

Upper Palaeolithic and Mesolithic Ornamental Traditions in the Eastern Adriatic Coast and Hinterland

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ABSTRACT

Archaeological finds of personal ornaments reveal not only behavioural patterns of the society they belong to, but also their forms of manifestations indicate connections, contacts and communication paths, exchange networks and movements of prehistoric populations. This paper advances the current knowledge regarding ornamental traditions in Eastern Adriatic area during Late Upper Palaeolithic and Mesolithic periods. Thirteen prehistoric sites from this area have yielded more than thousand finds of ornamental assemblage, making Eastern Adriatic coast and hinterland fruitful area for the research of this type of archaeological assemblage. Results of the analysis have shown existence of diachronic changes in the selection of raw materials from Upper Palaeolithic to Mesolithic period. Personal ornaments are less abundant during Upper Palaeolithic, but are typologically diverse compared to Mesolithic period when the selectivity of the raw material with the large increase of the number of finds is present.

Key words: ornamental assemblage, material selection, Upper Palaeolithic, Mesolithic, Eastern Adriatic

Introduction

In an attempt to understand culture and social behaviour of prehistoric populations, their communication and contact paths, finds of personal ornaments are of extreme importance. Ornaments have unique characteristic to highlight the relationship between the prehistoric mind, society, symbolism and technology¹⁻⁶. Eastern Adriatic area is abundant with prehistoric sites, although some of them are unavailable due to the sea level rise during Late Glacial Maximum. So far, more than thousand finds of personal ornaments from 13 sites are discovered – making Eastern Adriatic coast fruitful area for the research of this type of archaeological assemblage.

This paper advances understanding of the trends of use and selection of material for ornamental production of hunter gatherer population during Upper Palaeolithic and Mesolithic period in the Eastern Adriatic coast and hinterland (Figure 1). According to geographical and natural division of the Republic of Croatia these 13 sites can be divided into smaller areas which belong to nowadays: (1) Croatian Littoral with (1a) northern part that belongs to Istria and Kvarner Gulf including nine sites: Abri Šebren, Lim 001, Ljubićeva cave, Nugaljanska cave, Pupićina cave,

Romualdova cave, Šandalja II, Vešanska cave and Vela cave (Lošinj island); and (1b) southern part that belongs to Dalmatia with three sites: Vlakno cave (Dugi otok island), Kopačina cave (Brač island), and Vela cave (Korčula island), and (1c) Mountainous Croatia with one site – Zala cave in Lika.

The aim of this paper is to reveal possible: (1) trends of use of certain types of ornaments according to classification made after taxa used as raw material; (2) diachronic changes in the selection of raw materials for their production; and (3) connections of material selection for ornaments with other economic activities such as procurement of lithic raw materials and diet.

Possible meanings and contexts of use

Personal ornaments, as a category of prehistoric portable art⁷, are objects whose size, shape and/or function is used as a decoration or adornment of person's clothing and/or body. Furthermore, it is every item transformed into symbolic media which by nonverbal means of communication transmits messages regarding sex, age, social status, ideology, belief systems, etc. Together with the person who



Fig. 1. Sites with ornamental assemblage: 1. Šandalja II; 2. Ljubičeva cave; 3 – 6. Pupičina cave, Abri Šebrn, Nugljanska cave, Vešanska cave; 7. Lim 001; 8. Romualdova cave; 9. Zala; 10. Vela cave; 11. Vlakno; 12. Kopačina; 13. Vela spila.

wears them, ornaments create fundamental part of the culture of transmitting information⁸. By wearing ornaments, marking and decorating the body with beads and pendants, person is emphasizing personality, establishing identity and sending certain message to the others⁹.

Personal ornaments are fundamentally important part of the communication repertoire that through visual mechanisms transfers and stores information related to social relationships same as the letter. They are mediators between the wearer and the »others«, »catalysts« in the transmission of messages between the inner and outer world.

Archaeological finds of personal ornaments suggest certain behaviour patterns of population which they belong to. Presence of the same type of the ornaments can indicate the contacts and connections, communication channels and possible exchange networks and movements of prehistoric populations⁹.

Changes in body decoration, i.e. changes in the selection of raw materials or production technique, can indicate on specific changes in lifestyle, or »survival strategies, belief systems and cosmology, as well as in the identification of ideas and styles and specific understanding of creation and expression of regional and local identity«¹⁰. In archaeological context personal ornaments are important because of the four qualities, which together cannot be found in any other type of archaeological material: »(1) their function is exclusively symbolic; (2) they have been used by a large number of ethnographically well-documented traditional societies, which allows, in perspective, the creation of an informed analogy linking beads to eth-

nicity, language, and genetic/biological diversity; (3) they are common at Upper Palaeolithic sites; and (4) they occur during this period in many distinct types«³. Personal ornaments are instruments of symbolic communication because of its repetitive forms, i.e. »repetitive design«². In traditional societies, ornaments are exclusively combined as a part of large compositions in the purpose of expressing and highlighting group affiliation, personal identity or status, such as wealth and marital or social status. In some cases, they function exclusively as a means of attracting and retaining attention at social gatherings. Taking traditional societies as the examples can help us to see how composition of »beads« contains much more information than the constituent units – individual beads, perforated shells, snails or teeth¹¹. Unfortunately, compositions such as necklaces, ornaments on the hair and clothing, etc., are very rarely preserved in prehistoric technocomplexes. Exceptions are composition from burials such as one from Sungir¹² or Barma Grande cave¹³. At most Palaeolithic and Mesolithic sites, however, ornamental assemblage is found scattered among other waste. The reason can be found in their small size, post-depositional disturbances, fragility due to the fact that organic material that binds composition is hard to preserve, as well as in the fact that these artefacts cycled through people's hands on daily basis via manufacture and maintenance¹¹.

Prehistoric ornaments from the Eastern Adriatic

The Eastern Adriatic area is abundant with the prehistoric ornamental assemblage. During the period of Upper Palaeolithic and Mesolithic body ornaments appear in many various forms, such as marine molluscs (gastropods, bivalves, and scaphopoda), freshwater gastropods, perforated animal teeth and modified animal bones. So far, 1072 pieces of various beads from 13 sites have been discovered. Detailed list of the sites with the number and type of beads is presented in the Table 1. Classification of different types of beads is made after taxa used as a raw material because selection of material determines the form of the ornament. Results of radiometric dating of the layers connected with ornament finds are presented in the Table 2. On four sites – Pupičina cave, Vlakno cave, Vela cave and Zala cave – ornaments are represented in both, Upper Palaeolithic and Mesolithic technocomplexes. Overview of the sites is divided according to the natural geographical division of the Republic Croatia as it follows: Croatian Littoral subdivided to (a) Istria and a Kvarner Gulf and (b) Dalmatia, and Mountainous Croatia with Lika region.

Croatian Littoral

Istria and Kvarner Gulf

Abri Šebrn is a small cave excavated in 1997¹⁴. A wealth of faunal remains and lithic artefacts, terrestrial gastropods and perforated marine gastropods were collected¹⁵. Three absolute dates of the layers 3B and 3C out-

TABLE 1
ORNAMENTAL ASSEMBLAGE FROM THE UPPER PALAEOLITHIC AND MESOLITHIC SITES ON THE EASTERN ADRIATIC

Period	General classification	CROATIAN LITTORAL										MOUNTAINOUS CROATIA	
		Istria			Kvarner Gulf	Dalmatia		Lika					
	Sites	Abri Šebrić	Lim 001	Ljubičeva cave	Nugjanska cave	Pupčina cave	Romaldo cave	Sandajla II	Vešanska cave	Vela cave	Vlakno	Vela spila	Zala
Aurignacian	terrestrial mammals (modified bones and teeth)							3					
	<i>Cervus elaphus</i>												
	<i>Meles meles</i>						1						
	<i>Cervus elaphus canines</i>						1	4		10		7	
	terrestrial mammals (modified bones and teeth)					1							
Late Upper Palaeolithic	<i>Alces alces incisive</i>												
	<i>Lynx lynx</i>							1					
	<i>Bison</i>							1					
	<i>Animalia</i> (bone tiles)							2	1				
	<i>Cyclope neritea</i>		1								9	2	14
	<i>Columbella rustica</i>					1						2	
	<i>Dentalium</i> sp.										1		
	<i>Nassarius</i> sp.											7	
	<i>Glycymeris</i> sp.										3	5	
	terrestrial mammals (modified bones and teeth)				1	6					4		
Mesolithic	<i>Cervus elaphusca nines</i>				1								
	<i>Arca noae</i>			1									
	<i>Cardium rusticum</i>										1		
	<i>Columbella rustica</i>		14	20	5?	94			1	352	338	13	
	<i>Conus mediterraneus</i>										1		
	<i>Cyclope neritea</i>					1					80		1
	<i>Cerithium</i> sp.			3	1?	1							
	<i>Glycymeris</i> sp.			1								2	
	<i>Lamellaria</i> sp.											2	
	<i>Nassarius</i> sp.					1					2		
freshwater gastropods					1								
<i>Teodoxus danubialis</i>													
<i>Lithoglyphus naticoides</i>		2			8					3		34	

TABLE 2

THE RESULTS OF RADIOMETRIC DATING OF UPPER PALEOLITHIC AND MESOLITHIC LAYERS OF SITES WITH ORNAMENTAL ASSEMBLAGE. ALL RESULTS ARE CALIBRATED IN OXCAL 4.2. PROGRAM WITH CURVE IntCal 13⁸³

Site	Horizon / Layer	Uncal bp	Cal BP 2 σ	Lab. Nr.
Šandalja II ⁸⁴	Layer G	27800 \pm 800	33760 – 30700	Z-536
Šandalja II ⁵³	Layer F	33355 \pm 290	38470 – 36700	OxA-V-2373-49
Šandalja II ²⁵	Layer E	23540 \pm 180	27970 – 27400	GrN-5013
Šandalja II ⁵⁹	Layer C/d	20750 \pm 400	25840 – 24080	Z-193
Zala ^{40,41}	Layer 12	13840 \pm 50	17120 – 16750	Beta-228734
Ljubićeva cave ¹⁷	Horizon D	13230 \pm 70	16710 – 15440	Beta-249371
Šandalja II ⁸⁵	Layer C/s	13120 \pm 230	16750 – 15100	Z-2424
Šandalja II ⁸⁵	Border between complex B/C	13050 \pm 220	16710 – 15020	Z-2423
Vlakno ⁸⁶	Beneath tephra	12350 \pm 70	14920 – 14020	Beta-277309
Šandalja II ⁵³	Layer B/s	11025 \pm 60	13040 – 12740	KIA-23489
Vešanska cave ¹⁶	Horizon II/ Layer 3	11410 \pm 90	13450 – 13110	Beta-127706
Pupićina cave ⁸⁷	Layer 373.1	11150 \pm 80	13250 – 12770	Beta-145095
Vlakno ⁷²	Layer 66	10970 \pm 50	12900 – 12720	Beta-363142
Pupićina cave ¹⁹	Layer 29-30	10000 \pm 270	12520 – 10760	Z-2576
Vlakno ⁷²	Layer 34	9860 \pm 40	11350 – 11200	Beta-327417
Pupićina cave ²⁰	Layer 28	9840 \pm 60	11410 – 11150	Beta-129332
Pupićina cave ¹⁹	Layer 25-26	9590 \pm 180	11400 – 10300	Z-2572
Zala ⁴¹	Layer 11	9430 \pm 60	11070 – 10500	?
Vlakno ⁷²	Layer 14	9230 \pm 80	10590 – 10 230	Z-3382
Zala ⁵⁸	?	9210 \pm 40	10500 – 10250	?
Abri Šebrn ¹⁶	Layer 3C	9070 \pm 90	10500 – 9910	Beta-120271
Abri Šebrn ¹⁶	Layer 3B	8810 \pm 80	10170 – 9600	Beta-127707
Pupićina cave ¹⁹	Layer 27	8770 \pm 310	10670 – 9030	Z-2577
Pupićina cave ^{19,20}	Layer 24	8710 \pm 170	10220 – 9450	Z-2635
Nugljanska cave ²¹	Layer 4	8170 \pm 50	9270 – 9010	Beta-127704
Nugljanska cave ²¹	Layer 4	8032 \pm 38	9030 – 8760	OxA-26060

standingly place usage of the cave by hunter-gatherers in the Early Mesolithic¹⁴⁻¹⁶ (Table 2). In layer 3 perforated marine gastropods *Columbella rustica* were discovered (Table 1).

Lim 001 is a small semi-cave where first excavation was conducted in 2008⁸. Since 2014 fieldwork is conducted as a part of the project »Archaeological investigations into the Late Pleistocene and Early Holocene of the Lim Channel, Istria« (2014-2017, Croatian Science Foundation). According to the type of archaeological assemblage this site is attributed to the late Mesolithic period⁸. During first excavation in 2008, five different types of beads were discovered: *Columbella rustica*, *Cerithium* sp., *Glycymeris* sp., *Arca noae*, and *Lithoglyphus naticoides* (Table 1).

Ljubićeva cave, situated near Ljubićeva stancija in Istria, was excavated during 2008 and 2009¹⁷. Only one marine gastropod, *Cyclope neritea*, was discovered in Late Upper Palaeolithic layers¹⁷ (Table 1).

Nugljanska cave was excavated in 1998 as a part of the »Pupićina cave« project by S. Forenbaher¹⁶. Results of the

radiometric dating are shown in the Table 2. Three different types of beads were found: red deer (*Cervus elaphus*) canine (layer 3), and *Columbella rustica* and *Cerithium* sp. beads in the layers without the context (Table 1). According to D. Komšo these beads belong to Mesolithic period¹⁰, but because of the missing context they will not be included in further analysis.

Excavations in Pupićina cave were undertaken during the end 80s and at the begging of 90s of 20th century by Ranko Starac¹⁸, and later by P. Miracle (1995 – 2002). Pupićina cave preserves evidence of a very long sequence of occupation – from the Late Upper Palaeolithic, Mesolithic, Neolithic, Copper Age, Bronze Age, Iron Age and Roman periods. Archaeological assemblage from the Upper Palaeolithic and Mesolithic horizons has not been published yet, while some data is available as a part of the larger reviews^{10,15-16,19-21}. Ornamental assemblage from the oldest contexts belongs to Late Upper Palaeolithic layers (N=2), and Mesolithic layers (N = 112) (Table 1). In the Table 3 detailed list of the layers with personal ornaments is presented. Figure 2 and 3 shows Harris matrix of Late

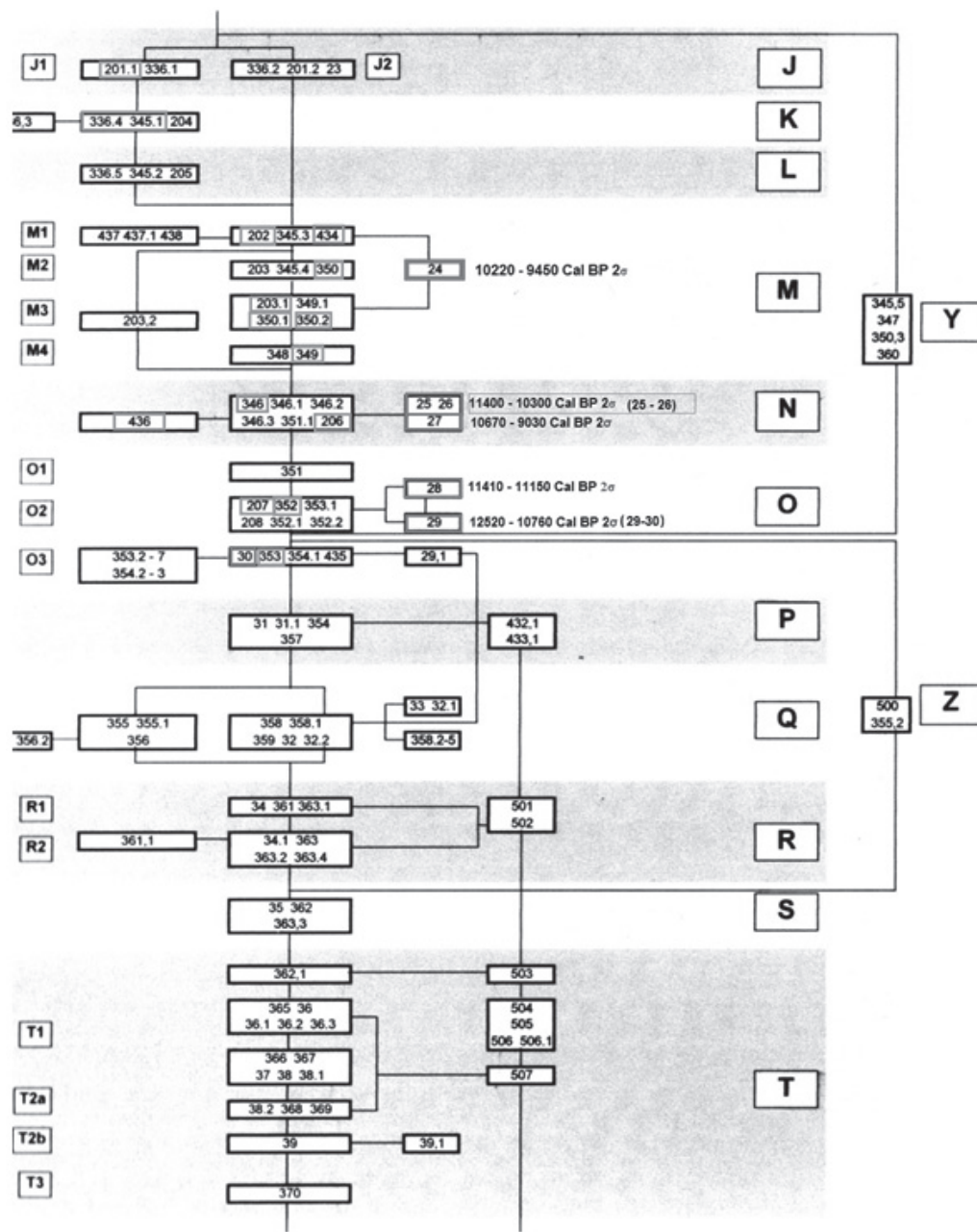


Fig. 2. Harris matrix of Early Holocene and Pleistocene layers of Pupičina cave with ornamental assemblage indicated with green, and dated layers with red colour (modified after Miracle⁸⁷).

Upper Palaeolithic and Mesolithic layers with highlighted layers where ornamental assemblage is discovered (for the results of radiocarbon analysis of the related layers please refer to Table 2).

Romuladova cave was excavated since the end of 19th century²² by Marchesetti and Gnirs¹⁰, and during 50s and 60s years of 20th century by M. Malez²³. In 2007 D. Komšo carried out the fieldwork, and since 2014 new excavations are conducted as a part of project »Archaeological investigations into the Late Pleistocene and Early Holocene of the Lim Channel, Istria« (2014-2017, Croatian Science

Foundation). In all conducted excavations only one ornament was discovered – perforated red deer (*Cervus elaphus*) canine in Upper Palaeolithic layer C²³⁻²⁵ (Table 1).

Šandalja II is a cave discovered in 1962, and since 1962 until 1989 M. Malez has conducted 22 excavations²⁶. Pleistocene sediments, more than eight meters deep, are divided into eight horizons (A to H)²⁷. Six different types of beads are present in the oldest contexts – in Aurignacian and Epigravettian layers (Table 4). Results of radiocarbon dating of layers with ornamental assemblages are presented in the Table 2.

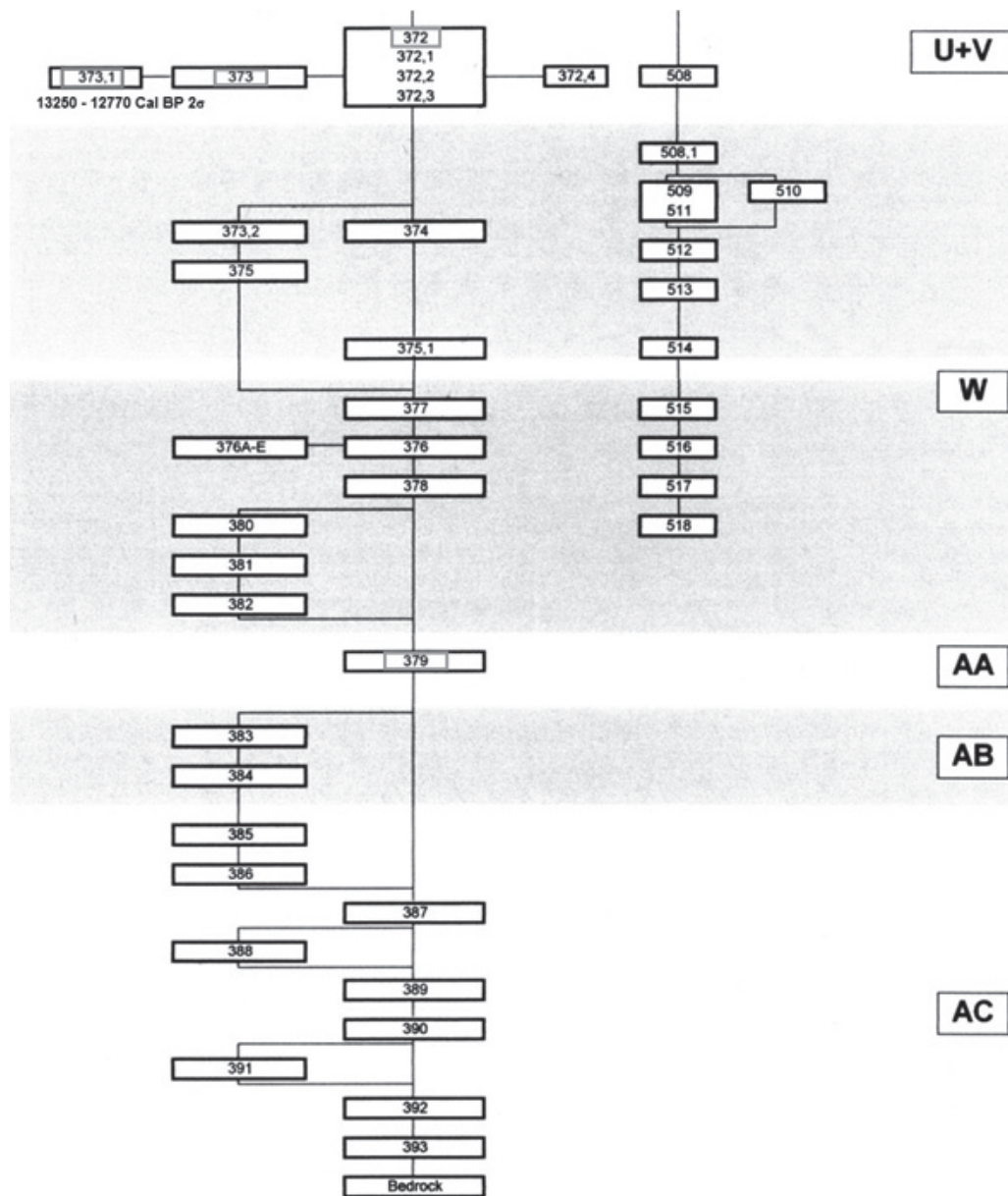


Fig. 3. Harris matrix of Early Holocene and Pleistocene layers of Pupičina cave with ornamental assemblage indicated with green, and dated layers with red colour (modified after Miracle⁸⁷).

Vešanska cave²⁶ was excavated in 1997 and 1999^{19,20,28}. Results of radiometric dating and typological analysis of artefacts indicate that cave was used during Late Upper Palaeolithic and re-use again during Middle Ages^{28,29}. Only one type of possible ornament, perforated bone fragment, was collected in 1999¹⁰ (Table 1 and 2).

Vela cave on the Lošinj island first was excavated in 1956 by Mirosavljević, and later by D. Komšo^{30,31}. The results of excavations have not been published yet, but based on the collected artefacts D. Komšo attributed this site to the Mesolithic period¹⁵. Only one type of ornament, perforated marine gastropod *Columbella rustica* was found (Table 1).

Dalmatia

Vlakno cave on Dugi otok island was discovered in 2003³². First excavations were conducted in 2004 by Z. Brusić. Since 2007 until present day excavations are conducted as a part of the project »Transition and Tradition in Vlakno Cave: Modelling the Palaeolithic-Mesolithic transition in Northern Dalmatia« (2015-2018, Croatian Science Foundation).

Mesolithic layers starts basically from the surface, and continuity between Epigravettian and Mesolithic techno-complex can be traced³³. Ten different types of personal ornaments (N = 470) are present through both periods

TABLE 3
ORNAMENTAL ASSEMBLAGE FROM MESOLITHIC LAYERS OF PUPIĆINA CAVE

Type Layer	<i>Columbella rustica</i>	<i>Cerithium sp.</i>	<i>Cyclope neritea</i>	<i>Nassarius sp.</i>	<i>Cervus elaphus</i>	<i>Lithoglyphus naticoides</i>	<i>Theodoxus danubialis</i>
201	3						
202	2						
203A	6						
203A / 206	1						
206	1						
207	1						
304	1						
336	4						
336/345	20					1	
345	7						
346	10		1				
349	12				1	1	1
350	5						
350A	2						
350B	1						
350/352/346	4					3	
352	4	1			2		
352/346	6					1	
353					2		
369/352	2						
434	1			1		2	
436	1						
A3					1		

TABLE 4
ORNAMENTAL ASSEMBLAGE FROM THE AURIGNACIAN AND EPIGRAVETTIAN LAYERS OF ŠANDALJA II

Techno- complex	Complex / Strati- graphical unit	<i>Cervus elaphus</i>	<i>Meles meles</i>	<i>Lynx lynx</i>	<i>Bison/ Bos</i>	<i>Glycymeris glycymeris</i>	<i>Animalia</i>
Aurignacien	E	2					
	F		1				
	G	1					
Epigravettian	C/d	2					
	C			1			1
	B	1			1		
	B/s	2				1	
	B/C						1

(Table 1). Detailed lists of layers with typological division of beads according to the excavation years are presented in Table 5 and 6. Results of radiocarbon dates for certain layers can be found in the Table 2. In Mesolithic layers, besides the perforated ornaments, technical pieces for production of ornaments are also present in the assemblage, and are indicated with the numbers in the brackets (Table 5 and 6).

Although finds of personal ornaments made of marine gastropod *Columbella rustica* from Kopačina cave (Brač

Island) are mentioned in literature^{34,35}, the exact number and stratigraphical data about these finds are missing. Some authors conditionally assigned these finds to Epigravettian³⁶, but due to the missing context these beads will not be part of further analysis.

Archaeological excavations of Vela Spila cave on the Korčula island were first conducted in 1951, and fieldwork continued by B. Čečuk (1974 – 1995), D. Radić (1996 – 2006), and D. Radić and P. Miracle (2007 – present)⁴. Cul-

TABLE 5
ORNAMENTAL ASSEMBLAGE FROM THE 2004/2007/2010 FIELDWORK. NUMBERS IN THE BRACKETS INDICATES TECHNICAL PIECES

<u>uncal BP</u> Cal BP 2σ	2004 Sonda 1	2007 Sonda 2	2010 Sonda 2	<i>Columbella</i> <i>rustica</i>	<i>Cyclope</i> <i>neritea</i>	<i>Cervus</i> <i>elaphus</i>	<i>Glycymeris</i> sp.	<i>Dentalium</i> sp.
	1	1						
	2	2						
	3	3						
	4							
	5	4		1				
<u>9230 ± 80</u>	6	5						
10 590 – 10 230	7	6						
	8			1				
	9	7						
<u>10 160 ± 100</u>	10	8				1		
12 370 – 11 320								
		9					(1)	
		10						
		11						
		12						
Tephra (NYT)		13				2		
		14			6	1		
		15			3			1
			1					
			2					
			3			1	2 (1)	
			↓					
			6			2		
			↓					
			11			1		
			12				1	
			↓					
			16			1		
			↓					
			22			2		

tural layers are dated from Upper Palaeolithic to Bronze Age. Personal ornaments from the oldest contexts attributed to Epigravettian and Mesolithic period are indicated in the Table 1. Five different types (N = 361) of personal ornaments from this technocomplexes are dated from 19 500 until 8 150 cal BP¹. Together with Vlakno cave, Vela spila is one of the richest sites with ornamental assemblage in this area.

Mountainous Croatia

Lika

Zala cave is located in the hinterland of Kvarner Gulf, but geographically it belongs to another area – Lika³⁷⁻³⁹. After the excavations in 2000⁴³, since 2005 further fieldworks were conducted under I. Karavanić⁴⁰⁻⁴². Cultural

layers are dated from Late Upper Palaeolithic until Middle Ages⁴². Three different types of personal ornaments were discovered in Late Upper Palaeolithic and Mesolithic layers (Table 1 and 7). Results of radiocarbon dating of the layers are presented in Table 2.

Results and discussion

The ornamental assemblage analyzed in this paper covers time period from 33355 ± 290 until 8032 ± 38 Uncal BP (Table 2). According to the raw material, the ornamental assemblage can be classified into three groups according to general classification: (1) marine gastropods, bivalves and scaphopoda; (2) freshwater gastropods; and (3) terrestrial mammals (modified bones and teeth). Ornament types were determined from bio-taxonomic and anatomical terms; beads made from the marine or freshwater mollusc are

TABLE 6
ORNAMENTAL ASSEMBLAGE FROM THE VLAKNO CAVE 2011 – 2012 FIELDWORK. NUMBERS IN BRACKES
INDICATE TECHNICAL PIECES

SJ	<i>Columbella rustica</i>	<i>Cyclope neritea</i>	<i>Cervus elaphus</i>	<i>Glycymeris</i> sp.	<i>Lithoglyphus naticoides</i>	<i>Nassarius</i> sp.	<i>Cardium rusticum</i>	<i>Lamel-laria</i> sp.	<i>Conus mediter-raneus</i>	<i>Pecten jacobus</i>
STRATUM 1										
13	88 (15)								1	
STRATUM 2										
13/14	15 (9)									
14	167 (78)	2	2		1	2 (1)				
24	18	1								
STRATUM 3										
34	33	6	1			(1)		2		
42	3	1								
43	5	6	(1)			(1)				
45	4 (2)	2			1					
46	5									
47		3								
53		4								
STRATUM 4										
54		1		1						
55		2		(1)						
56	2	9					1			(1)
60	3	17								
60A		5		(1)		(1)				
61		2			1					
63	2	2								
66	5	17		1				1		

typed according to genus or species, whereas a modified animal tooth is typed according to both: the species and the dental element if possible. Ornamental assemblage with listed species and their quantities is shown in Table 1. Besides the perforated ornaments, technical pieces for production of ornaments are present in the assemblage from Vlakno cave, and are indicated with the numbers in the brackets in the Table 5 and 6. Most of the raw material for the decorative assemblage is collected from the local resources. All species of marine gastropods and bivalves are present in the Adriatic Sea⁴⁴⁻⁴⁶, except the freshwater gastropods *Lithoglyphus naticoides* and *Theodoxus danubialis* that could be found in the rivers from the continental regions⁴⁷.

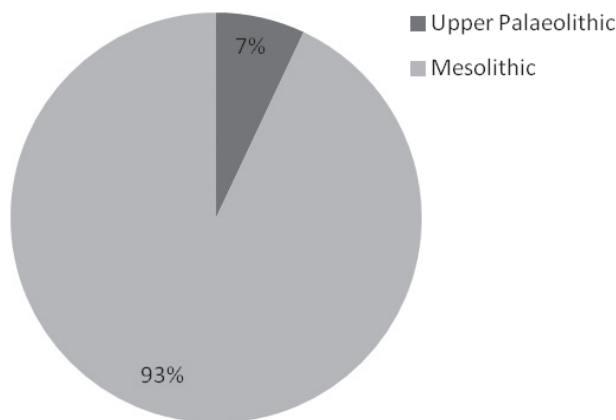
Upper Palaeolithic and Mesolithic ornamental assemblage is consisted from 18 different types of beads and pendants (N = 1072). In general, with the beginning of Holocene number of ornamental assemblage has enormously increased (Graph 1). The smallest in number, but the oldest ornaments are discovered in the Aurigancian levels of Šandalja II (0,01%), 6,9% of ornaments are from the Late Upper Palaeolithic period, while ornaments are most abundant during Mesolithic period (93%).

During Late Upper Palaeolithic and Mesolithic periods the most abundant type of personal ornaments are those

TABLE 7
ORNAMENTAL ASSEMBLAGE FROM THE EPIGRAVETTIAN AND MESOLITHIC LAYERS OF ZALA CAVE

Techno-complex	Layer	<i>Columbella rustica</i>	<i>Cyclope neritea</i>	<i>Lithoglyphus naticoides</i>
Epigravettian	100		11	
	101		2	
	102		1	
Mesolithic	80	3		8
	82	1	1	2
	83	1		1
	84	1		13
	85			3
	90	3		2
	91			3
	93	3		
	103	1		2

made of marine gastropods and bivalves, while beads made of *Columbella rustica* are dominant type during Mesolithic period (84%). Ornaments made of animal teeth



Graph 1. Representation of ornamental assemblage during Upper Palaeolithic and Mesolithic period on the Eastern Adriatic

and bones are more abundant during Upper Palaeolithic compared to Mesolithic period when their number decreased and in the use are exclusively red deer (*Cervus elaphus*) canines. During Holocene occurs new type of beads made of freshwater gastropods (see Table 1).

On a few sites (Vlakno cave, Vela cave, Pupičina cave, Lim 001, and Zala cave) change of natural colour as a result of the exposure to the high temperature is present on the marine and freshwater gastropods (*Columbella rustica*, *Cyclope neritea* and *Lithoglyphus naticoides*) (Table 8)⁸. According to Claassen⁴⁸ sample can be divided into three categories that represents different stages of exposing to the high temperatures (Table 8): (1) natural colour without change (no exposure to burning and heating); (2) black or dark grey (exposure to burning and high temperatures); (3) light grey (heating, but not exposed to burning). Lange *et al.*⁴⁹ have proven with their experiments that the black colour of Palaeolithic perforated marine gastropods *Cyclope neritea* is a result of exposure to high temperatures and the accumulation of amorphous carbon under special conditions. Change of natural colour on the prehistoric assemblage of marine and land snails is not so rare find, especially on the sites where those snails were collected for the food consumption or for the production of ornaments^{1,50,51}.

Two specimens with changed colour have been discovered from the Upper Palaeolithic period: black *Columbella rustica* bead from the Pupičina cave, and black red deer canine pendant from the Vlakno cave. According to Shipman *et al.*⁵² black colour on the deer canine is a result of surface burning.

During Mesolithic this number increased (N = 50), and most of the finds, 76%, are from the Vlakno cave (Table 8). Intention to change natural colour of the beads can be partially explained by the necessity to create and express a unique visual effect with the combination of light and dark beads.

Metric data was recorded for the Mesolithic beads and whole specimens of *Columbella rustica* from Vlakno cave

(maximum width and height). The average dimension of perforated *Columbella rustica* is 13.80 x 8.72 mm, and of whole pieces 13.96 x 8.58 mm. Results of metric data show that there is no significant difference between those two categories, and suggest that marine gastropods were not selected for the beads production on the basis of their size, but maybe rather on the basis of their shape, as Stiner² proposed. Since *Columbella rustica* do not have nutritional value, abundance of whole specimens (23%), and specimens with changed colour (24%) can suggest intentional collection for purposes beyond subsistence¹. The unperforated specimens may represent a reserve of 'raw material', e.g. technical pieces, collected and prepared for the future use. In this context Vlakno cave could be, same as Vela Spila on the Korčula island⁴, interpreted as a site with possible *in situ* production of ornamental assemblage.

The oldest personal ornaments from the Eastern Adriatic coast and hinterland were discovered in the Aurignacian levels (E, F and G) of Šandalja II (Table 4): two canines and incisor of red deer (*Cervus elaphus*) (Figure 4), and a badger tooth (*Meles meles*) (Figure 5). Results of radiometric dating placed them in the period before 33 300 to 23 000 years BP⁵³ (Table 2). The most common type of Aurignacian personal ornament in Central Europe is fox canine, while the red deer canines or incisors are rare find⁵⁴. Perforated badger tooth from Šandalja II is the isolated type, and so far, has never been found in this part of Europe^{3,8,55}. According to Vanhaeren and d'Ericco³ on the 98 Aurignacian sites of Europe and the Middle East, 157 different types of personal ornaments were in use. Results of the seriation analysis by the type of ornaments within these 98 sites are ranked in 15 groups containing three or more sites that can be spatially linked in a single unit³. Ornamental assemblage from the Šandalja II does not fit to any established group. Sites with the personal ornaments made of red deer teeth, like ones from the Šandalja II, geographically are located in the area of the Pyrenees, while the badger tooth as ornament type has never been found on any site. Faunal analysis of Aurignacian levels of Šandalja II have shown presence of red deer (*Cervus elaphus*), while the remains of the badger (*Meles meles*) is not recorded²⁷. Further researches and possible new finds



Fig. 4. Perforated red deer canine, Aurignacian, layer G, Šandalja II.



Fig. 5. Perforated badger tooth, Aurignacian, layer F, Šandalja II.

of the Aurignacian ornaments should help in understanding Šandalja II assemblage. Although only 6,9% of ornamental assemblage is from the Late Upper Palaeolithic period, its constitution is very diverse – almost all types, apart from freshwater gastropods, are represented. In the Istria prevail beads and pendant types made of animal teeth and bones^{55,56}, while in Dalmatia and hinterland »first choice« were ornaments made of marine gastropods, bivalves and scaphopoda⁸. Ornaments made of bone and

teeth in Istria, in relation to marine raw material choice in Dalmatia, can be partly interpreted in favour to great distance of Istria from the coast during Upper Palaeolithic period^{20,57}. The prevalence of marine raw material in Dalmatia can be interpreted in favour to coast proximity – although there are many examples where geographical distance was not the obstacle for the procurement of raw material³. During Late Upper Palaeolithic, on all sites, except in the Zala cave⁵⁸, trend of using local raw materials for lithic industry and fauna is present^{21,28,39,59–61}. Same trend is present regarding the selection of raw materials for ornaments, except in the Zala cave where the marine gastropod *Cyclope neritea* prevails. Hunter gatherers from Zala cave show greater mobility and different patterns of behaviour in the selection of raw materials for lithic industry⁵⁸ and personal ornaments compared to neighbouring regions^{21,28,39,59,61}. In the area of North Italy, on the Epigravettian sites, such as Riparo Mochi¹, Riparo Dalmeri⁶², and Riparo Tagliente⁶³ also prevail personal ornaments made of marine gastropod *Cyclope neritea*, same as it is case in Zala cave. *Cyclope* sp. has been in use since the beginnings of the Upper Palaeolithic, not only in Italy but also in the Balkan area⁶⁴, such as in the Epigravettian layers of Badanj cave⁶⁵. This distribution can indicate possible contacts between different groups or the existence of regional trends. Dominant Pleistocene orna-

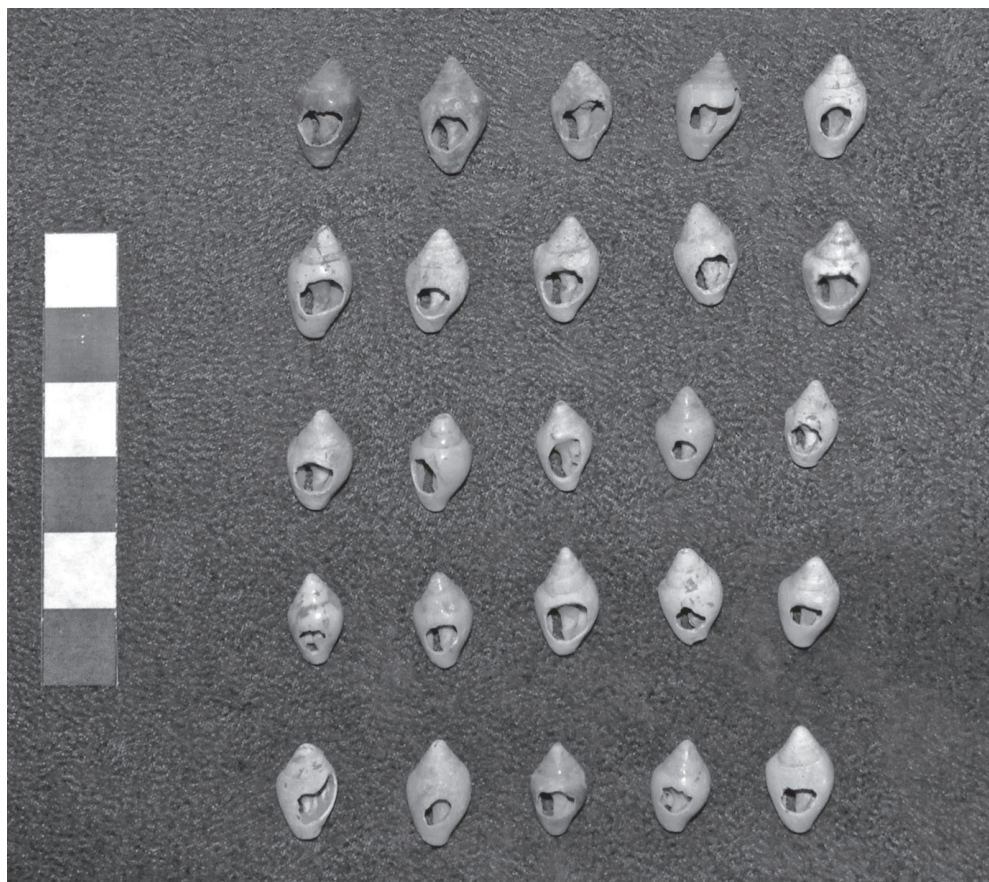


Fig. 6. Selection of *Columbella rustica* beads, layer 13, Vlakno cave.

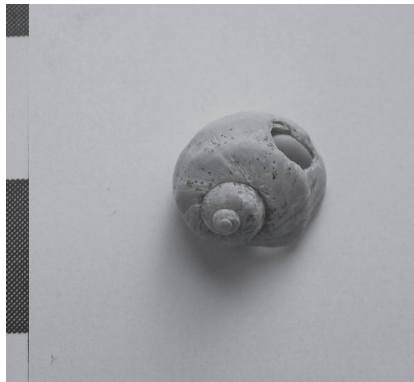


Fig. 7. Perforated freshwater gastropod *Lithoglyphus naticoides*, layer 349, Pupičina cave.

ment type in Vlakno cave is also *Cyclope neritea*⁸ (Table 6), and the gradual decrease of the *Cyclope neritea* use is followed by increase of *Columbella rustica* from older to younger strata.

During Mesolithic period most of the ornaments were made of marine gastropods and bivalves (94%), with the prevalence of *Columbella rustica* (84%) (Figure 6)⁸. Results of radiocarbon dating of layers with ornamental assemblage span from 10 000 until 8 000 years BP^{10,14,16,19,20,21,32,41,58}. Ornaments made of animal teeth – exclusively from red deer canines – are rare find (1%), and are still in use on only three sites: in Nugljanska cave, Pupičina cave (Figure 8), and Vlakno cave (Table 1).

As a new trend, use of freshwater gastropods (5%) occurs; *Lithoglyphus naticoides* (Figure 7) and *Theodoxus danubialis*. Sites with the major number of ornaments are Vlakno cave, Vela spila and Pupičina cave – all three with the prevalence of *Columbella rustica* beads (Table 1). On the other sites this marine gastropod also prevails, with the exception of Zala cave (Table 1). Dominant type of ornaments in Holocene layers of Zala cave are beads made of freshwater gastropod *Lithoglyphus naticoides* (Table 1 and 7). Use of this freshwater gastropod was almost unknown in the Late Pleistocene and early Holocene archaeological record in the Mediterranean area. Apart from the Holocene specimens from Lim 001, Zala, Vlakno and Pupičina cave, this freshwater gastropod was discovered

TABLE 8
ORNAMENTAL ASSEMBLAGE WITH CHANGED
NATURAL COLOUR

Period	Site	Change of natural colour		
		Natural	Black / dark grey	Light grey
Late Upper Palaeolithic	Ljubičeva cave	1	-	-
	Pupičina cave	2	1	-
	Romualdova cave	1	-	-
	Šandalja II	16	-	-
	Vešanska cave	1	-	-
	Vlakno	23	1	-
	Zala	15	-	-
Percentage		97%	3%	-
Mesolithic	Abri Šebrn	14	-	-
	Lim 001	24	2	1
	Nugljanska cave	7	-	-
	Pupičina cave	110	2	-
	Vela cave	-	1	-
	Vlakno	396	26	12
	Zala	48	3	-
Percentage		92%	6%	2%

in the Epigravettian and Mesolithic layers of Riparo Biarzo in Julian Prealps, Italy⁶⁶, and Gravettian⁶⁸ and Epipaleolithic sites in Romania⁶⁷. In the norther part of the Europe use of this gastropod is also recorded on a few Mesolithic sites⁶⁹. According to Bertolini *et al.*⁶⁶ continuing use of the *Lithoglyphus naticoides* in Riparo Biarzo »reveals the existence of exchange networks and connections between the Alpine valleys of Friuli and the central Croatian region to the east.«

Compared to greater mobility during Late Upper Palaeolithic, during Holocene population from Zala cave show some different lifestyle patterns. Results of faunal analysis in Zala cave show increased trend of use of local freshwater resources for nutrition⁷⁰, same as the selection of local material for the ornamental assemblage.

Phenomenon of the increased use of marine gastropods during Holocene can be interpreted in terms of the sea

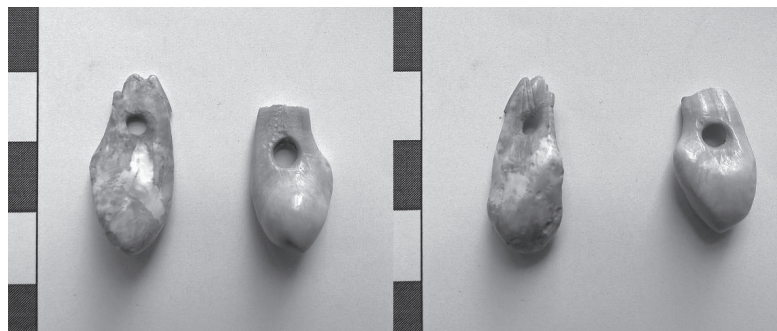


Fig. 8. Perforated red deer canine, layer 352, Pupičina cave.

level rise during Late Glacial Maximum when this type of material was easy to collect near almost all sites. Populations who inhabited area that became part of the islands, such as Vlakno cave or Vela spila, were specially limited to the local resource of raw materials, not only for the nutrition⁷¹ and lithic procurement^{58,33} but also for the ornaments⁷². Although it is almost impossible to put precisely into the time frame separation of the islands, due to the lack of detailed paleo geographical reconstruction of Dalmatia archipelago during Pleistocene to Holocene transition, this should be taken as a possible explanation for local resource procurement. Similar situation is present in Istria, where the proportions of the marine nutrition have increased²⁰. Increased use of marine resources in faunal and ornamental assemblage can be, again, explained due to the easy accessibility according to sea level rise⁷³. Present trends during Mesolithic in the selection of raw materials for nutrition and ornaments in the Eastern Adriatic coast and its hinterland reveal and suggest a possible connection between these two aspects of lifeways.

Furthermore, *Columbella rustica*, as a preferred and dominant type of ornament not only in the Eastern Adriatic area (except in Zala cave), but further⁷⁴, indicates the existence of not just local but also regional identity during prehistory. Selectivity in the selection of raw material can be interpreted in a means of non-verbal visual communication in order to establish visible »social links«, which Whallon⁷⁵ called »safety net«. This is considered as an important part of the survival strategies, especially in a period of major climatic oscillations that have caused large changes in the environment in relation to the availability of food sources.

Conclusion

Abundance of prehistoric ornamental assemblage on the Eastern Adriatic coast gives an opportunity to define Late Upper Palaeolithic and Mesolithic ornamental traditions and to trace their transformations over time.

The Early Upper Palaeolithic sites are scarce in this area⁷⁶, and ornamental assemblage, so far, is discovered only in Šandalja II^{3,8}. The reason why there are small number of Early Upper Palaeolithic sites can be found in the geoclimate changes and sea level rise which completely changed the environment, and possibly destroyed some potential sites that were located in the Great Adriatic Plain^{55,76}. Reasons can be also found in the small occupancy of this area during Early Upper Palaeolithic period^{55,76}. Researches of Upper Palaeolithic have been intense in a last few years, and the new results will contribute to the better understanding of these issues.

Late Upper Palaeolithic ornamental repertoire is quantitatively small but characterised by material diversity. According to material diversification different trends of ornamental use can be observed between Istria and Dalmatia. In Istria, domination of personal ornaments made of animal teeth and bones is present, which corresponds with the diet and climatic conditions of that

area^{19,26}, while in Dalmatia, besides small percentage of pendants made of animal teeth (28%), prevail ornaments made from various species of marine molluscs (72%). In the hinterland region ornaments made of marine gastropod *Cyclope neritea* prevails. As an ornament *Cyclope neritea* has been in use since the beginnings of the Upper Palaeolithic in Italy and Balkan area but during the Early and Middle Mesolithic period it almost disappeared from the use^{1,4,62-64,77-79,80,81}. At one level of interpretation, a phenomenon of homogeneity in the use of marine gastropods for making ornaments present in Zala cave, that were not part of the food repertoire, may indicate a potentially weakening of the link between transmission of information related to survival strategies through visual communication, or decoration in the Late Upper Palaeolithic, in relation to the theory of integration of survival strategies and transmission of information through selectivity of raw material for ornaments⁸². On contrary, during Mesolithic connection between selection of food and raw material for ornaments can be noticed throughout all area.

The quantity of ornaments has increased ten times during Mesolithic, and selectivity of *Columbella rustica* is present on almost all sites, except in Zala cave, where the freshwater gastropod *Lithoglyphus naticoides* prevails. Among three sites with the greatest abundance of ornaments – Pupičina cave, Vlakno and Vela spila – only in Vlakno cave all types of Mesolithic ornaments are present, including technical pieces. According to that Vlakno cave can be interpreted as a key location for acquisition and production of ornaments in the Eastern Adriatic area.

Ornamental assemblage made exclusively of local raw materials and simple perforation technique^{4,83}, during all periods indicates the daily use of personal ornaments, while exotic or local materials used for body ornaments in burial or ritual context during Upper Palaeolithic or Mesolithic have not yet been recorded in this area.

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tion and Tradition in Vlakno Cave: Modelling the Palaeolithic-Mesolithic transition in Northern Dalmatia« (2015-2018, Croatian Science Foundation, UIP-2014-09-1545).

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OSOBNI ORNAMENTI ISTOČNOJADRANSKE OBALE I ZALEĐA IZ RAZDOBLJA GORNJEG PALEOLITIKA I MEZOLITIKA

SAŽETAK

Arheološki nalazi osobnih ornamenata otkrivaju ne samo obrasce ponašanja društva kojima pripadaju, nego ukazuju i na kontakte, puteve kumanikacije i kretanja te međusobnu povezanost različitih prapovijesnih populacija. Ovaj rad donosi pregled više od tisuću nalaza prapovijesnih ornamenata s trinaest lokaliteta istočnojadranske obale i zaleđa. Rezultati analiza pokazali su postojanje dijakronskih promjena u odabiru sirovine za izradu perlica i privjesaka od razoblja gornjeg paleolitika do mezolitika na istraživenome području. Iako manje zastupljeni, ali po tipu raznovrsniji u razdoblju gornjeg paleolitika, korištenje osobnih ornamenata u mezolitiku postaje intenzivnije, s naglaskom na selektivnost u odabiru materijala za izradu na gotovo svim lokalitetima istočnojadranske obale i zaleđa.

