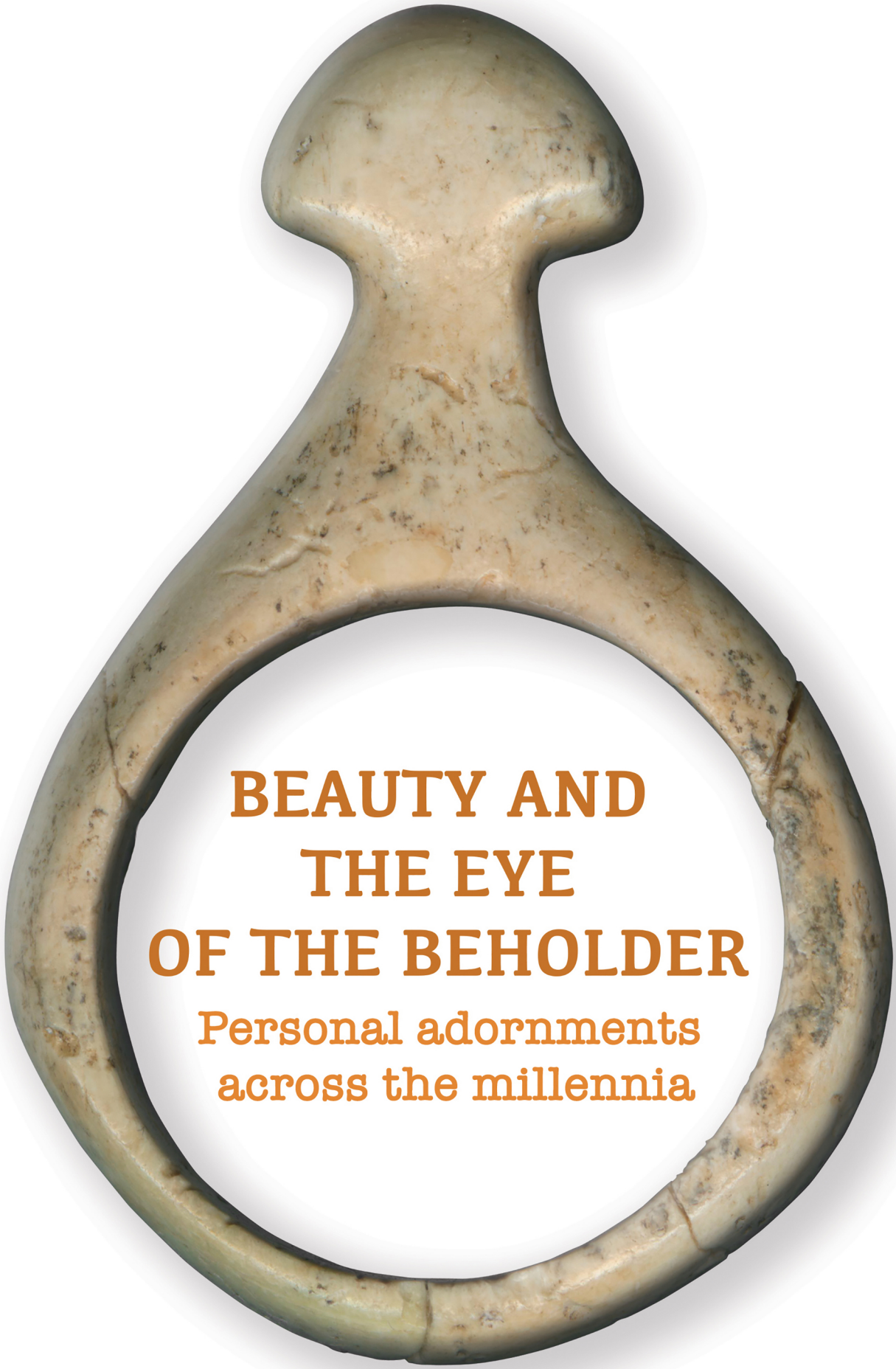

BEAUTY AND THE EYE OF THE BEHOLDER

Personal adornments across the millennia

Edited by Monica Mărgărit & Adina Boroneanț

CETATEA DE SCAUN

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DE SCAUN

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Photo cover: Bone piece with a ringlike morphology from the necropolis of Sultana-*Valea Orbului* (Romania) and *Spondylus* beads from the necropolis of Urziceni-*Vamă* (Romania) (photos: Monica Mărgărit)

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FOREWORD

The message of personal adornments is not an easy one to decipher. Nevertheless, they provide an insight to the many aspects (social, spiritual, economic, etc.) of human behaviour, personal expression, relationships and communication. Understanding the complicated social and technical aspects of adornments generally require a broad spectrum of technical and methodological approaches as well as a good knowledge of the state of research and numerous local case-studies.

Beyond the aesthetic impact, at times secondary in traditional societies, personal adornments represents a language in itself, a complex communication system, conveying clear messages on ethnic, gender and age class affiliation. They are associated to certain rituals (e.g. passage or marital), they can be amulets or talismans and they can act as currency or as symbols of the ritualistic trade (e.g. Sciama 1998; Trubitt 2003; Vanhaeren 2005, etc.).

Moreover, their manufacture can be related to complex territorial and economic organization helping to identify in certain cases crafts and specialized workshops, circulation paths of raw materials and the existing systems for inter-community exchange (e.g. Newell *et al*. 1990; Vanhaeren and d'Erico 2006; Rigaud *et al*. 2015). Further information can be extracted from their presence in funerary contexts, revealing whether they were exclusively created for the afterlife or had been part of the every-day life of the respective individual/community.

There is already an impressive literature dedicated to personal adornments, which analyses the most diverse aspects: from their possible social-cultural functions to the means of obtaining the raw materials, the techniques used for their transformation, the ways they were used/repaired and their discard (e.g. Bar-Yosef Meyer *et al*. (eds.) 2017; Bar-Yosef Mayer and Bosch (eds.) 2019; Baysal 2019; Ifantidis 2019; Mărgărit 2019; to exemplify only with the latest publications). Nevertheless, as this volume also shows, the subject is a vast one and there is continuous need for further exploration.

***

The International Colloquium: "Beauty and the eye of the beholder: personal adornments across the millennia" took place at Valahia University, Târgoviște, Romania, between 12 and 14 September 2019. Bearing in mind the complexity of the subject, the participants were invited to discuss a variety of topics, expressing the views of various "beholders" both in the past and at the present moment: their meaning/symbolism within the prehistoric/historical societies (e.g. cultural tradition, social and spiritual organization and exchange systems), raw materials (identification of sources and acquisition), various methodologies of study (technological and usewear analyses, microscopy, SEM+EDS analysis, FTIR and RAMAN spectroscopy, etc.) and experimental approaches (creating experimental reference collections), etc.

At the end of the colloquium, following the discussions with our colleagues, it was decided to gather all presentations in a volume while also inviting other contributions dedicated to this topic, in an attempt to capture a broader spatial and temporal image.

The result is the present volume comprising 26 studies organized in three major sections related to regional studies on adornments, and their use and presence in everyday life and afterlife. Within one section, papers were organized in chronological order. The papers in the volume cover geographically the whole of Europe and Anatolia: from Spain to Russia and from Latvia to Turkey; it spans chronologically many millennia, from the Middle Palaeolithic to the Iron Age (2^{nd} – 4^{th} centuries AD).

The volume opens with ten regional studies offering not only comprehensive syntheses of various chronological horizons (Palaeolithic - Daniella E. Bar-Yosef Mayer, Neolithic/Chalcolithic - Emma L. Baysal; Fotis Ifantidis; Selena Vitezović and Dragana Antonović; Sanda Băcueț Crișan and Ancuța Bobînă; Andreea Vornicu-Țerna and Stansislav Țerna; Roberto Micheli) but also new data on the acquisition and working of various raw materials or specific types of adornments (*Columbella rustica*

shells - Emanuela Cristiani, Andrea Zupancich and Barbara Cvitkusić; wild boar tusk - Ekaterina Kashina and Aija Macāne; canid tooth pendants - Petar Zidarov). The unbreakable link between adornments of the everyday life and those of the afterlife it is also highlighted in some of the contributions.

The following section - *Adornments in settlement archaeology* - includes nine studies, covering the archaeological evidence from specific settlement sites. Many studies focused on the adornments' iconographic designs, meaning, and exchange but also on raw materials, technologies of production and systems of attachment. Chronology-wise, this section brings together the most varied range of ornaments, raw materials and processing techniques from sites in Spain (Esteban Álvarez-Fernández), Turkey (Sera Yelözer and Rozalia Christidou), Greece (Catherine Perlès and Patrick Pion; Christoforos Arampatzis) and Romania (Adina Boroneanț and Pavel Mirea; Ioan Alexandru Bărbat, Monica Mărgărit and Marius Gheorghe Barbu; Monica Mărgărit, Mihai Gligor, Valentin Radu and Alina Bințințan; Gheorghe Lazarovici and Cornelia-Magda Lazarovici; Vasile Diaconu).

The last section - *Adornments of the afterlife* - focuses on ornaments identified in various funerary contexts allowing for a more detailed biography of ornaments through mostly use- and micro-wear studies, in order to reconstruct their production sequence and use life. Raw material availability and their properties, as well as contexts of deposition are also taken into account. In the seven studies of the section, different funerary contexts from Latvia (Lars Larsson), Ukraine (Nataliia Mykhailova), Hungary (Zsuzsanna Tóth) and Romania (Monica Mărgărit, Cristian Virag and Alexandra Georgiana Diaconu; Vlad-Ștefan Cărăbiși, Anca-Diana Popescu, Marta Petruneac, Marin Focșăneanu, Daniela Cristea-Stan and Florin Constantin; Dragoș Măndescu; Lavinia Grumeza) are discussed.

We would like to thank to all contributors who responded to our call and helped us complete this volume in less than a year. Each paper was submitted to external reviews. Therefore, we would like to also thank our colleagues who accepted to anonymously review the contributions, thus improved the overall content of the volume.

The Editors

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THE FOOT OF THE HARE, THE TOOTH OF THE DEER AND THE SHELL OF THE MOLLUSC: NEOLITHIC OSSEOUS ORNAMENTS FROM AŞIKLI HÖYÜK (CENTRAL ANATOLIA, TURKEY)

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Abstract: This paper examines osseous beads and pendants from the Aceramic Neolithic mound site of Aşıklı Höyük (Central Anatolia, Turkey). The major part of the excavated occupational sequence spans c. 8350-7350 cal BC, a period characterised by local differences in subsistence strategies prior to the emergence of agropastoral systems. At Aşıklı Höyük, gradual replacement of a variety of animals harvested for meat with caprines and stock keeping have been observed. Cultivation would be the prime explanation for the location of the site, which became larger and more densely occupied over time. Material culture provides evidence for technological and social behaviours changing at different rates and degrees. The osseous ornaments highlight deep-rooted habits and concepts as well as shifting attitudes toward personal adornment. Beads made from small mammal and bird bones and marine mollusc shells and deer canine imitations made from mammal bones were a constant choice. The major variations concern the spatial and temporal distributions of the tooth pendants and shell beads and the materials and skills used for imitation. We use here faunal and technological data to explore these distributions further.

Keywords: Aşıklı Höyük, Central Anatolia, Aceramic Neolithic, osseous beads and pendants, technology, spatial and temporal distribution.

Introduction

The relevance of adornment practices to the study of cognitive, technological and social change in prehistory has been addressed time and again and archaeological research has come a long way in gleaning such information from fashioned specimens and various raw materials (e.g. Newell *et al*. 1990; D'Errico 1993; White 1993, 2007; Stiner 1999; Choyke 2001; Kuhn and Stiner 2007; Bonnardin 2008; Alarashi and Chambrade 2010; Astruc *et al*. 2011; Belcher 2011; Rigaud 2011; Hitchcock 2012; Benzel 2013; D'Errico and Vanhaeren 2016; Poulmarc'h *et al*. 2016; Lazăr *et al*. 2018; Perlès 2018). Most approaches recognize the functional aspects of the ornaments, particularly their role in self- and group representation and cultural interaction. Portable items, especially jewellery, are highly prized evidence in these respects since they are discovered in relatively large numbers, even on very old sites, have different forms and move at multiple spatial and temporal scales. Among these artefacts, the osseous beads and pendants are remarkable. Their earliest recorded appearance is dated to the Middle Palaeolithic (Zilhão 2012 with references). From early on in the next period, they would be widely distributed and diversified and show spatial patterning (e.g. Taborin 1996; Kuhn *et al*. 2001; Vanhaeren and D'Errico 2006; Pitulko *et al*. 2012; Wolf and Conard 2015).

The use and production of personal ornaments at the time of the Neolithic transformation of Southwest Asia, a region that is a focal point in the study of early foraging-farming transitions, has received attention (e.g. Wright and Garrard 2003;

Bar-Yosef Mayer and Porat 2008; Maréchal and Alarashi 2008; Le Dosseur 2009; Alarashi 2014; Ridout-Sharpe 2015; Rigaud *et al*. 2017). Among the sites that show gradual *in situ* change of the subsistence base is the Aceramic Neolithic mound of Aşıklı Höyük in eastern Central Anatolia (Fig. 1). Excavations at the site exposed a 16-meter-thick stratigraphic sequence, which was divided into five main phases of occupation, or levels, numbered 1-5 from top to bottom (Özbaşaran 2012 with references; Özbaşaran *et al*. 2018). Level 1 has suffered severe damage by modern ploughing and natural erosion. Substantial are the underlying deposits of Levels 5 through 2. The bulk of these deposits, dated by ^{14}C to c. 8350-7350 cal BC (Table 1), document a diversified meat diet in the early levels, largely supplanted later by caprine exploitation (Stiner *et al*. 2014; Buitenhuis *et al*. 2018; Peters *et al*. 2018). Other important changes are the gradual growth of the local human population that abandoned quickly wattle-and-daub in favour of mudbricks, replaced its oval semisubterranean dwellings with rectangular aboveground ones and built eventually compact settlements. The placement of durable personal ornaments, particularly beads and pendants, in human burials, which began modestly in a few children's graves in Level 2 and extended to a larger number of individuals including adults by the end of this phase, reveals shifts in mortuary and adornment behaviours. Among the osseous ornaments, only mollusc shell beads and deer canine pendants were used as grave goods. These artefacts document rare instances of use of osseous materials for the adornment of the dead since they come from only three out of a total of 27 burials with ornaments. In the graves, the shell beads were found in association with stone beads and the canine pendants with copper beads. These pendants number 52 (Esin 1995). They have not been studied; it is therefore not possible to say whether the teeth were real or imitated, or even both. Artificial deer canines made of stone and mammal bone, as well as perforated incisors and beads made from mammal and sometimes bird bones are also found at Aşıklı Höyük. More than 60% of the osseous ornaments were collected from outdoor spaces, particularly fills of open areas and middens (Stiner *et al*. 2018; Yelözer 2018). Such artefacts were also often recovered from fills of houses and indoor structures, some activity areas and accumulations of construction debris. They represent abandoned or lost stuff. No composite ornaments were spotted, but a concentration from Level 4 could be a string of 17 bone beads and three canine imitations. Grouping of the artefacts by level shows that beads made of bone and shell and canine imitations made of bone occur from Level 5 through Level 2 (Table 2). Imitations made of stone come from Level 2 and are the only pendants manufactured from this raw material in this phase. Incisor pendants are only present in Level 5. The procurement of the osseous raw materials varied. Bones and teeth were available locally, while nearly all of the shells were from Mediterranean taxa. In this paper, we explore variations in osseous ornaments further and put emphasis on the bones and teeth of mammals. We examine acquaintance of the local people with this source of raw materials. Faunal patterns and behavioural elements of the bone technology from the site contribute to the better understanding of the relationship. Artefact treatments during their manufacture and use that highlight attitudes toward ornamentation are also considered. Next, we present data on the beads and pendants of Aşıklı Höyük and assess the relative importance of the osseous materials and the major formal and technological variations associated with them.

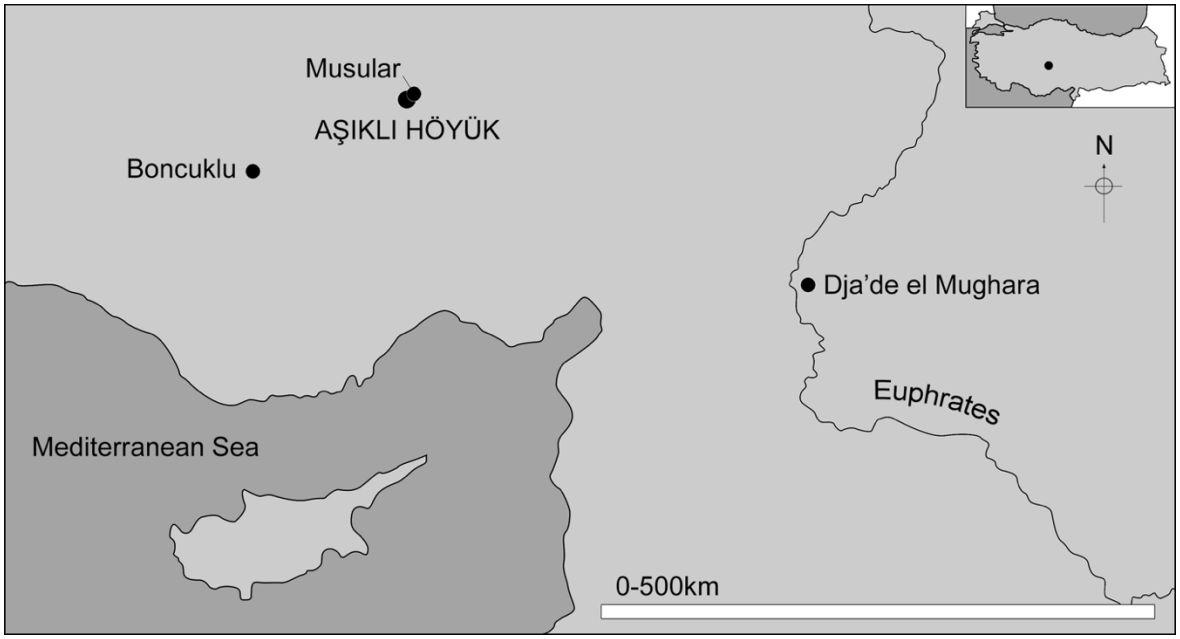

Figure 1. Aşıklı Höyük and sites mentioned in the text. The inset map shows the location of Aşıklı Höyük in Turkey.

Table 1. Chronology of technological and cultural changes at Aşıklı Höyük mentioned in the text. Ages of levels are from Quade *et al.* 2018. Periods in parentheses are based on average sedimentation rates. Percentages of caprines in the identified fractions (NISP) of the faunal samples from Levels 4 through 2 are based on Stiner *et al.* 2014: Table S2.

Level	Kyr BP	Cal BC	Caprines (% of total NISP)	Building construction materials	Building plan	Burials with beads
2	9.7-9.3	7750-7350 (8110-7300)	c. 84-92	Mudbricks	Rectangular	Children, adults
			c. 51-88			Children
3	10-9.7	8050-7750 (8290-8110)	c. 47-63			-
4	10.3-10	8350-8050 (8350-8290)	c. 32-46		Oval	
5	Not dated		Ongoing study	Mudbricks, wattle-and-daub		

The osseous beads and pendants of Aşıklı Höyük

The ornaments were first classified according to form, size and proportions (Yelözer 2016: 87-99, 2018: 384-385). Since some types were made from more than one raw material, this variable was considered at a later stage of the analysis. Bead and pendant morphology was described following Beck's (1928) typology, Bains's (2013) bead report from Aşıklı Höyük and other specialised research from the wider region of the site (Wright and Garrard 2003; Bains 2012; Bains *et al.* 2013; Bar-Yosef Mayer 2013; Baysal 2013a, 2014; Alarashi 2014, 2016). As a rule, beads have a central transverse or longitudinal hole, but perforated mollusc shells are invariably referred to as beads; all pendants have off-centre holes. Table 3 presents the classes and raw materials of the beads discussed here. "Other types" include various complex forms manufactured from stone and all but one of the shell beads. The shells were only

perforated prior to use. As explained below, the bone beads and the true tooth pendants also represent little modified bone. Canine copies were worked all over to shape.

If the aforementioned funerary cluster of canine pendants is added to the total of 1430 ornaments reported on Table 2, the number of specimens increases to 1482. The majority are from Level 2. Although our study is in progress, the largest part of the ornament collection has been recorded and classified into categories of raw materials. Other factors such as higher population density and larger surface area excavated for Level 2 (c. 4000 m^2, i.e. about 16.5 times as large as the area excavated for Levels 5 through 3, cf. Özbaşaran 2012: 136) may account, partly at least, for the observed differences. The Level 2 sample is also biased in favour of funerary goods: out of a total of 1320 specimens 1179 (89.3%) were deposited in graves. This use of ornaments affects mainly the copper, stone and shell components of the collection. All copper and the great majority of stone and shell specimens were grave offerings. Of 105 shell beads from Level 2, 87 (82.8%) are from burials. Of 87, 86 were buried with an adult male and one with a child. The canine pendants cluster is from an adult female burial. These associations echo the habit of burying adults with groups of beads of various colours (Yelözer 2018: 404). Single or pairs of green beads accompanied children and some females. Otherwise, the burials show great variation as regards the numbers and types of ornaments that were grave goods.

Table 2. Osseous beads and pendants by level of Aşıklı Höyük.

			Level 2	Level 3	Level 4	Level 5	Total
Bead	Bone		37	20	40	12	119
	Mollusc shell		105	4	7	3	119
Pendant	Incisor		-	-	-	3	3
	Deer canine	Real	-	-	3	-	3
		Imitation	2	1	3	4	10
		Undetermined[1]	52	-	-	-	52
Total			196	25	53	22	296

[1]Not analysed funerary pendants cluster.

At first sight, the large number of stone beads dwarfs those of the osseous ornaments. However, there is a clear contrast between Levels 4 and 5 on the one hand and Levels 2 and 3 on the other. In the early occupations, bone and teeth outnumber shell and stone by at least 6.33 to 1. The relationship is reversed later, when the stone beads become common. In addition, there is absolute and relative increase of the number of shells in Level 2, even if grave goods are excluded from the calculations: the ratio of non-funerary shells to bones and teeth in Level 2 is 1:2.17 (18 and 39 specimens, respectively). In Levels 3, 4 and 5, it is 1:5.25, 1:6.57 and 1:6.33, respectively. Comparisons between faunal and ornament samples and between funerary and non-funerary beads allowed us (Yelözer 2018: 394) to propose bead diversification and multiplication in Level 2. During this phase, large amounts and a wide variety of local as well as non-local stones and some new shell varieties were incorporated into the ornament repertoire. Typological diversity was also greater than in the preceding levels. Biconically drilled butterfly-shaped beads, a type well known from the Middle Euphrates Valley and the South Levant (see in particular Groman-Yaroslavski and Bar-Yosef Mayer 2015; Alarashi 2016), were found in Level 2. The increase in the number of non-local elements has been interpreted as an indication of more interregional interaction than at any previous time.

Table 3. Osseous raw materials used for beads and pendants at Aşıklı Höyük. Stone, clay and copper totals are reported for comparative reasons. The funerary canine pendants are not included here. Animal bones are identified to species and skeletal elements where possible. In all other cases, they are classified into broader groups.

			Bead												Pendant				Total
			Cylinder				Disc				Other type								
Level			2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	
Mammal	Aurochs	Incisor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	Red deer	Canine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3
	Cervid	Incisor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	Caprine	Incisor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	Hare	Tibia	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
		Metapodial	30	12	15	5	-	-	-	-	-	-	-	-	-	-	-	-	62
	Fox	Femur	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
		Tibia	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
		Metapodial	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Large size	Long bone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
	Medium size	Scapula	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
		Long bone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	Large or medium	Long bone	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2
		Compact bone	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	1	5
	Small size	Metapodial	-	1		4	-	-	-	-	-	-	-	-	-	-	-	-	5
		Long bone	3	5	21	1	-	-	-	-	-	-	-	-	-	-	-	-	30
	Subtotal		*37*	*19*	*36*	*10*	-	-	*1*	-	-	-	-	-	*2*	*1*	*6*	*7*	*119*
Bird		Long bone	-	1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	6
Mollusc	*Columbella rustica*		-	-	-	-	-	-	-	-	18	4	2	-	-	-	-	-	24
	Conus mediterraneus		-	-	-	-	-	-	-	-	74	-	1	1	-	-	-	-	76
	Tritia gibbosula		-	-	-	-	-	-	-	-	2	-	4	-	-	-	-	-	6
	Cerithium vulgatum		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
	Hexaplex trunculus		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
	Theodoxus sp.		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
	Cerithiopsiae sp.		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
	Cerastoderma glaucum		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
	Episiphon filum		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Undetermined		-	-	-	-	-	-	-	-	6	-	-	1	-	-	-	-	7
	Subtotal		*1*	-	-	-	-	-	-	-	*104*	*4*	*7*	*3*					*119*
Stone			65	12	1	1	878	42	2	1	107	2	-	-	4	-	-	1	1116
Clay/Ochre			-	-	-	-	4	-	-	-	2	-	-	-	-	-	-	-	6
Copper			62	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	64
Total			165	32	40	13	882	42	3	1	215	6	7	3	6	1	6	8	1430

When the osseous and stone fractions of the ornament assemblage are compared, bone cylinders appear to coexist with stone ones. The morphometric characteristics and skilful production of the latter beads distinguish them from their bone counterparts. Therefore, contrary to the canine pendants made of stone from Level 2, stone cylinders were not copies of bone beads. Comparisons between bone cylinder and faunal samples suggest a slight decrease in the number of bone cylinders in Level 2 (Table 4), but, when it comes down to the non-funerary artefacts, these beads are again the most basic form of osseous jewellery. The bone cylinders were transverse fragments produced using grooving and snapping from shafts of long bones of small mammals and some birds (Figs. 2 and 3). They preserved intact the marrow cavity, which was used as the hole of the bead. The bones were usually metapodials of hares. Fox metapodials were also employed. These bones are quite similar in shape and size to those of the hare. Two distal epiphyses of hare metapodials from Level 4 and a proximal half of metacarpal with a cylinder grooved but not snapped off the shaft from Level 5 represent waste from cylinder production. The two epiphyses were not useful material. Unlike other sites and periods (e.g. Le Dosseur and Maréchal 2013), Aşıklı Höyük does not provide evidence for use of epiphyses as beads. A femur and a tibia of fox and a tibia of hare are reduction waste from Level 2. The fox femur and the hare tibia are diaphysis fragments bearing respectively the distal and proximal articular ends. The opposite ends of the fragments terminate in cylinders. While one or two products could have been cut from the femur, none was from the tibia. The sawn end of this element lies immediately above the distal metaphysis indicating abandonment of the shaft after the epiphysis was removed. The fox tibia is represented by a distal epiphysis. The femur and the tibia bones are larger than metapodials, but six relatively large specimens, made from long bones of birds, exist among the cylinders. They come from Levels 3, 4 and 5. Based on the measurements on about 40 cylinders, the products obtained from small mammal bones are 6.9-18 mm long with the majority clustered between 9.2 mm and 12.9 mm; a single specimen measures 22.2 mm in length. Their external diameters vary between 3 mm and 5 mm. Their sides are (sub) parallel or oblique and their cross-sections vary showing that various shaft parts were exploited. The largest cylinders are 24.7-29.8 mm long. Their external diameters measure approximately 7-7.3 mm.

The wasted shafts and epiphyses amount to 5.5% of the cylinder sample. Five shaft fragments preserving two cylinders grooved but not cracked (cf. Fig. 2a, lower rows) and two fragments bearing four cylinders were also found. Level 2 yielded two fragments of this kind. Level 3 has three and Levels 4 and 5, each one have a single specimen. A pair was used as a single bead. The other fragments have not as yet been analysed for use wear. Even if they were not used, the amount of reduction waste would still be low (11.1%). Two pairs, dated to the 9th millennium, have been published from western Central Anatolia (Baysal 2013a: 6 and Fig. 7). Use is not indicated. All of these finds are different from two used beads from Levels 2 and 4 of Aşıklı Höyük, each one bearing two central transverse grooves that outline three unusually short cylinders, which measure 2.4-4 mm in length (Fig. 2c). There is no simple cylinder that is shorter than 6.9 mm. The two beads are c. 15 mm long and therefore comparable to simple specimens.

Table 4. Comparison between cylindrical bead and faunal samples from Levels 2-4 of Aşıklı Höyük. Faunal data are from Stiner *et al.* 2014: Table S2.

	Level 2	Level 3	Level 4	Level 5
Bone cylinders (*n*)	37	20	39	12
Faunal sample (NISP)	50486	3639[1]	17586	Ongoing study
Proportion of bone cylinders to faunal sample (%)	**0.1**	0.5	**0.2**	-

[1]Small sample.

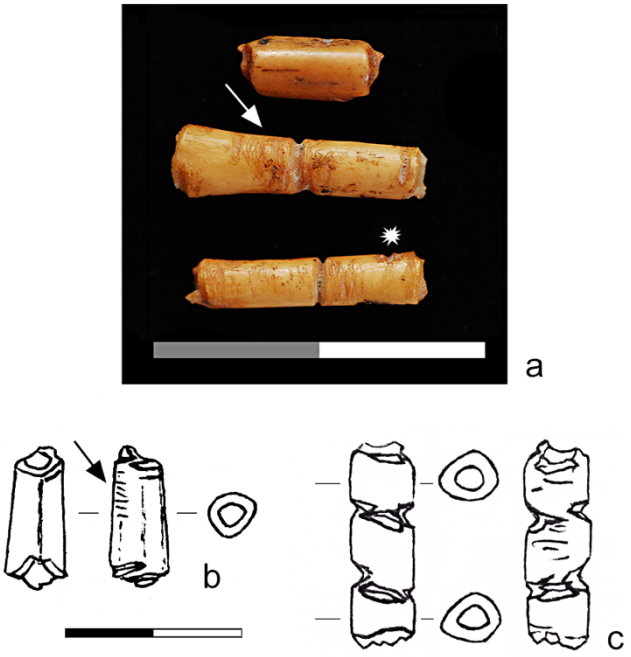

Figure 2. Cylinders. All are from Level 4. The arrows indicate secondary cutmarks, the star an abandoned incision. Scale: 2cm.

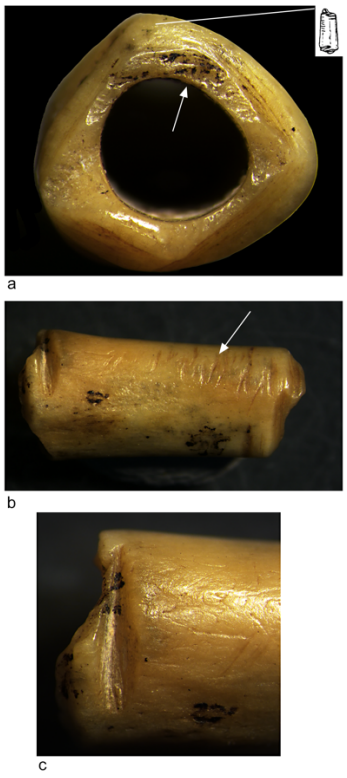

Figure 3. Manufacturing marks on the cylindrical bead shown in figure 2b: a. grooved and snapped extremity; b. secondary cutmarks below this extremity and deep straight non-joining incision on the opposite extremity; c. close-up of the deep straight non-joining incision on (b). The arrows indicate snapped bone on (a) and secondary cutmarks on (b). Polish and rounding are use wear. Images (a), (b) and (c) captured at 2.5x, 1x and 2x magnifications, respectively.

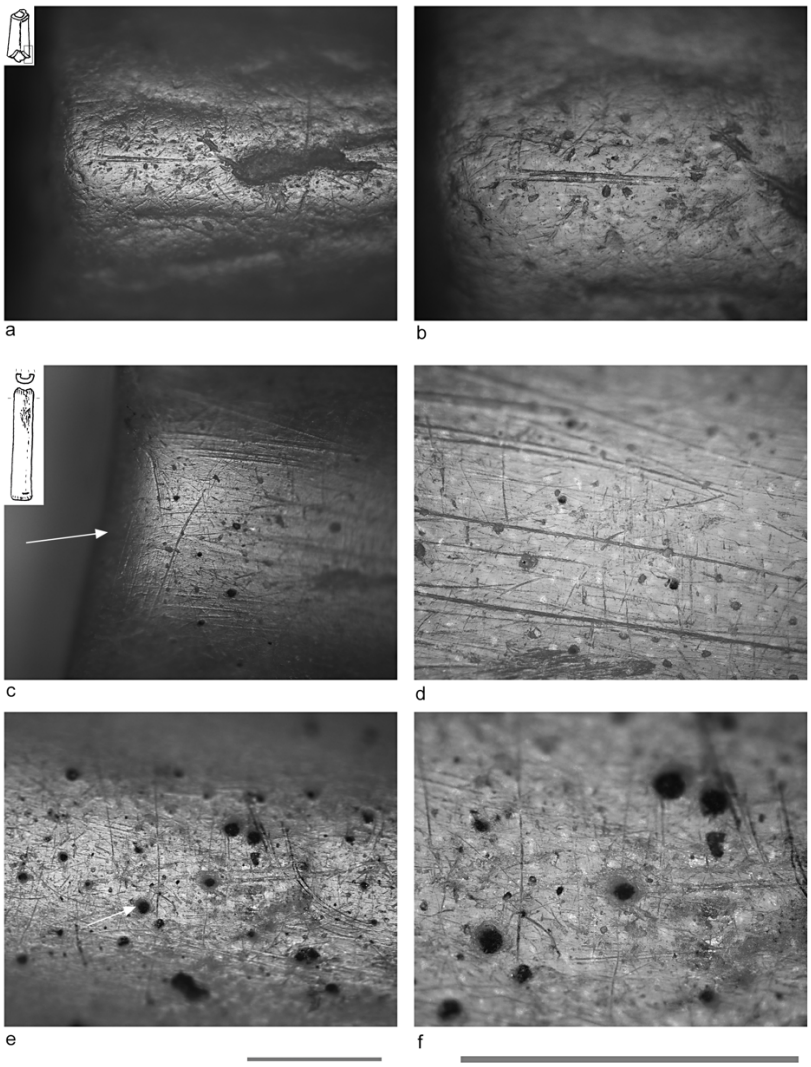

Figure 4. Use worn cylinders: a-b. outer aspect of the specimen shown in figure 2b, polishing and rounding generally following surface contours, abundant, often polished, abrasion features; c-d. medullary surface of the cylinder fragment of the inset, abundant, mainly longitudinal, more or less polished striations near the upper extremity; e-f. aspect of the medullary cavity near the mid length of the inset fragment on (c), thinner polish and abundant narrow striations running in various directions. The arrow indicates rounded sloping outward inner margin of the upper end of the cylinder on (c) and unpolished natural holes on (e). Images (a), (c) and (e) captured at 100x magnifications and (b), (d) and (f) at 200x magnifications. Scales: 0.5mm.

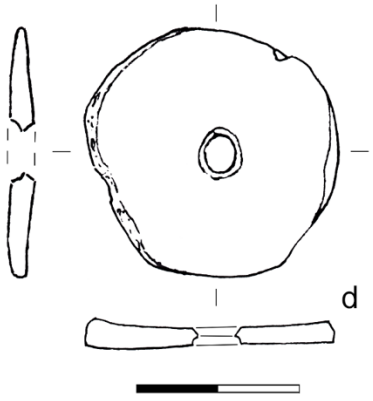

Figure 5. Disc. Scale: 2cm.

In the sample analysed for cylinders at Aşıklı Höyük, carefully grooved ends coexist with cursorily and even crudely marked ones. In all cases, a stone edge was employed with a back and forth motion in a straight line to incise and thin the bone wall, which was then cracked along the cut line. A dozen of objects show that more than half of the thickness of the compact bone was reduced around the entire circumference of the bone shaft prior to breakage. On four objects, only one extremity exhibits these characteristics; the incisions shaped on the opposite end have various depths. Such variations were observed on another seven specimens. There are also shallow grooves running around the entire shaft circumference as well as non-joining incisions. Three cylinders were grooved using two opposite incisions. On shallow and irregularly grooved ends, the fracture line did not always follow the cut line. This created irregular broken edges with excess bone left on (or removed from) them. As a rule, the products were used without further modification. Four cylinders show superficial grinding of the irregularities of the broken surface. A fifth was completely smoothed on both ends. The outer surface of the cylinders often bears groups of secondary cutmarks. Their location, number and depth vary, but all are shallower than some individual incisions that show change in groove location. The secondary marks could represent intermittent, quick passages of the stone edge over the bone surface at the beginning of the work. Eight specimens indicate scraping, partial or covering, of the bone shaft prior to grooving. This work did not alter the shape of the products. It was probably used to clean and remove minor defects of the bone surface. Direct use of scored outer surfaces and rough broken edges combined with rare wasted bone shafts indicate that the work was focused in the extraction of multiple cylinders.

Except a badly preserved cylinder, the other analysed specimens displayed use wear. Polishing and rounding of the relief created during the manufacture are the most prominent characteristics of this wear. Under magnification, abrasion features (i.e. pits and striations) are abundant (Fig. 4a-b). They have no constant orientation and size and their degree of polishing varies suggesting loose but prolonged contact with soft abrasive materials as well as manipulation. Rounding and polish also appear on the inner margins of the hole of the beads (Fig. 4c-d). On well-worn extremities, these margins slightly slope outwards. The wall of the cavity is also abraded and polished testifying to threading of cylinders using vegetal fibres (cf. Fig. 4e-f). The most worn specimens constitute about one third of the analysed sample.

To make the perforated disc (Fig. 5), the naturally thin (0.9-1.7 mm) and flat shape of a scapula blade was exploited. The bone was from a medium size, i.e. sheep-sized, mammal. The broken edge of the fragment was simply smoothed and the disc was roughly rounded. Its diameter is 19.6-21 mm. These dimensions and shape have no parallels among the stone discs. The circular hole was bored from both the lateral and medial sides of the bone. Uneven cone rims and variations in the angles formed between the slopes of the cones and the cortical surface of the bone are consistent with changing cutting angles and incomplete rotation of a hand-held tapered stone perforator with cutting margins. The internal diameter of the hole is 2.8 mm and the external 3.4-4 mm. The function of the disc remains obscure. Polish is not preserved. The bone surface is slightly but uniformly eroded.

Pieces of cortical bone were used to shape the canine copies (Fig. 6a-e), all of which are finished products. Six fragments are from mammal long bones. Two mammals were large (cf. cattle) and one medium in size. This distinction was not possible on other copies. Overall, these artefacts are too small and worked to permit precise identifications. Of a total of ten imitations six were analysed in detail. Table 5 presents their raw materials and dimensions. The teeth are complete specimens or nearly so. Among the genuine

canines, two have partially damaged roots. The third is a short root fragment with closed apex. It measures 8.4 mm in length. The best-preserved canines have different morphological characteristics (Vanhaeren and D'Errico 2002). The root diameters are 10.4/4 mm and 7.8/4.1 mm. The widest specimen displays a little worn globular crown (Fig. 6f); the other (Fig. 6g) is well worn. In the first case, the distal and mesial root profiles are fairly well preserved and nearly parallel. This tooth would be from a young male. The other was modified through use and is not classified.

Non-utilised specimens are absent in the unworked faunal bone samples (M. Stiner, personal communication to S. Yelözer, 2014) and comparisons cannot be made. Of the three incisors, one comes from a deer. This specimen was cut transversely away from the apex in order to shorten the length or remove from the jaw (Fig. 7a). It was not further used and represents manufacturing waste. The other specimens are a 2nd or 3rd incisor of a caprine animal (Fig. 7b) and a 1st incisor of a 1.5-2 years old aurochs (Fig. 7c).

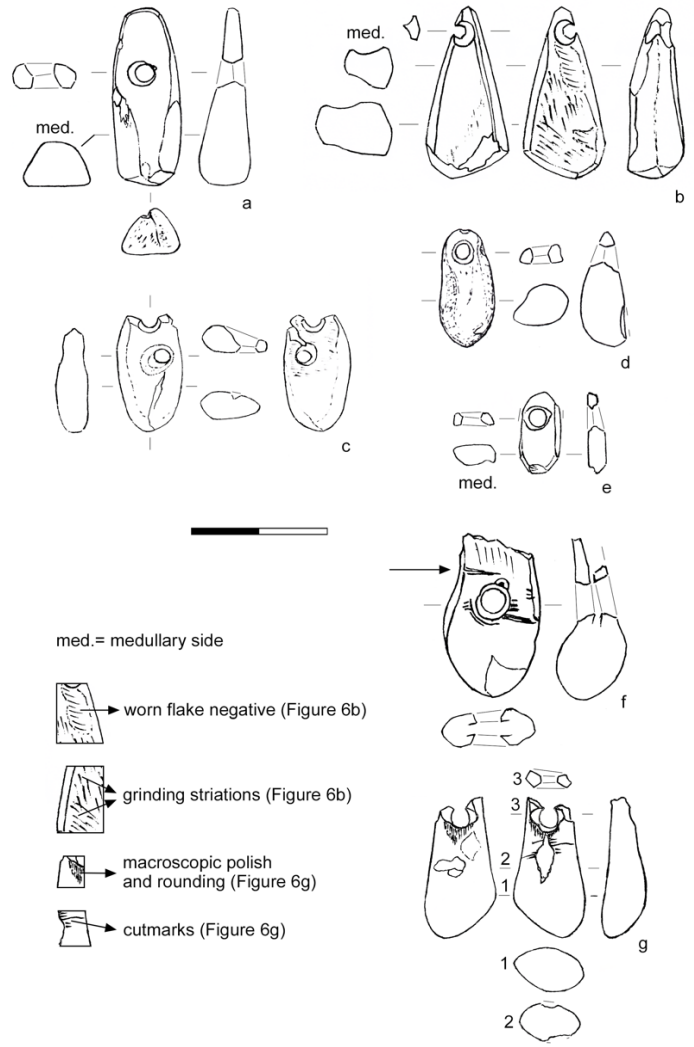

Figure 6. a-e. Deer canine imitations made of bone; f-g. perforated deer canines. The arrow indicates cutmarks (cf. Fig. 8a-b). Specimens (a), (c), (d), (f) and (g) are from Level 4, (b) and (e) from Level 5. Scale: 2 cm.

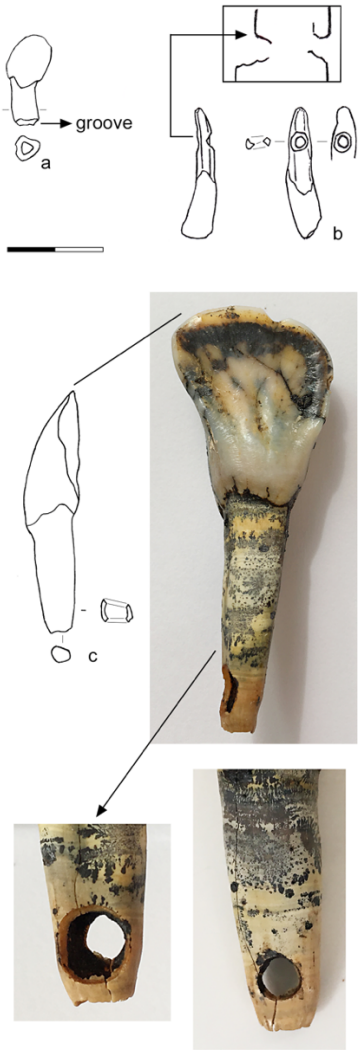

Figure 7. a. Deer incisor (not at scale); b. caprine incisor oriented as pendant; c. aurochs incisor. The inset for (b) represents major relief variations on the perforation wall. Scale of drawings: 2 cm.

The method used to perforate the disc was also applied on the tooth pendants. The diameters of the holes were small overall. Perforations could be described on five out of six analysed canine imitations. In one case (Fig. 6c), a new hole replaced an older, broken one of the same type. Lopsided cone profiles, locally flaring or facetted hole rims, walls with discontinuous and intersecting striations and diameter variations (cf. Table 5) were recorded. Traces diagnostic of the perforation method were eliminated from the sixth copy, which was thoroughly worked and bevelled after the perforation. The other holes were cut during the final stage of shaping. When the work continued on another three specimens, it did not modify the perforations significantly. Thus it was possible to see on two occasions (Fig. 6c and e) that a cone was first cut deep and that the opposite, shallow, was simply used to widen the diameter of the hole. There was no single shaping process associated with the canine copies, which are schematic representations of the tooth. Facets and shaped or naturally curving profiles on the blanks helped depict the rounded and asymmetric profiles of the real canines and their crowns. A nearly flat end (Fig. 6a) could represent advanced crown wear. Like on original teeth, the apex, preserved on four specimens, was a blunt point or edge, rounded or nearly straight with rounded angles. Differences in lingual and buccal tooth profiles were also shown by exploiting the flat split sides of long bone splinters used as blanks for the copies (but see Fig. 6e). Long bones naturally widen and bulge at the level of the metaphysis. In two cases, this was exploited in order to indicate the protruding crown (Fig. 6a). To obtain a similar effect, the outer side of two splinters was bevelled from about the mid length down to the apex (Fig. 6b). On a third fragment, the virtual root was thinned from the medullary side (Fig. 6e). On a fourth, both the outer and the medullary side were thinned (Fig. 6c).

Table 5. Raw material and metrical data on analysed canine imitations of Aşıklı Höyük (measurements in millimetres). Diameters are longitudinal and transverse measurements. They are indicative because manual perforations did not form perfect circles. The external diameter was measured on both cones (A: cone on concave (cf. medullary) or flat side).

Level	Raw material	Compact bone Th	L	Max W/Th	Max Th	Hole		
						Internal diam	External diam	
							A	B
4	Compact bone Medium-large mammal	-	17	8/6[3]	6[3]	2.3/2.1	3.1/3.2	3.2/3
		-	17.6	9.3/3.5	4.5	2.4/2.5	3.7/3.5	5.5/5
	Long bone Large mammal	-	25.4[2]	9.6/5.3	7.5	2.9/3	4.2/4	3.9/4
5	Long bone Medium mammal	2	11.6[2]	6/2.8	2.8	2.4[4]	3.5[4]	4[4]
	Long bone[1] Medium-large mammal	-	15.4	7/5.9	5.9	2[5]	-	-
	Long bone[1] Large mammal	6.8	24.8	11.6/7.4	7.4	1.6[5]	3[6]	3.2[6]

Abbreviations. L: length; W: width; Th: thickness; diam: diameter
[1]Small portion of metaphysis preserved
[2]Portion of medullary cavity preserved
[3]Approximate thickness measurement because of accidental flaking
[4]Width not measured because of use damage
[5]External diameters altered because of thorough shaping
[6]Width not measured because of accidental damage

To obtain fragments for shaping imitations one could break bones or collect debris produced during the processing of bones for marrow. This latter activity was regularly conducted on the site. The fragments were probably chosen for their size. The largest specimens indicate thorough use of both scraping and grinding, sometimes alternatively, for cutting facets and rounding profiles. Almost all of the ridges were blunted; they were usually rounded. The other copies are very worn by use, but three preserve traces of grinding. This technique was not commonly employed at Aşıklı Höyük to shape bone tools. Its main use was for removing unwanted material and modifying profiles locally (cf. corrections on broken ends of cylinders). On the canine imitations, it was applied for the same purpose. Despite the effort invested, no care was taken to obtain a uniform finish of the worked surfaces. A single specimen (Fig. 6d) shows more care for creating even rounded profiles, but it is too worn to observe details. Bevelling, on the other hand, was not used successfully since the bone was extremely thinned and the objects were broken quickly at the level of the perforation (Fig. 6b).

To shape the cones on the teeth easily, the artisans exploited the wider surfaces. Thus the axis of perforation runs in buccolingual direction on the canines and in mesiodistal direction on the incisors. These directions facilitated the display of the crowns of the teeth worn as pendants. The largest canine was perforated immediately below the crown. A hole closer to the root end was abandoned. Its mark, shallow, was partially removed during the boring of the final hole (Fig. 8a-b). The slopes of the cones of this hole, short because of the presence of the pulp cavity, exhibit well-striated intersecting facets that form in places angular edges indicating abrupt stops of the movements used to wear the bone down (Fig. 8c-d). The internal diameter of the hole is c. 3 mm. The external rings are 5-5.4 mm long. The hole on the other canine is only partially preserved because of breakage. Strong rounding and polish of the broken end indicate that the pendant was reused (Fig. 8e-f). Wear in the form of polished notches on the distal and mesial margins of the hole also interrupt the perforation marks, which are best seen on the occlusal side of the hole. On this tooth, the lingual cone was deeper. Breakage at the level of the hole and polished notches were also observed on the small root fragment. Only rough estimates of the diameters of the broken holes are possible. They are in the order of 3 mm and 2 mm, respectively. Perforation followed careful and deep scraping of the buccal, mesial and distal sides of the root of the caprine incisor and light scraping of the protruding buccodistal edge of the root of the aurochs tooth. The caprine incisor was perforated by a hole, about 2 mm in diameter (Table 6), at a distance of c. 5.5 mm from the apex. Semicircular scraping grooves were best formed on the naturally thicker wall on the apical side of the hole (see inset for Fig. 7b). The worked mesial and distal surfaces were inclined toward the buccal side of the root and the notched appearance of this aspect of the tooth is a deformation created during the perforation. Two opposite holes were bored close to the hollow root end. The distance between the apical edge of the distal hole and this end is 1 mm. It is 2.5 mm on the opposite face. Few curving scrapes and little pressure toward the root canal were enough to perforate the thin (c. 1 mm) shell of the young aurochs incisor root. Thus, the inner edges of the holes are jagged and striations are not well formed on their walls. The outer edges also show chipping in places indicating short work duration.

Use wear on the imitations and the incisors could only be examined under low magnifications. Two canines were observed using high magnification. Basic analysis revealed two major patterns of use modifications of the holes. The first consists of the polishing and rounding of the upper relief of the surface, i.e. ridges and plateaus, mainly on/near the rim and the intersection of the cones. The intermediate area is less worn.

The most worn specimens show smoothing down of the relief and polish associated with fine striations, mostly perpendicular to the edges of the holes. Use marks tend to affect mostly their apical part. They fade away from this region, but the most exposed (convex) areas between the apex and the hole are also well worn (Fig. 9). The amount of use wear on the rest of the surface of the objects varies. The manufacturing marks appear severely worn down or obliterated in places, but the aurochs incisor, the largest canine and one of the two large imitations (Fig. 6a) were less worn. The aurochs incisor presents the less developed use wear, perceptible from the apical side of the hole through the root end. The imitation was deeply scraped and ground, which might explain the tenacity of the manufacturing striations. The second pattern is related to the broken and reused canine, the canine root fragment, the smallest imitation (Fig. 6e) and one of the two large imitations (Fig. 6b). The holes of these objects show advanced wear on their lateral sides. On the real teeth and the small copy, it takes the form of shallow rounded notches. Under magnification, the surface exhibits numerous polished narrow continuous striations (Fig. 10). The wear resembles that on the interior of cylinders. The large imitation shows more rounding and polishing of the rim and the internal crest of the hole on the preserved lateral side, but notches are not formed. These data suggest that the objects were tied around these areas. While the first pattern is consistent with suspension of the ornaments, the second indicates sewing or use of laces for complex fastenings of elements that had to be kept flat or separate from each other in a string ornament.

Most of the shells from Aşıklı Höyük belong to *Conus mediterraneus* (synonym of *Conus ventricosus*, Puillandre *et al.* 2015; for shells see Fig. 11). The second most common shell was *Columbella rustica*. *Tritia gibbosula* (formerly *Nassarius gibbosulus*, Galindo *et al.* 2016) is rare. All other taxa are represented by single specimens. Perforations were observed on *Conus*, *Columbella* and *Tritia* specimens using the criteria proposed by Francis (1982: 713). The *Conus* and *Columbella* shells have holes opened on the apex by gouging and percussion. The *Tritia* cases were perforated using abrasion. These preliminary data point to standard procedures of bead making. The majority of shell surfaces exhibit well-developed macroscopic use polish (M. Stiner, personal communication to S. Yelözer, 2019).

Table 6. Perforation diameters on the incisors of Aşıklı Höyük (measurements in millimetres. For details, see Table 5).

	Mesial		Distal	
	Internal diameter	External diameter	Internal diameter	External diameter
Aurochs	3	4	$4.5^{1}/4^{2}$	$6^{1}/5^{2}$
Caprine	$2.2^{1}/2^{2}$	$3.3^{1}/3.2^{2}$	Cf. mesial	$3.4^{1}/3.2^{2}$

[1]Along the length; [2]along the breadth

Discussion

Notwithstanding variability related to ecological, economic and cultural background, the bone and tooth ornaments of Aşıklı Höyük fit in with the general picture of the Epipalaeolithic and the early Pre-Pottery Neolithic productions in Anatolia and the Levant. Use of small mammal and bird long bones for cylindrical (also often termed tubular) beads has been observed in various regions including Central Anatolia (e.g. French *et al.* 1972; Stordeur 1988; Özdoğan 1999; Maréchal and Alarashi 2008; Baysal 2013a; Le Dosseur and Maréchal 2013; Günyol 2019). Deer canine pendants, genuine and copies, the latter sometimes described as oval or teardrop-shaped (e.g. Le Dosseur and Maréchal 2013: 294; Shaham and Belfer-Cohen 2017), are also present (see Özdoğan 2016 with references). Their absence from the 9th millennium sites of western Central Anatolia

is noteworthy; they occur in the region later (Bains *et al*. 2013; Baysal 2017). Perforated incisors are rare overall. On typological and chronological grounds the closest parallel to the Aşıklı Höyük aurochs specimen comes from the site of Dja'de el Mughara in the Middle Euphrates Valley. It is dated to the Early Pre-Pottery Neolithic B (9th millennium cal BC; Alarashi 2005: 54)

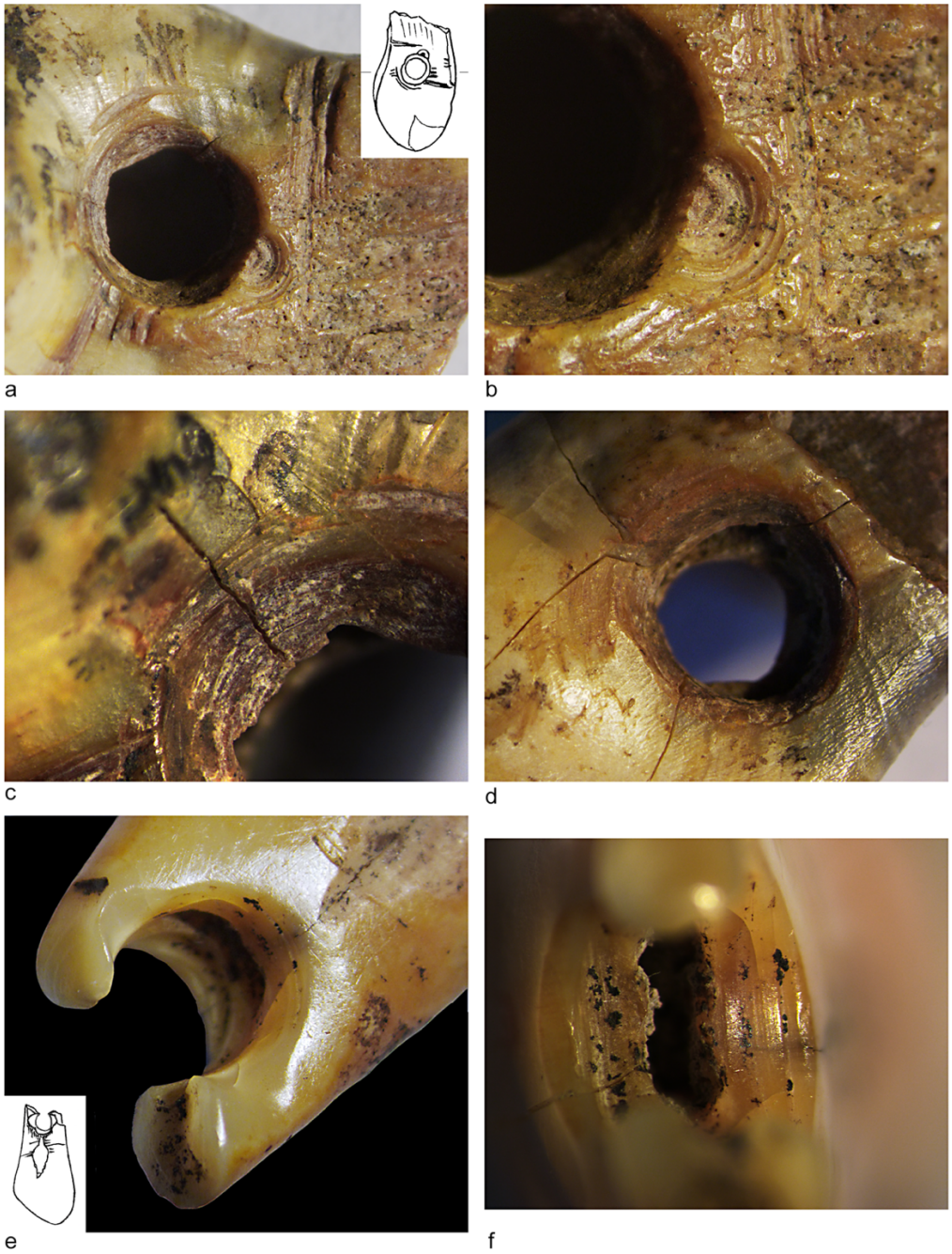

Figure 8. Perforated deer canines. a-b. Complete and incomplete perforations; c-d. opposite cones showing wavy lightly polished outer edges, variations in striation length and direction and irregular inner hole edges; e. well-developed polish and rounding on broken end and notches; f. perforation striations preserved on the occlusal side of the hole and obliterated by use wear near/on the notches where the surface appears smooth, pulp cavity in the middle. Images (a), (d) and (e) captured at 1x magnification. The rest were photographed with 2x magnification. The red substance on (c) is modern damage.

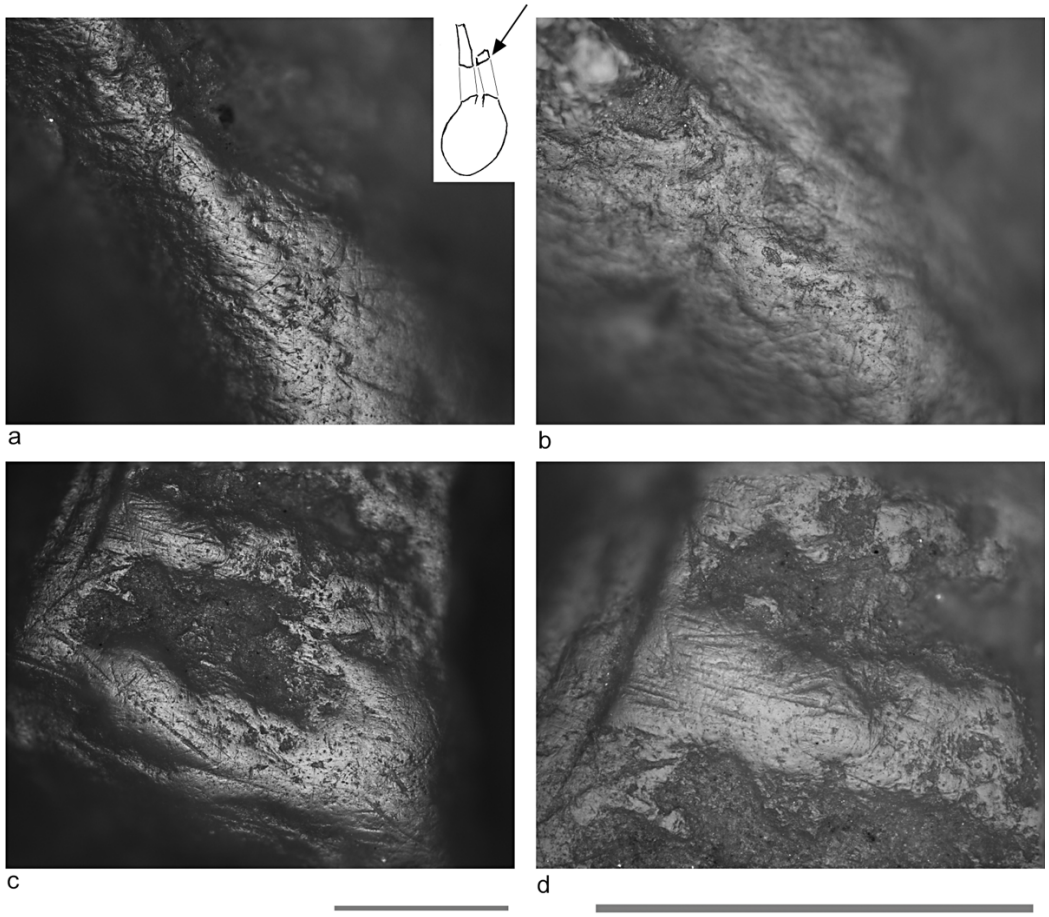

Figure 9. Use wear on perforated deer canine: a-b. abundant abrasion features associated with polish and rounding of the profiles; c-d. similar polish and rounding of the upper relief of the natural surface away from the hole, near and along the broken edge of the root. The arrow indicates the position of (a) and (b) on the outer margin of the apical side of the perforation. Scales: 0.5 mm.

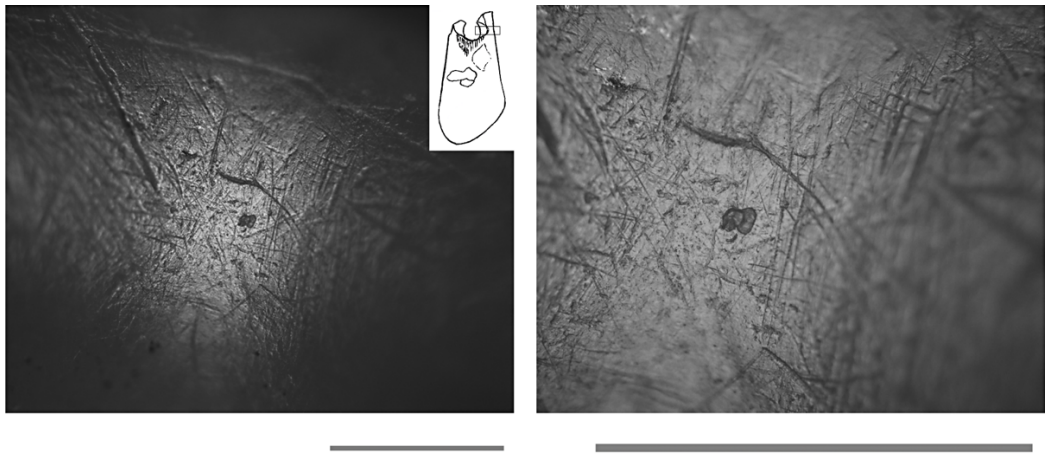

Figure 10. Use wear in notch of perforated deer canine: smoothed surface with abundant, mainly polished, striations running perpendicular to the edges of the notch, which present the same aspect. The pits, mainly small, are also polished. Images (a) and (b) captured at 100x and 200x magnifications, respectively. Scales: 0.5 mm.

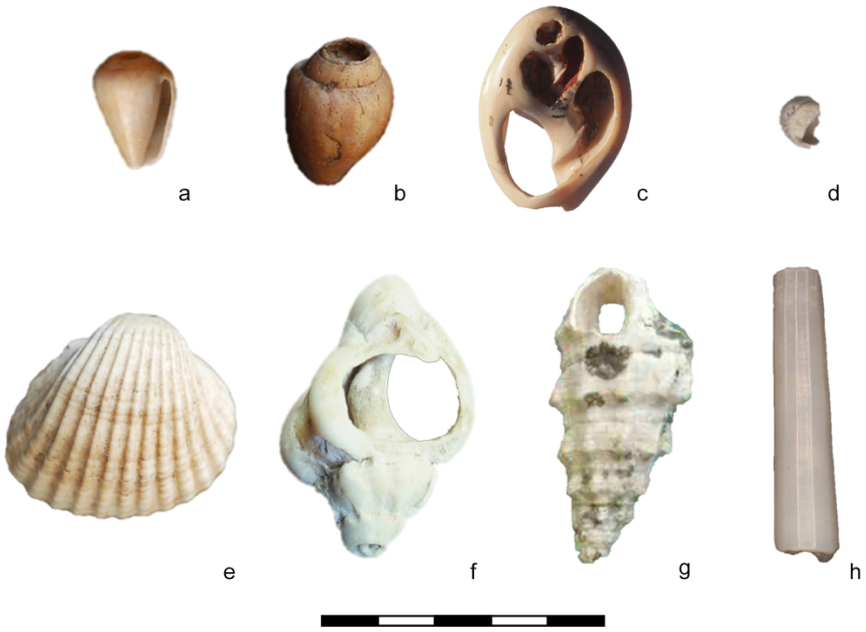

Figure 11. Mollusc shell beads from Aşıklı Höyük. a. *Conus mediterraneus*; b. *Columbella rustica*; c. *Tritia gibbosula*; d. *Theodoxus* sp.; e. *Cerastoderma glaucum*; f. *Hexaplex trunculus*; g. *Cerithium vulgatum*; h. *Episiphon filum*.

Conus, Columbella and *Tritia* beads were in circulation in Anatolia and the Levant during the Epipalaeolithic and early Neolithic periods, but their number varies among sites (Bar-Yosef Mayer 2005; Maréchal and Alarashi 2008; Baysal 2013b; Alarashi 2014; Çakırlar 2015; Ridout-Sharpe 2015; Baysal and Erek 2018). At Boncuklu in western Central Anatolia, which is contemporaneous with Aşıklı Höyük, *Tritia* shells are mostly found (Baysal 2013a). Other shells used at this and other early Neolithic sites are absent or represented by single specimens at Aşıklı Höyük. Dentaliidae and Cypraeidae in particular have a wide distribution and occur over a large area extending from Central Anatolia to the South Levant (cf. also Alarashi 2010; Kurzawska *et al*. 2013; Reese 1982). Freshwater shells are represented by a *Theodoxus* shell in Level 5 of Aşıklı Höyük (Cf. Fig. 1). Chronological parallels to *Theodoxus* use come from Early Pre-Pottery Neolithic sites in the Middle Euphrates Valley (Alarashi 2014; Ridout-Sharpe 2015). Local variations in the taxa used for beads and the frequencies in which they occur could be related to wearers' preferences or their connections with exchange networks. Whatever the case, movement of goods over long distances was of foremost importance for their procurement. Prevalence of used beads and absence of non-perforated marine shells suggest that these shells reached Aşıklı Höyük as ready-made artefacts.

The other osseous materials used at Aşıklı Höyük indicate use of local sources. All of the taxa that provided raw materials for beads and pendants are present in the bone refuse from the site. The use of hare bone correlates well with the importance of this animal in the people's diet during the 9th millennium. Hare continued to be a favoured small prey after the focus turned to the caprines and the frequency of small game dropped altogether. Shifting economic strategies do not seem to have distorted the production of cylindrical beads. Availability constraints are unlikely since the proportion of utilised hare bone to the total hare count is always low (Level 2: 2.3%; Level 3: 2.6%; Level 4: 0.4%). The number of beads made from bird long bones is too small to show trends in bead production. The specimens made from fox metapodials are rare too. It is possible that some of the

undetermined long bones of small mammals are from this species, but foxes were less frequent than hares overall. The representations of these animals in the bead sample could reflect greater reliance of the artisans on the commoner of the two species, the hare. In a paradox, if one considers the emphasis on the exploitation of caprines, which were also kept intra muros in all levels (for Level 5 in particular see Kalkan and Özbal 2018; Mentzer 2018; Tsartsidou 2018), a single incisor pendant is associated with these species. One can as well puzzle over the discovery of only one incisor of aurochs since this animal was constantly exploited and in some phases, including Level 5 that yielded the artefact, its frequency increased. On the other hand, it is difficult to directly associate the production of canine copies with the scarcity of deer remains in the faunal debris (0.3-3.1% of total NISP). Dearth of genuine teeth could be a reason for producing copies, but the motives for imitation are multifarious (Choyke 2008). We discuss this issue below using morphological and technological data. Factors that could have rendered real canines unavailable for use include complex butchering processes and differential access to body parts and secondary products such as skin, sinew and bone. Such evidence is not published. Selectivity of the sex and age of the deer from which the teeth were derived could also be a bias, but the studied sample is not adapted to this kind of research. Moreover, one cannot exclude the possibility that teeth were collected from animals that had died from natural causes. Among the studied specimens, the two most complete bear cutmarks used to remove the teeth from the jaw. Regardless of where the teeth came, the total number of ornamental canines including imitations and the funerary cluster is low in comparison to other types of osseous jewellery. These pendants do not seem to have been commonplace and a sign of it would be their concentration in a single burial.

Faunal data provide further insights into the relations between humans and animals. Hare was a recognisable source of food and raw materials. In the industry, hare feet would have been chosen for the size, the morphological characteristics and productivity of the metapodials. These bones have regular shapes, dense compact bone and, as mentioned above, hollow shafts. One of the main characteristics of the bone industries of Aşıklı Höyük is the exploitation of the natural forms and dimensions of bone fragments for making tools and belt buckles and hooks (Christidou 2014, in preparation). If nothing else, the production of cylindrical beads would be emblematic of this behaviour. Moreover, a killed hare yields sixteen metapodials from which multiple beads can be produced. Fox is equally productive. The small amount of waste from cylinder production, particularly abandoned diaphyses, suggests that beadmakers were taking advantage of this quality of the metapodials too. The low number of epiphyses might reflect recovery bias since such small finds are usually found in flotation.

The extremely limited use of teeth of caprines and aurochs suggests cultural bias and can in no way be related with people's knowledge of these species. It is interesting that the incisor pendants come from Level 5, which also yielded a representational figurine from a proximal phalanx of equid, comparable to the Early Pre-Pottery Neolithic A-B specimens from the Middle Euphrates Valley (Christidou *et al.* 2009). The latter type of artefact does not occur in later occupations at Aşıklı Höyük. From a stratigraphic point of view, the incisors and the figurine are not connected in any significant way, but the aurochs and equid specimens show parallels between the Euphrates region and Central Anatolia during the 9th millennium. Ornaments such as the butterfly-shaped beads will point again to eastern territories in Level 2. The worked deer incisor, as old as the caprine and cattle teeth, further stresses the difference between Level 5 and the subsequent phases of occupation. Level 5 represents an early stage of the combination of sedentism, plant cultivation and stock keeping in Central

Anatolia (Stiner *et al*. 2014; cf. Baird *et al*. 2018). Aşıklı Höyük was founded on a floodplain and this has been related to plant cultivation, which was practiced in parallel with the utilisation of various wild resources from the surrounds. Caprines were also hunted. It is possible that older practices and symbols persisted at this time. Some of these elements would be abandoned or modified later. The incisors were perforated at the root, to exhibit the white shiny crowns. It is not unreasonable to assume that the aesthetic or representational qualities of these teeth were lost when the animals from which they were derived became part of the household and village routines or acquired new qualities. The manipulation of caprines through the years made them an essential part of the daily activities on the site. This is emphasised, among other things, by the use of their long bones for manufacturing the most common bone tools that are the awls. Aurochs was hunted. It was the largest wild ungulate and, as suggested by the constant presence of its bones in the food debris, a valuable meat source. Organised regular hunting and consumption would not have kept cattle outside local people's standard activities to which one can add the use of various fragments of cattle long bones, ribs and shoulder blades for tools and belt elements. However, cattle were not a foreign element in the symbolic repertoire of the earliest Neolithic in Anatolia and the Near East. Cattle and sometimes sheep appear in iconographic representations (e.g. Helmer *et al*. 2004; Peters and Schmidt 2004). Display of bucrania and horns and butchering and sharing, ritualised or not, are associated with cattle (e.g. Stordeur 2010 with references; Rosenberg 2011; Baird *et al*. 2012; Coqueugniot 2014). Such evidence also comes from the flat site of Musular, which was founded by the Aşıklı Höyük inhabitants a few hundred meters west of the mound in the mid-8th millennium and used for communal activities, processing of cattle carcasses and consumption in particular (Duru and Özbaşaran 2005). Then, there would be another kind of relationship between aurochs and the local society, which possibly changed over time and made at the end the consumption of this animal a community affair. Such a relationship perhaps eliminated quite early the cattle teeth from the repertoire of personal adornments. The sources of canines and shells played a minor or no role in the subsistence. Then, the function of canine pendants including the copies would not have changed or, if it were, this would not have revoked their role in personal ornamentation. In this regard, the deer incisor is a dissonance and another explanation could be proposed, that all three incisors were retrieved together with the types of ornamental compositions with which they were linked. That is, the pendants had no direct or any link at all with the animals from which they originated, but acquired significance as parts of particular composite ornaments. Such ornaments have been excavated in Level 2 from graves and probably in Level 4. Whatever the case, the fact remains that utilised teeth indicate temporal trends. This is hardly the case of the bone cylinders. It is interesting that the single or pairs of beads that accompanied some child and female burials were never bone cylinders. The utility of the osseous beads and pendants probably varied. This is also suggested by the technological data examined here.

The manufacturing and use data for small mammal bones corroborate production of multiple cylinders for stringing. Breakage of shallow, irregularly and partially grooved shafts and direct use of the products indicate quick manufacturing as well as acquired ability to apply the reduction method efficiently. Irregular broken edges did not represent defects worthy of attention. These data taken together with regular consumption of hares at the site fit the definition of expediency strategy by Nelson (1991). Technical experience and raw material availability minimised the beadmakers' efforts and allowed them to operate under predictable conditions. Scored outer surfaces of cylinders and irregular broken edges are not particular to Aşıklı Höyük (cf. Stordeur 1988: Fig. 3a, b;

Maréchal and Alarashi 2008: 584 and Fig. 17.4-6, 8). Much like the use of these beads, the technology of manufacture associated with them could also be widely shared among the early Neolithic populations. Transverse grooving was also sometimes applied in order to create relief on the outer surface of cylinders. The products of this kind are very few, but they come from different levels suggesting a recognisable bead variety, or sub-type. Cylinders with two central grooves are known since the Upper Palaeolithic (e.g. White and Normand 2015: 156 and Fig. 19). They were also quickly made. If the production of cylinders somewhat diminished in the late occupations of Aşıklı Höyük, it still indicated persistence of a long-standing technical and adornment tradition. It is possible that the cylinders were used in series to cover the threads. If this were the case, the display of canine copies would be the purpose of the string proposed from Level 4.

The imitation of deer canines also represents a practice that existed for a long time. Basic technical knowledge was applied to create abstract representations of the tooth. Variations in tooth morphology and dimensions were shown by exploiting natural features of the bone blanks and by modifying profiles. There were no special skills invested in the manufacture of imitations. On the contrary, there is evidence for poor control of the grinding technique, which was not widely used in bone working. There were no typical processes of shaping of imitations either and the bifacial perforations simply represent the most common method used for boring small holes at the site. It is likely that copies were produced from bones when need arose. Variations in attachment modalities of real and copied canines suggest individual decisions of the wearers of the pendants and underline their use as personal ornaments. There were also different degrees of wear. The largest real canine was neither overused nor destroyed. It could be lost jewellery. If it were abandoned, it would add to the variety of individual attitudes toward pendants. Variations in the amount of wear of the incisor pendants were also observed.

Imitations at Aşıklı Höyük were not limited to those made of bones. Out of four copies made of stone in Level 2 three were grave offerings. Like the cluster of 52 canine pendants, they were buried with adult individuals. Like the imitations made of bone, they were abstract representations, three being typical oval pendants and one triangular in shape. However, their production required more work and skills. Stone ornaments became fashionable in Level 3. In the subsequent Level 2, stone working was also associated with imports of new raw materials. The canine imitations from Aşıklı Höyük conform to the classification of imitations proposed by Choyke (2008). The bone specimens would belong to Type 1, being copies of a rare object, made from raw materials easy to obtain. Technological and morphological data from the analysis of six imitations suggest emulation of real canine wearers or replacement of lost or destroyed genuine teeth that could not be easily found. It is also possible that schematic reproductions allowed for differentiating genuine specimens from copies as well as the wearers of these two separate categories of jewellery. Although the specimens made of stone can be classified as imitations of Type 2, that is, representations made from valuable materials, they were still abstract representations found in both funerary and non-funerary contexts. Only their raw material and skilful shaping would distinguish them from their bone counterparts, unless the group of 52 canine pendants also contained copies. There would be basic rules, or norms, that guided imitation and probably mortuary behaviours, but the raw materials chosen, the morphometric and technological characteristics of the artefacts suggest individual taste and initiative.

Concluding remarks

The osseous ornaments are a rather small part of the ornament collection of Aşıklı

Höyük, but the study of their morphological and technological characteristics and depositional contexts reveals regularities as well as different attitudes toward jewellery. The different types of ornaments seem to have had different value or significance. The cylinders were rather simple and commonplace. The pendants appear more variable and personalised. Only pendants were used as grave goods in Level 2. The examination of the funerary ones will show whether imitations of Type 1 were also buried with the dead. The ornament repertoire changed over time. In the case of the bone and tooth ornaments, the data available at this moment indicate that this movement was materialised through subtraction and addition of pendants and not by any profound change in their technology of manufacture. This observation further supports the idea that the methods of bone working for ornaments and tools at Aşıklı Höyük were simple and adaptable. Long-distance procurement of mollusc shells, possibly already perforated, highlights another aspect of the Aşıklı Höyük society, its participation in systems of interregional exchange. The early Neolithic strategies applied by the Central Anatolian populations in Mediterranean shell procurement are not as yet defined (for the Epipalaeolithic period, see discussion in Baysal 2013b), but local preferences for particular taxa would have much to say about alliances and differentiation between local communities or between individuals from different communities. It cannot pass unobserved that a single adult was buried with all but one of the funerary shells. Whatever the case, interregional interaction in the 8th millennium is stressed further by elements of the stone bead technology and the systematic use of imported materials as funerary offerings.

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