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A USE-WEAR ANALYSIS OF THE KNAPPED LITHIC GRAVE GOODS FROM GRUTA DO MORGADO SUPERIOR (TOMAR, PORTUGAL)

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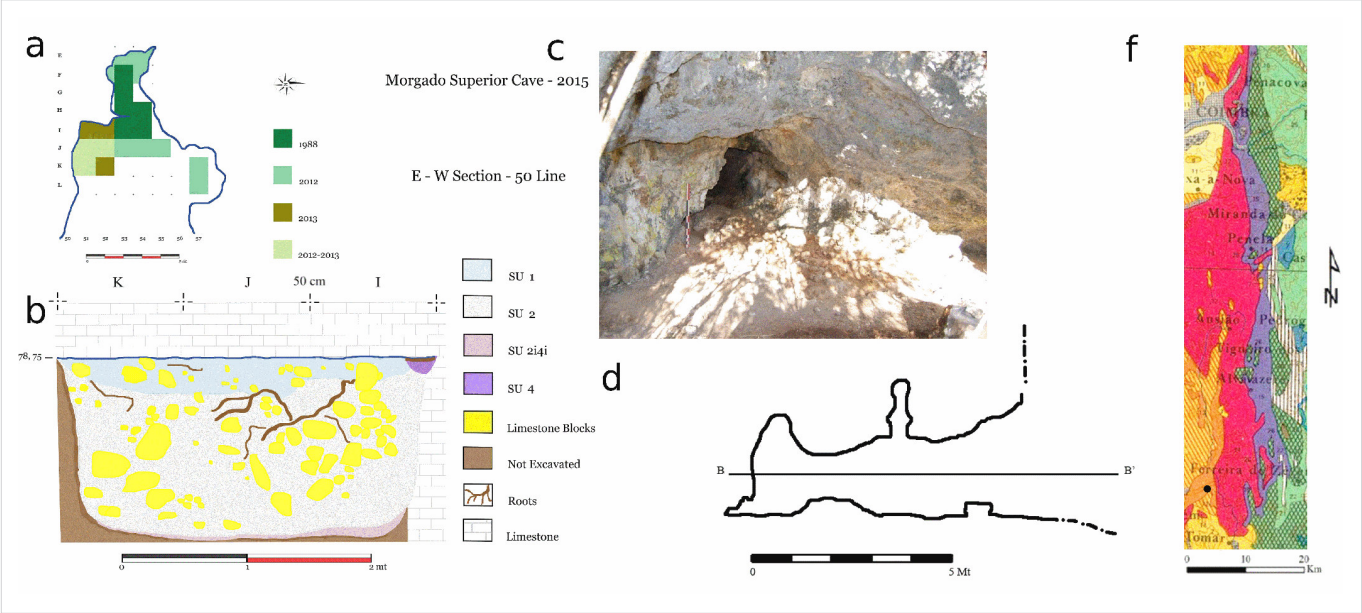

Figure 1: a) plan of the Morgado Superior Cave; b) section E-W of line 50 of the Morgado Superior Cave; c) section of the Morgado Superior Cave (source: CHP); d) extract of the lithological map of the Tomar area with the Morgado Superior Cave position (source: Atlas do Ambiente de Portugal).

ABSTRACT. *The Morgado Superior cave is a karst cave located in the municipality of Tomar (Santarém, Portugal). As other caves of the same area, it has provided stratigraphic data and votive deposits falling within the Holocene, more precisely in a diachronic time range that extends from the Neolithic to the early Bronze Age. In the Morgado Superior cave there are multiple burials with a few votive objects like jars, bone artefacts and lithic tools (blades, arrowheads etc.), beads, pendants, and other decorative items in association with more than 8,000 human bones: the number of the grave goods elements is low if compared with the number of individuals buried in the cave. Concerning the use-wear study, we analyzed the grave goods in order to understand both their meaning in this funerary context and their function in the economy of this prehistoric society. We focused on the most representative elements of the grave goods: arrowheads and knapped lithic artefacts. This study led us to understand that the majority of the grave goods were everyday objects but with a strong symbolic value. Since in the Morgado Superior Cave there are a lot of grave goods showing prior breaks, their symbolic value does not seem to be lost even if the objects were broken. Thus, the use-wear analysis of the grave goods from the Morgado Superior Cave allowed us to identify the strong symbolic value of these elements for that human community, but at the same time to hypothesize a funerary practice that did not provide a spe-*

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cial respect for the body and the grave goods of those dead previously buried in the cave. For these reasons we hypothesize a progressive spoliation (probably ritual) of the previous grave goods. Through the use-wear study of the knapped lithic assemblage of the Morgado Superior Cave it was possible to reconstruct part of the ritual activities that were carried out in the site: the 90% of the lithic artefacts are used objects, all of the artefacts have been produced in another place and they were probably intentionally placed in the burials.

***KEYWORDS**: Use-wear analysis, Grave goods, Chalcolithic, Cave.*

***RESUMEN**. La cueva del Morgado Superior es una cavidad kárstica situada en el municipio de Tomar (Santarém, Portugal). Como otras cavidades de la misma zona, en esta se dispone de datos estratigráficos y depósitos votivos pertenecientes al Holoceno, más concretamente a un rango cronológico de tiempo que se extiende desde el Neolítico hasta los inicios de la Edad del Bronce. En la cueva del Morgado Superior se han documentado múltiples enterramientos con objetos votivos como jarras, artefactos en hueso e industria lítica (láminas y puntas de flecha, etc.), cuentas, collares y otros elementos decorativos asociados a más de 8.000 huesos humanos: los elementos del ajuar funerario son escasos en comparación con el número de individuos enterrados en la cueva. En relación al desgaste de uso, hemos analizado el ajuar funerario con el objetivo de entender su función en el contexto funerario y económico de esta sociedad prehistórica. El estudio se ha centrado en los elementos más representativos del ajuar funerario: puntas de flecha y artefactos líticos tallados. Dicho análisis muestra que la mayoría de los elementos del ajuar funerario fueron objetos de uso cotidiano pero con un fuerte valor simbólico. Teniendo en cuenta que en la cueva del Morgado Superior se han encontrado numerosos objetos del ajuar funerario previamente rotos, su valor simbólico no parece desaparecer si los objetos se rompían. Además, el análisis del desgaste de uso del ajuar funerario de la cueva del Morgado Superior nos ha permitido identificar un fuerte valor simbólico de estos elementos para la comunidad y, al mismo tiempo,* hipotetizar *una práctica funeraria que no implicaría un especial respeto por los cuerpos y el ajuar funerario de estos muertos enterrados en la cueva. Por estas razones, podemos vislumbrar una expoliación progresiva (probablemente ritual) del ajuar funerario. A través del estudio del desgaste de uso del conjunto lítico de la cueva del Morgado Superior, fue posible reconstruir parte de las actividades rituales que se llevaron a cabo en el sitio: el 90% de los artefactos líticos son objetos usados, todos los artefactos se han producido en otro lugar y probablemente fueron colocados intencionalmente en los entierros.*

***PALABRAS CLAVE**: análisis del desgaste de uso, ajuar funerario, Calcolítico, cueva.*

INTRODUCTION

Gruta do Morgado Superior is a karst cave located on the banks of the river Nabão about 10 km away from Tomar. As other caves of the same area, it has provided stratigraphic data and votive deposits falling in a diachronic time range that extends from the Neolithic to the early Bronze Age. In the Morgado Superior cave there are multiple burials with a few votive objects like jars, bone artefacts, and lithic tools (blades, arrowheads, etc.), beads, pendants and other decorative items in association with more than 8,000 human bones. These artefacts raised some questions about the reason of their presence within the burial context: were they made to be buried or were they common objects? Was their presence within the burial area intentional? Do they have symbolic value? Were they part of the rituals or are they objects which were deposited incidentally in this area (i.e. were the arrowheads introduced in the site inside the human bodies)? What information can we gain from the grave goods about the lifestyle of the people who made them? These questions can be partly answered through the use-wear analysis of the lithic remains.

Regional archaeological context

Geologically, the Morgado Superior cave is located in the *Mancha de Condeixa-Serra de Sicó-Alvaiázere-Tomar*, an area formed by the limestone formations of Lias and Dogger. The limestone of *Canteirões do Nabão* is, like the Dogger limestone, hard, compact, oolitic, calciclastic and with a microcrystalline structure. The increase of the presence of marly limestones from the base to the top is a characteristic of the Lias formation. In the surroundings of Tomar this formation is more or less 150 m thick and appears with marlstone characteristics until the

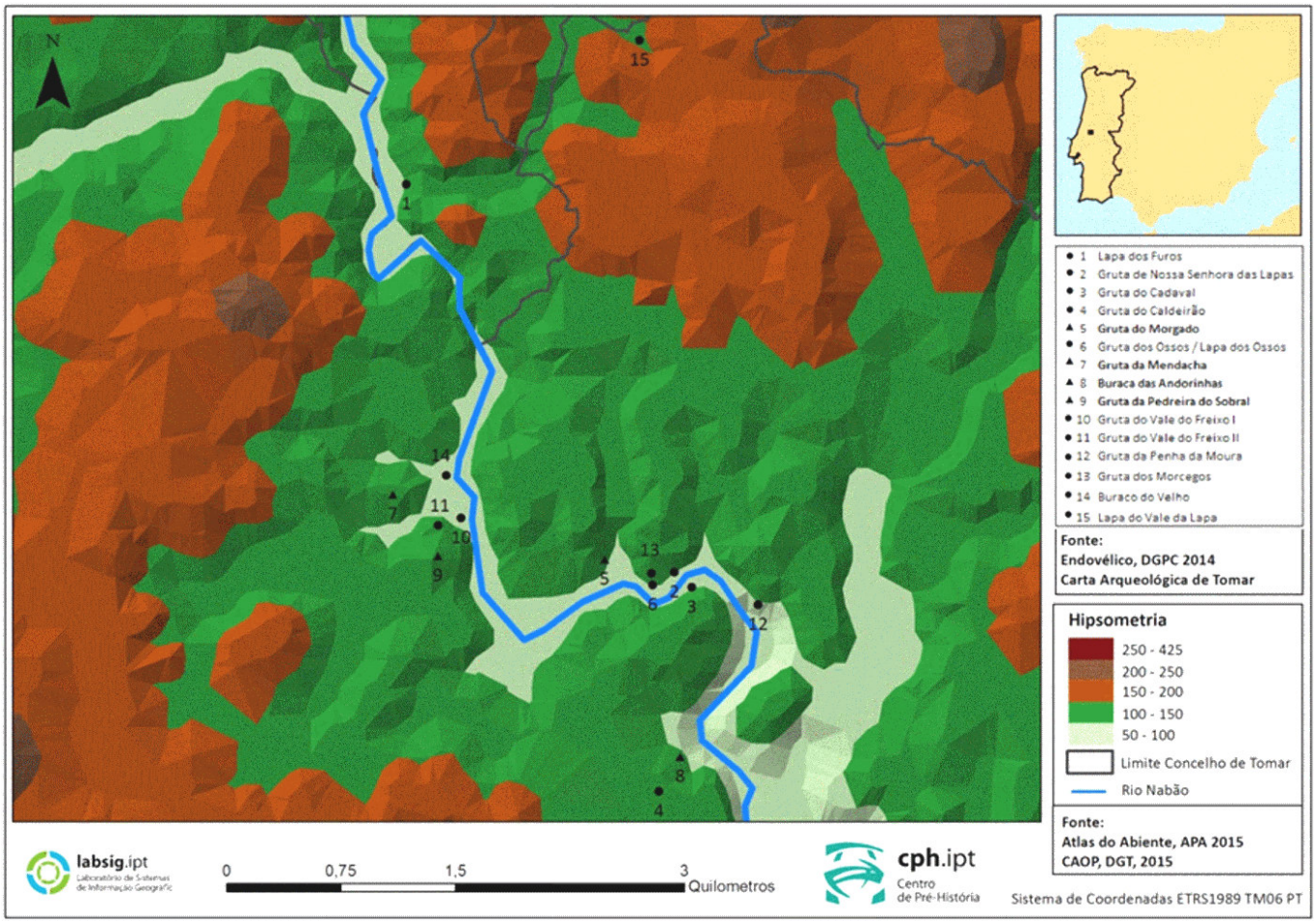

Figure 2. Localization of the burial caves in the Nabão valley (source: Rita Anastácio 2015).

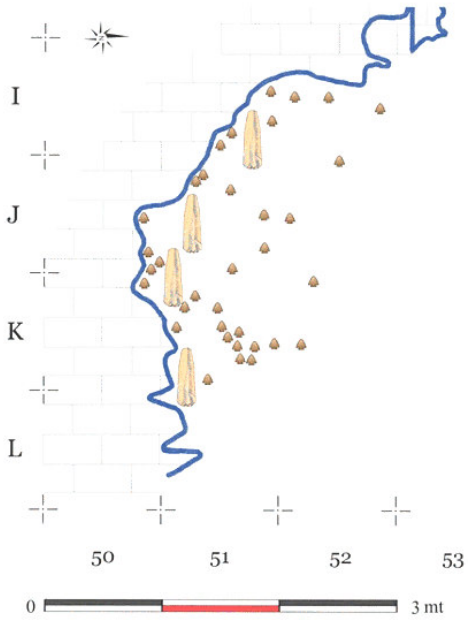

Figure 3. On the left, photo of the 2013 archaeological excavation of the Morgado Superior Cave. On the right, spatial distribution of the arrowheads and blades found in the same area (edited by Ana Pinto da Cruz 2015).

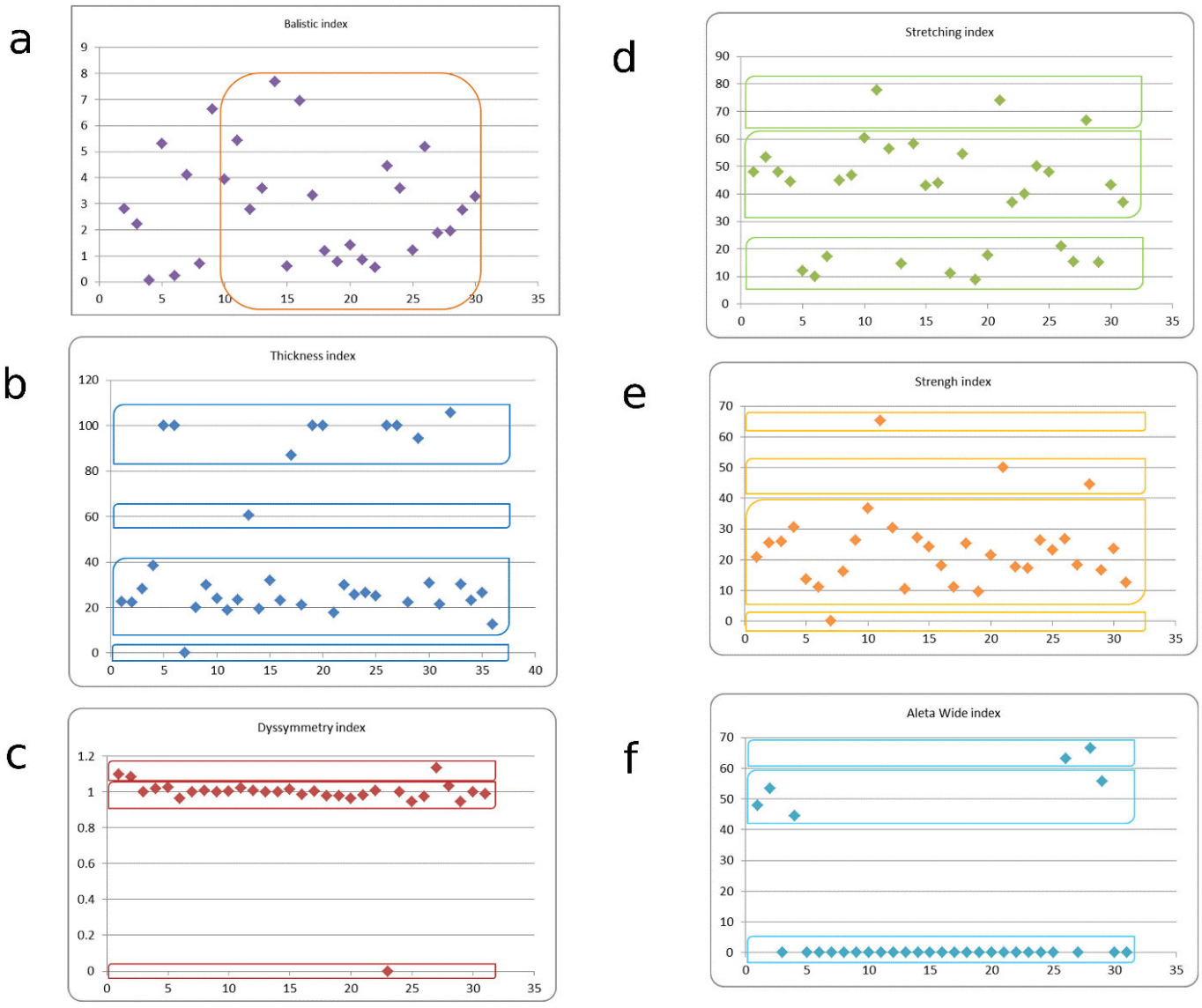

Figure 4. Indices of the Morgado Superior Cave's arrowheads (edited by Ana Pinto da Cruz 2015).

Carixiano and with dolomite rock features in the remaining part of the series, until the base of the Sinemurian (Manupella *et al.* 2014) (see Figure 1). The cave is part of a set of several burial caves, five of them already excavated (Grutas dos Canteirões, Gruta do Caldeirão, Gruta do Cadaval, Gruta dos Ossos, and Gruta de N.ª Sr.ª das Lapas) and located along the same river (see Figures 1 & 2). All the caves have a karst origin, are developed within the same limestone formation and have archaeological deposits referable to prehistoric funeral rituals (Oosterbeek & Cruz 1998). From the chronological point of view, the burials in these caves dated from the Ancient Neolithic Cardial to the Early Bronze age (Cruz 1997; Oosterbeek 1997; Cruz *et al.* 2014). During this time lapse three successive types of burial practice have been identified: individual burial, collective burial, and again individual burial. In these caves there were also occasional settlements in correspondence of moments of social instability: the Romanization, the Islamic conquest, and the Napoleonic invasion. The palynological analysis shows the presence of several species in the different caves: in Gruta de Nª. Sr.ª das Lapas were found (layer B; 5130 ± 140 BP and 6100 ± 70 BP) *Pistacia lentiscus*, *Ficus carica*, *Olea europaea*, *Arbustus unedo*, *Quercus ilex*, *Quercus coccifera*, decayed oaks and *Cistaceae* sp.; in Gruta do Cadaval were found (layer C, 5180 ± 140 BP, and layer D, 5390 ± 50 BP and 5160 ± 50 BP): *Pinus* sp., *Quercus* sp., *Juniperus* sp. and *Ericaceae* sp.; in Gruta dos Ossos (layers I–III, between 4630 ± 80 BP and 4460 ± 110 BP, layer IV, 3970 ± 140 BP) *Arbustus unedo*, *Olea europaea*, *Pistacia lentiscus*, *Quercus ilex/coccifera*, *Quercus*

Table 1. Radiometric date from the Morgado Superior Cave (source: Ana Pinto da Cruz 2015).

Provenance	Date B.P.	Laboratory	Calibration 2 - Sigma	Method
GMS - J 51 - 904	4260 ± 30	Beta-359086	2910-2880 cal B.C.	A.M.S. - homo
GMS - J 51 - 997	4180 ± 30	Beta-359087	2890-2830 cal B.C.	A.M.S. - homo
GMS - J 50 - 574	4505 ± 20	Wk-40440	3344-3263 cal B.C.	A.M.S. - homo
GMS - J 50 - 946	4168 ± 20	Wk-40441	2879-2836 cal B.C.	A.M.S. - homo

sp., *Rhamnus*/*Phillyrea*, *Leguminosae* and *Erica* sp. were found; finally, in Gruta do Morgado Superior (S.U. 1 and S.U. 2) pollen referable to *Pinus* sp., *Olea europaea* were found (Allué 2000). In conclusion, the palynological data from the different caves show that the area was characterized by a Mediterranean shrubland (Almeida 2014).

Gruta do Morgado archaeological context

The cave is located between two river meanders with very steep sides that make the access very difficult. It can be easily accessed only from the top because on the east there is a vertical scarp, 28 m high, on the stream Ribeira do Fetal, a stream tributary of the Nabão river. Its entry is disguised by endemic vegetation and it is "hidden" from the river side. The plan of Gruta do Morgado Superior is characterized by two different rooms, the smaller one located at the end of the cave and the wider at the entry. Archaeological research in the cave began in 1988 when a test pit was dug that allowed the identification and definition of the archaeological deposit. Excavations resumed in 2012 when, after an abusive excavation, the Instituto Politécnico of Tomar started investigating an area of 11 m². This work led to the identification of two different collective burial areas dated to the Late Neolithic/Chalcolithic. It was immediately clear that the two burial areas were modified over the centuries in order to allow the setting of new burials (Cruz *et al.* 2013). Two excavation campaigns were carried out in 2012 and 2013.

During these first two excavations several human bones, knapped lithic artefacts, and pottery remains were recovered (see Figure 3). Preliminary anthropological studies of the human remains allowed the calculation of the Mininum Number of Individuals present in the cave that has been estimated in 151 individuals (Tomé 2015); with human remains belonging to all the age groups and to both sexes, very fragmented, and with an underrepresentation of skulls and long bones. The radiocarbon analysis (C14 A.M.S.) of some of the human bones from the burial area two allows us to date the use of the cave as a necropolis to the Chalcolithic, thus confirming a long and continuous funerary use (see Table 1). The combined isotopes analysis carried out on two of the human remains from the burial area two, the same used for the first and second dating respectively (C: N = 3:25 and 3:32), suggests a predominantly terrestrial diet. The number of artefacts found in the cave is poor if compared to the Minimum Number of Individuals obtained by the anthropological study of the human remains. This data let us to hypothesize the presence of a selected spoliation of the collective burial area and of the related grave goods (Cruz *et al.* 2013). The spoliation could be directly related to the funeral practice and to the ritualized gestures that pass through the "recycling" of the grave goods to the relocation of certain categories of skeletal bones (skulls and long bones). Maybe these remains (artefacts and bones), carefully selected, were replaced in other cultural/burial areas: i.e. another cave or even the original settlements of these communities. Anyway, the presence of archaeological remains associated with human bones suggests that their presence in the cave was linked to burial rituals.

MATERIALS AND METHODS

Lithic assemblage

As mentioned above, the number of grave goods found is scarce. The knapped lithic assemblage is composed of 68 artefacts belonging to the following groups: core (1), flakes (9), blades (6), bladelets (6), retouched blades (8), and arrowheads (38). The majority of the knapped lithic assemblage is made of flint but there are six elements made of a good quality of hyaline quartz (2 flakes, 2 retouched blades and 2 bladlets), and two flakes made in local quartzite. It follows a typological classification of the flint artefacts (Table 2).

Table 2. Table with types and shapes of the arrowheads (source: Ana Pinto da Cruz 2015).

Class		Triangular	
Type	1	Triangular shape with simple basis	
Sub-Type	1.1.	Straight base	
Derived Sub-Type	1.1.1.	Straight base with triangular barbs	
Sub-Type	1.2.	Concave base	
Type	2	Triangular shape with triangular base	
Sub-Type	2.1.	Triangular base with elongated protrusions (barbs)	
Sub-Type	2.2	Large triangular base	
Type	3	Convex foliated shape	
Sub-Type	3.1.	Simple	
Sub-Type	3.2.	With elongated protrusions (barbs)	
Type	4	Tanged shape with protrusions (barb)	
Sub-Type	4.1.	Medium tang (2/4 of the arrowhead body = a 2/4 of the tang of the body) with barbs.	
Sub-Type	4.2.	Short tang (= 2/3 of the arrowhead body = 1/4of the tang body) with convex edges	
Sub-Type	4.3.	Very short tang with semi-convex edges.	
Sub-Type	4.4.	Straight barbs with sketched tang and concave edges	
Sub-Type	4.5.	Tanged and convex, with developed barbs and edges rounded and concave.	
Type	5	Elongated shape with concave base	
Sub-Type	5.1.	Concave base with triangular surpassed barbs	
Sub-Type	5.2.	Concave base with rounded surpassed barbs	

Use-wear analysis

The use-wear analysis was conducted on all the knapped lithic artefacts. The artefacts were carried to the laboratory where they have been gently washed with warm water and soap, and then washed for 3 minutes in a mixture of demineralized water (75%) and alcohol (25%) in an ultrasonic tank and open air dried. The first part of the study was carried out with the aid of a stereomicroscope in reflected light and with an USB Microscope Camera, with the purpose of evaluating and quantifying the presence of post-depositional alterations on the artefacts' surfaces. The main features that differentiate traces of use from post-depositional alterations are the combinations of the trace attributes: the contact with the worked material produces specific combinations of attributes, which rarely are replicated by post-depositional agents (e.g. Asryan *et al.* 2014; Keeley 1980; Lemorini *et al.* 2014; Mansur-Franchomme 1986; Vaughan 1985). As testified by the experimental reference collections, the traces of use are always distributed in a localized portion of the artefact, usually in close proximity to the edge, while the post-depositional marks are randomly spread all over the lithic surface (Shea & Klenck 1993).

Macro- and microanalysis of knapped Morgado Cave's artefacts

The microscopic analysis of the Gruta de Morgado Superior cave artefacts was carried out with the combined use of a stereomicroscope in reflected light and a metallographic microscope. Macrotraces were observed with the stereomicroscope in reflected light and microtraces were observed with the metallographic microscope (e.g. Lemorini *et al.* 2014; Van Gijn 2014; Rots 2010). The analysis of the macrotraces provides information about the activities carried out (e.g. cutting, scraping, piercing, etc.), and allows a first hypothetical interpretation of the hardness of the worked materials. The hardness categories used to describe the worked materials are: soft (e.g. animal soft tissue, herbaceous plants and some tubers), medium (e.g. fresh wood and hide), and hard (e.g. bone, horn, antler, dry wood and stone). There are some materials with intermediate hardness or resistance such as soft/medium materials (e.g. fresh hide, wet softwood) or medium/hard materials (e.g. softwood, wet antler) (e.g. Lemorini 2006; Lemorini *et al.* 2014; Odell 2004; Rots 2010; Semenov 1964; Tringham *et al.* 1974). The analysis of the micro-

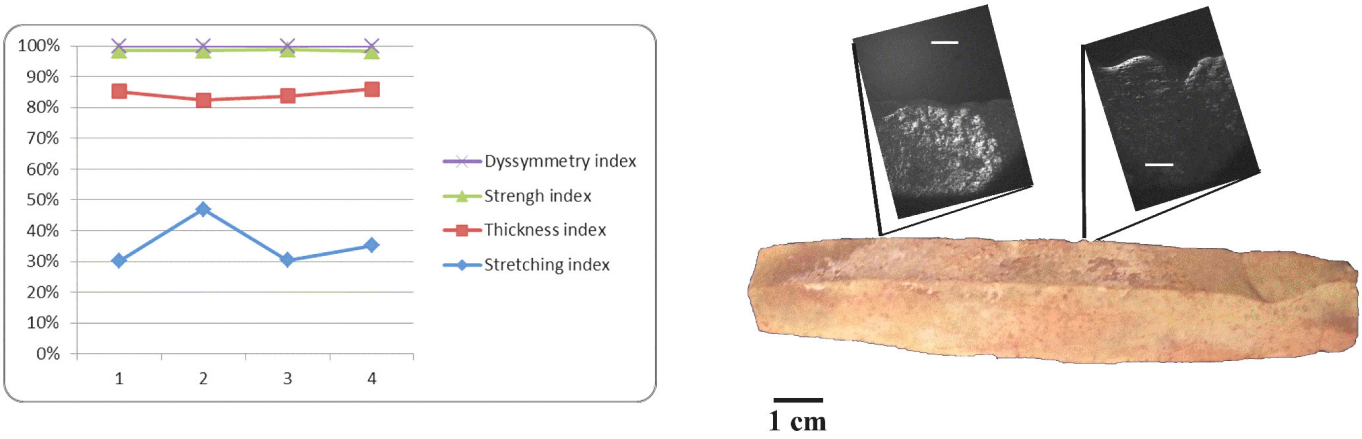

Figure 5. On the left: indices of the Morgado Superior Cave's blades (source: Ana Pinto da Cruz, 2015). On the right: GMS-Y50-296 with well-developed harvesting polish on the dorsal surface, near the edge (scale bar = 100µ) (edited by G.L.F. Berruti 2015).

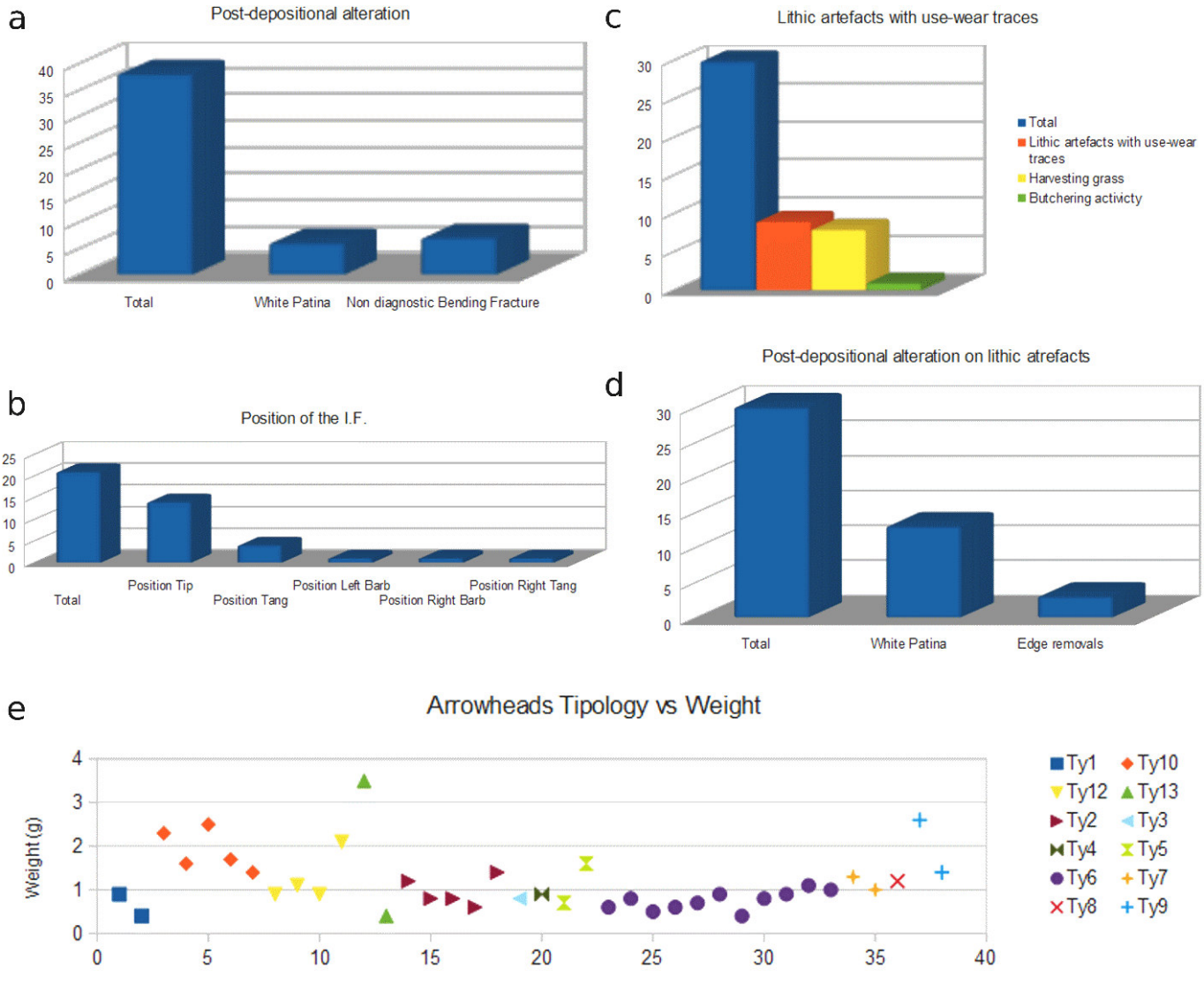

Figure 6: a) post-depositional alterations identified on the arrowheads; b) position of the impact fractures on the arrowheads; c) use-wear identified on the lithic artifacts; d) post-depositional alterations identified on the lithic artifacts; e) graph showing the different typologies of arrowheads in relation to their weight (edited by G.L.F. Berruti 2015).

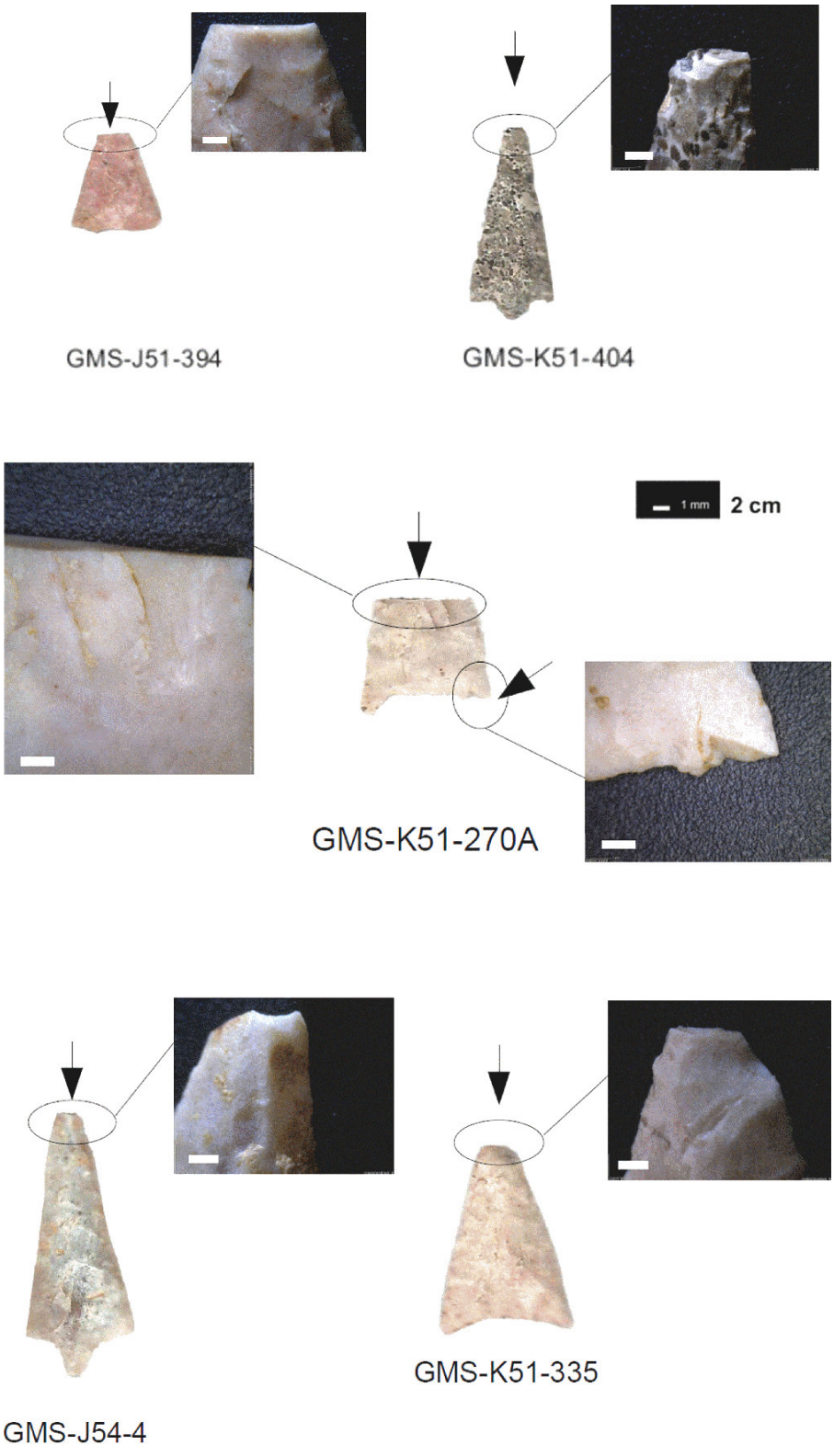

Figure 7. Arrowheads with impact fractures (edited by G.L.F. Berruti 2015).

traces is the study of micro-edge roundings, polish, abrasions, and striations. This kind of study was conducted to provide a more detailed understanding of the activities carried out with the lithic artefacts, and to improve the diagnosis of the processed materials (e.g. Beyries 1987; Christensen 1996; Moss 1983; Keeley 1980; Lemorini *et al.* 2014; Lemorini 2006, 2000; Plisson 1985; Rots 2010; Vaughan 1985; Ziggiotti 2011). The analysis of the lithic artefacts was conducted using three different microscopes: a stereoscopic microscope Seben Incognita III with magnification from 10x to 80x, a metallographic mi-

croscope Optika B 600 MET supplied with 5 objectives PLAN IOS MET with 5-10-20-50-100 objectives and 10x oculars equipped with a Optika camera B5 and a Microscope Camera Dinolight Am413T.

Analysis of the arrowheads of the Morgado Cave

The study of the arrowheads was completed through the approach at low magnification (Low Power Approach) (Semenov 1964), using the criteria developed by Fischer and O'Farrell (Fischer et *al.* 1984) and by several researchers in recent years (Dockall 1997; Geneste & Plisson 1990, 1989; Lombard 2005; Schmitt *et al.* 2003; Shea *et al.* 2001; Sisk & Shea 2009; Villa & Lenoir 2006). The analyses were carried out using a stereo microscope Seben Incognita 3 (10–80x) and a digital microscope Dinolight Am413T (5–230x). The position of the traces identified on the surface of the arrowheads is referred to the diagram made by Van Gijn (1989).

RESULTS

Techno-typological analysis

The arrowheads assemblage

From the technological point of view these lithic artefacts are the result of a bifacial retouch. The *chaîne opératoire* can start from different platforms: blades, bladelets or flakes. The first stage of the *chaîne opératoire* is the thinning of the proximal area of the lithic platform through bifacial removals. During the second stage, the curvature of the distal zone of the lithic platform is reduced through a progressive inverse retouch. The next step is the shaping of the tip through pressure retouch, in order to obtain flat and tiny removals (Tixier *et al.* 1980). The study of the arrowheads of the Morgado Cave was conducted taking into account the results of previous studies (Hugot 1957; Savary 1964; Brezillon 1969; Bagolini 1970; Gonzales & Gonzales 1990; Inizan *et al.* 1995; Carvalho 1997; Eiroa *et al.* 1999; Forenbaher 1999, 1989; Renard 2003; Morgado Rodríguez *et al.* 2008). The typological analysis allowed the identification of only one class of artefacts (triangular) with 5 different shapes: 1) triangular with straight base; 2) triangular with triangular base; 3) convex foliated; 4) barbed and tanged; 5) elongated shape with concave base, in turn divided in 15 subtypes and one derived subtype (see Table 2). Several indices have been applied in the study of the arrowheads: the streching index divides the arrowheads assemblage in three classes: short (0–20), medium (35–60) and long (65–78) (see Figure 4, Graph D); the dissymmetry index presents three classes: equilateral (0), symmetrical isosceles (0.9–1.1), and asymmetry (1.1, –1.2) (see Figure 4, Graph C); the barbs dimension index has three classes: very little (0), broad (40–60); very broad (60–70) (see Figure 4, Graph F); the thickness index has four classes: very fine (0); thin (10–40); medium (60); thick (78–110) (see Figure 4, Graph B); the strength index has four classes: very weak (0), weak (10–38), medium (40–50), and robust (65) (see Figure 4, Graph E). The balistic index has two classes: < 10 and between 10 and 30; these values are supported by several different studies (see Figure 4, Graph A) (Bergman *et al.* 1988; Josserand 1970; Carrère 1990).

The blades assemblage

The entire laminar assemblage clearly exceeds the corresponding double value to the length in relation with the width. The blades and the bladelets have parallel edges and their detachments were achieved by indirect percussion: the lips are pronounced, the bulbs are short and marked, and the butts are plain. The sections are ranging between triangular and trapezoidal. The robustness and symmetry indices are all coincident with the characteristics of the blades and the thickness ratio is around 85% (see Figure 5). The elongation index varies between 30 and 48%, giving an elongation between middle and long.

Use-wear analysis

All the knapped lithic artefacts show a good state of preservation, although there are some of them that have post-depositional edge removals and white patina (Figure 6, Graph D). Edge removals are caused by pressure on the flake edges: the causes of this pressure are trampling or sedimentary load. The results of this post-depositional alteration are the microfracturing of the most fragile portions of the artefacts edges (McBrearty *et al.* 1998). The white patina is a patina which appears as an opaque veil, usually visible to the naked eye, which changes the original colour and texture of the raw material (Lemorini 2009). "Under the microscope a dissolution process is visible causing the formation of a porous sur-

face which led to the loss of homogeneity and to the dispersion of the reflected light, causing a whitish and porous appearance of the artefact" (Ziggiotti 2005). It was observed at different stages and it seems that it begins to operate along the edges and ridges until arriving to cover the entire surface of the lithic tool. This kind of alteration is extremely invasive, and its presence usually tends to make all the anthropic traces unreadable (Keeley 1980).

The presence of these post-depositional alterations is attributable to the modifications of the deposit during the phases of reuse of the burial areas. All of the retouched blades show harvesting traces that are always located only on one of the edges of the tools (Figure 5). In just one case there are traces of hafting with wood material. Only one flint flake has traces of butchering activities (Figure 6, Graph C). The state of preservation of the 38 arrowheads is good, although there are some of them that have no diagnostic bending fractures and others with traces of white patina (Figure 6, Graph A). The presence of these post-depositional alterations is attributable to the modifications of the deposit during its phases of reuse. Only 7 artefacts show fractures that removed more than the 80% of the original volume, and in all these cases, during the excavation, only the proximal part of the arrowheads was found. In total, it was possible to identify impact fractures on 18 of the arrowheads for a total of 21 different impact fractures (Figure 7). The majority of the impact fractures have been identified on the tip of the arrowheads (Figure 6, Graph B). These data confirm those obtained from the preliminary study of the arrowheads of the Morgado Cave (Berruti & Daffara 2014). The arrowheads belong to thirteen different typologies that correspond to thirteen different kind of hafting (Brizzi 2006; Loi & Brizzi 2011). Moreover, the different kinds of hafting and the different typologies of the arrowheads seem closely related to the weight of each artefact (Figure 6, Graph E).

DISCUSSION AND CONCLUSION

The use-wear analysis of the knapped lithic assemblage highlights the presence of various post-depositional alterations probably linked to modifications that occurred, over the centuries, in the two burial areas, due to their reuse (Cruz *et al.* 2013). The high number of arrowheads with impact fractures (47%) falls fully within the percentage obtained experimentally by Fischer (Fischer *et al.* 1984), who recorded that a percentage between 40% and 60% of the arrowhead had identifiable impact fractures after use. This data allows us to confirm that most of the arrowheads of the burial areas have been actually used. The absolute lack of distal fragments suggests the hypothesis that the arrowheads have been broken in another location, before the burials. If it had been an accidental deposition, such as in the case of Costa de Can Martorell in Spain where arrowheads were introduced in the burials within the bodies of the warriors (Palomo & Gibaja 2002; Gibaja & Palomo 2003), we would have found all the typologies of fragments. In the Morgado Superior cave, the presence of only proximal fragments suggests the idea of the deposition of previously used projectiles. These data allow us to hypothesize that the presence of arrowheads in the Morgado cave is due to a deliberate choice and also suggest that they had strong symbolic value, that wasn't lost after the breakage of the object.

According to Ventura and Senna-Martínez (2003), if considering as a target a man, the arrowheads with the ballistic index < 10 (type 1) can not penetrate the skin while those with ballistic index > 10 (type 2) can penetrate the skin, causing damage to internal organs (Figure 6, Graph E). These data led us to think that part of the arrowheads of the Morgado Superior cave were made for the hunting of small prey or, especially concerning type 1, were produced for ritual purposes, linked to offerings to the deceased, as if they were a sort of amulets. Looking at the graph that relates the morphology of the arrowheads and their weight (Figure 6, Graph E), it is evident that the clusters are very narrow: according with ethnographic and experimental studies, the kind of hafting and the weight of the arrow is connected with the kind of prey and with the hunting method (Brizzi 2006; Churchill 1993; Loi & Brizzi 2011).

The presence in the lithic assemblage of the Morgado Superior cave of groups of arrows with the same weight and the same hafting suggests the presence of two different hunting methods. Nevertheless, without precise stratigraphy, we cannot know if we are in the presence of two co-existing hunting methods or if a change took place during the years of use of the cave as a burial area. The absence of *débris* and of elements belonging to the first phases of exploitation of the cores, let us assume that the lithic artefacts have been produced in another place. The 33% of the lithic tools of the Morgado Superior Cave has use-wear traces; the retouched blades, all obtained through the exploitation

of allocthonous raw materials, show traces linked to grass harvesting. There is only one unretouched blade made in flint without use-wear traces. These data suggest that the blades were used as harvesting knives. The harvest traces are very easy to recognize on the edges of the lithic tools (Barron *et al.* 2015, Palomo *et al.* 2011) even if in the lithic assemblage of the Morgado Superior Cave these traces are not very developed, thus suggests that the use of these artefacts was not intensive but probably was symbolic or ritual. Similar observations have been made concerning the flint blades found in the hypogeum of Colos (Cruz *et al.* in press).

Within the considered sample there is only one flake with traces linked to slaughtering activities: the presence of this single remain is difficult to explain, it could be a forgotten artefact or part of a particular kind of grave good for a particular ritual or person. Through the use-wear study of the knapped lithic assemblage of the Morgado Superior Cave it was possible to reconstruct part of the ritual activities that were carried out in the site: the 90% of the lithic artefacts are used objects, with the exception of bladelets and flakes that don't have use-wear traces. All of the artefacts have been produced in another place and probably (perhaps with some exceptions: e.g. the flake with butchering traces) they were intentionally placed in the burials.

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