

The representation of isolated legs in Middle Magdalenian portable art: a widespread and shared symbolic motif

LA REPRESENTACIÓN DE PATAS AISLADAS EN EL ARTE MUEBLE DEL
MAGDALENIENSE MEDIO: UN MOTIVO SIMBÓLICO EXTENDIDO Y COMPARTIDO

Miguel García-Bustos

Universidad de Salamanca
C/ Cervantes, s/n, 37002 Salamanca
miguelgarbus@usal.es
 0000-0002-3641-9474
(corresponding author)

Olivia Rivero

Universidad de Salamanca
C/ Cervantes, s/n, 37002 Salamanca
oliviariver@usal.es
 0000-0002-0730-4854

Abstract The Middle Magdalenian (14 500–13 000 BP) is characterised by symbolic and artistic productions shared across long distances. This article examines one such production that has received limited attention in previous research: the representation of isolated herbivore legs in portable art. Through a systematic process of documentation and compilation, more than forty pieces have been identified, distributed from the Cantabrian region to Central Europe, with a particular concentration in Pyrenean sites. These figurative motifs are analysed according to a range of variables, including raw material, manufacturing technique, decorative style, and the possible taxonomic identification of the limb. Their chronological attribution is also discussed considering the existence of precedents in the Lower Magdalenian and later occurrences in the Upper Magdalenian. In addition, other Palaeolithic contexts are presented in which animal limbs fulfil artistic or ritual functions. Overall, this study proposes reconsidering isolated herbivore legs as meaningful elements within Magdalenian symbolic practices rather than as marginal motifs. A critical reassessment of symbolic productions that have traditionally been overlooked can provide additional evidence for interpreting the social and symbolic dynamics of prehistoric communities.

Keywords Palaeolithic art, Iconography, Franco-cantabrian region, Limb representation, Long-distance contacts.

Resumen El Magdaleniense Medio (14 500-13 000 BP) se caracteriza por producciones simbólicas y artísticas compartidas a gran distancia. En este artículo se analiza una de esas producciones escasamente atendida en la investigación: las representaciones aisladas de patas de herbívoros sobre arte mueble. Gracias al trabajo de documentación y recopilación se han identificado más de cuarenta piezas distribuidas desde la región cantábrica hasta Europa Central, con una particular concentración en yacimientos pirenaicos. Estos motivos figurativos han sido evaluados a través de diferentes variables como el material utilizado, la técnica aplicada, el estilo decorativo y la posible clasificación taxonómica de la pata. Asimismo, se discute su atribución cronológica por la existencia de antecedentes en el Magdaleniense Inferior y otras posteriores en el Magdaleniense Superior. De forma complementaria, se exponen otros contextos paleolíticos en los que las extremidades de animales cumplen ciertas funciones de tipo artístico o ritual. En definitiva, este estudio propone reconsiderar las patas exentas de herbívoros como elementos significativos dentro de las prácticas simbólicas magdalenienses y no como meros motivos marginales. La revisión crítica de producciones simbólicas tradicionalmente olvidadas puede aportar material adicional con el que interpretar las dinámicas sociales y simbólicas de las comunidades prehistóricas.

Palabras clave Arte paleolítico, iconografía, región franco-cantábrica, extremidades, contactos a larga distancia.

García-Bustos, M. y Rivero, O. (2026): "The representation of isolated legs in Middle Magdalenian portable art: a widespread and shared symbolic motif", *Spal*, 35.1, pp. 9-33. <https://dx.doi.org/10.12795/spal.2026.i35.01>

1. INTRODUCTION

The Middle Magdalenian (14 500-13 000 BP) is possibly one of the richest periods of humanity from a social, cultural and symbolic point of view. The number of archaeological sites attributed to this chronology is considerable, without precedent in previous cultures. Likewise, within a vast territory of Western Europe that includes regions such as the Cantabrian region, the Pyrenees and Périgord, we find a shared cultural system where long-distance contacts are corroborated by different domains such as the lithic industry (Cazals *et al.*, 2005; Elorrieta, 2016; Lacombe, 2005; Sánchez de la Torre, 2015), the bone industry (Lefebvre *et al.*, 2021; Pétillon, 2013; 2016; 2018), malacofauna (Álvarez-Fernández, 2002; 2003; Álvarez-Fernández *et al.*, 2021; Taborin, 1993) and, of course, both parietal and portable art (Bahn, 1982; Corchón *et al.*, 2012; Garate *et al.*, 2023; García-Diez *et al.*, 2016; 2021; García-Bustos, 2019; Intxaurbe *et al.*, 2022; 2024; Rivero, 2010; 2011; 2015; Rivero and Sauvet, 2014; Sauvet *et al.*, 2008), even in Central and Eastern Europe (e.g. Braun, 2018; Langley *et al.*, 2026; Oliva, 2017).

Around 14 500 BP, there was a rapid expansion of a homogeneous artistic expression from Asturias to the Vézère Valley, passing through other areas such as the Ariège or Quercy. In addition, symbolic and artistic creation increased significantly (Ruiz-Redondo, 2019). The abundance of archaeological evidence, together with the verification of long-distance contacts between different regions (Bahn, 1982; Ochoa *et al.*, 2025; Rivero, 2010), reveals an interconnected cultural and social reality among hunter-gatherer groups. On the other hand, the remarkable stylistic and thematic homogeneity during this chronology suggests a stability and continuity of a regulated cultural transmission of the graphic tradition over at least 3 500 years (Rivero, 2010). These long-distance connections and the existence of a common symbolic background are much more evident in portable art than in parietal art, since the portable nature of certain objects warns us of their dissemination in a circuit of variable but bounded range (Sauvet *et al.*, 2008). The study of analogies and the diffusion, borrowing or convergence of ideas is undoubtedly one of the fundamental pillars on which to base the idea of contact between groups, the possible interpretation of sites as centres of aggregation (Utrilla and Bea, 2008; Conkey, 1980; 1992; González Sainz, 2007) and the existence of a shared, though not uniform, common identity (Sauvet, 2019).

There are numerous works in the literature that have brought to light and characterised examples of this. Two of the most recurrent are, in turn, the two artistic innovations that were apparently the most successful, produced in large quantities: the perforated *rondelles* (Corchón and Rivero, 2008; Heras *et al.*, 2007-2008) and the cut-out outlines (*contours découpés*) (Barge-Mahieu *et al.*, 1991; Bellier, 1984; Buisson *et al.*, 1996; Corchón, 2005; Fritz and Simonnet, 1996). It is widely accepted that both are regarded as fossil directors of this chronology. Through this type of highly standardised artefact, many authors have sought to determine a potential point of origin on the map, locating it in the Pyrenees. Following this, the presence of these artefacts in sites becomes less frequent until they become sporadic, exhibiting a radial diffusion pattern (Sauvet *et al.*, 2008). Other examples, although less cited and with less interpretative force are horse incisors with lateral notches (Álvarez-Fernández, 2006), propellers with horse heads (Cattelain, 2020), semi-cylindrical rods with geometric decoration (Barandiarán *et al.*, 2019), the isolated representation of bison heads (Rivero, 2009), the modelling on clay (Boureux, 2004), the inclusion of the ground line on which the figures rest (Fritz *et al.*, 2015), the Pyrenean and Aquitanian morphotypes of the bison (Forteza *et al.*, 2004; Vialou, 1986) or parietal signs such as the claviforms (Fuentes *et al.*, 2019; Robert, 2006).

To this list can be added another witness of these contacts: the representation of isolated herbivore legs. During the Middle Magdalenian, the representation of free-standing anatomical parts is very common (Rivero, 2009). Unlike many of the previous artefacts of portable art, these legs, recreated using different techniques and on different media, have hardly aroused the interest of researchers, relegating their role to a secondary and too scarce type (Rivero, 2010). The aim of this paper is to present a database in which these isolated legs are collected, as well as to carry out a first exploratory analysis in relation to the iconography, the media, the technique or the type of decoration included.

2. THE ISOLATED LEGS: THE STUDY CORPUS

2.1. Selection criteria and rejected specimens

Isolated legs are a type of figurative motif in which, with a few exceptions, only one limb of a herbivore is depicted. Due to poor preservation and the abstract way the leg is rendered, it is often impossible to determine whether the motif represents an isolated segment or part of a more complete animal (see Fig. 1A-B and 1G). A notable example can be seen in the depiction of limbs on plaquettes, which often appear fragmented and are therefore easily overlooked. As a result, figurative motifs commonly include disconnected components (Fig. 1F-H). In some cases, legs are depicted together with other anatomical elements, such as the abdomen or thorax, indicating an intention to represent more than the limbs alone. Sculptures in the round that have been interpreted as isolated legs must also be considered. Although described as “legs” in the extant literature, their morphology is poorly defined and highly questionable (see Fig. 1A, 1C-E). Consequently, all pieces presenting such interpretative issues were excluded from the study corpus.

All cases identified as genuine representations of isolated legs are supported by convincing arguments. However, some specimens raise additional uncertainties and therefore require further discussion. In the case of bone fragments, the size of the leg, its position within the available surface, and the limited graphic space indicate that the depiction of a more complete figure would not have been possible. This can be observed in the leg fragments from Las Caldas (Fig. 2A-B), Isturitz (Fig. 2E, 2K), Mas d’Azil (Fig. 3K) and Massat (Fig. 4K). In all the specimens examined, the available space is insufficient to permit the depiction of the animal beyond its legs. A clear example is provided by the one from Massat, engraved on a bird bone that can only accommodate the vertical depiction of a leg. In the case of volumetric pieces, such as small sculptures and cut-out contours, even when fragmented (see Fig. 2F-I, 2L, 2N; 3A-B, 3G, 3L, 3N-O; 4A, 4H), their dimensions likewise indicate the intentional depiction of an isolated anatomical segment. This is due to the constraints imposed by the antlers and the osseous support available to the artist. The final piece requiring further discussion is the specimen from Tuc d’Audoubert, produced on a plaquette (*cf.* Fig. 4B). The finely engraved line of the leg does not extend to any of the edges of the medium. According to Bégouën *et al.* (2009), this supports the interpretation of the engraving as an isolated leg and not as part of a more complete figure. We concur with this interpretation.

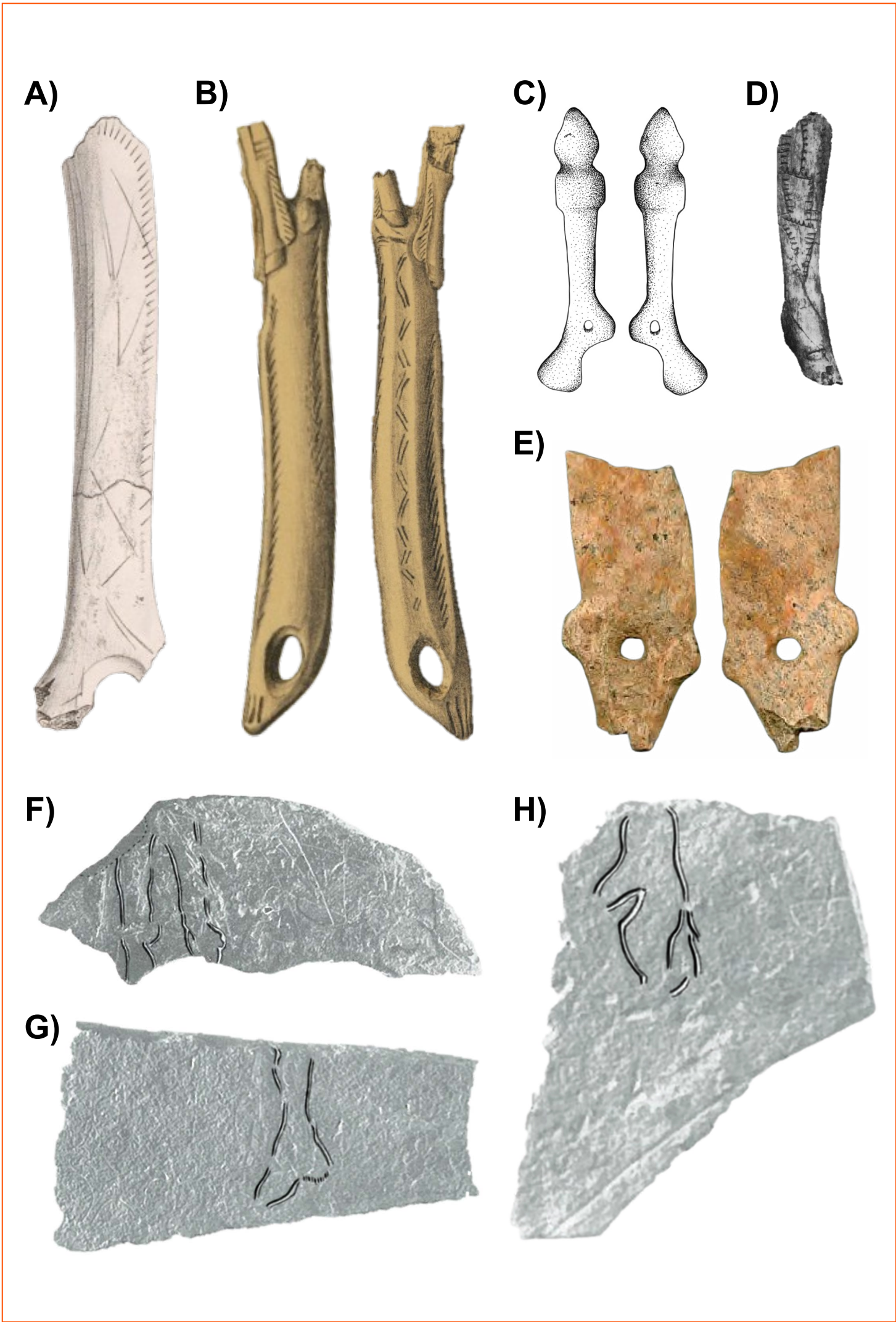


Figure 1. Dubious representations of isolated legs. A, C, D, and E correspond to objects with a possible free-standing leg shape, but their attribution is uncertain. B, F, G, and H are fractured pieces that may have been intended to represent a larger anatomical form than appears. A) Kesslerloch (Merk, 1875). B) Saint-Michel (Piette, 1907). C) La Garenne (modified orientation) (tracing of M. García-Bustos from a photograph in Peschaux *et al.*, 2016). D) Lortet (Chollot, 1964). E) Bolinkoba (modified orientation) (Barandiarán, 2015). F-H) Lortet (tracing of M. García-Bustos from a photograph in Chollot, 1964). Various scales.

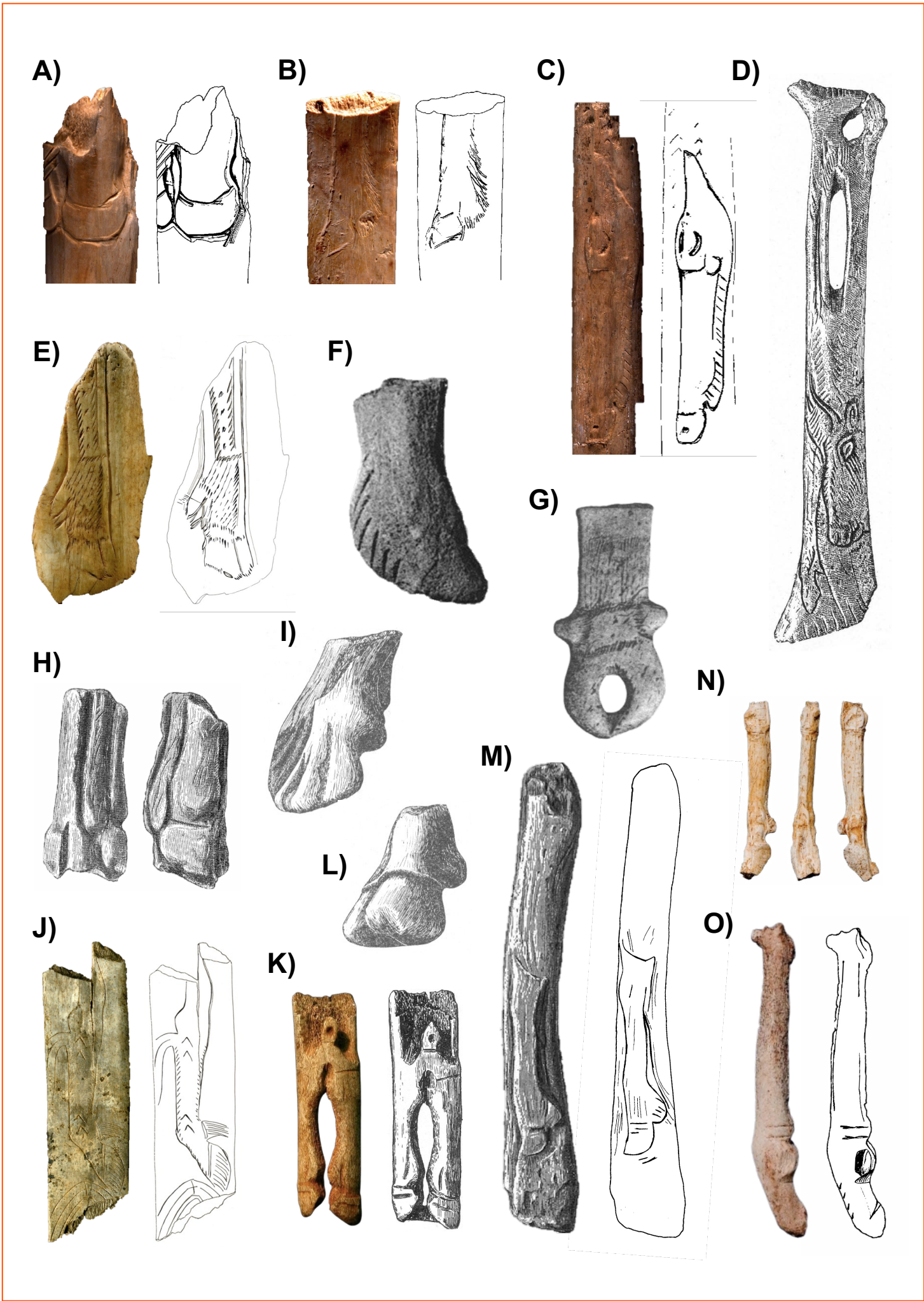


Figure 2. Corpus of legs from Las Caldas, Courbet, Isturitz and La Garma. A) IXb-299, Las Caldas (Photo: Rivero, 2010; Tracing: O. Rivero). B) IX-1904, Las Caldas (Photo: Rivero, 2010; Tracing: O. Rivero). C) IXC-1144, Las Caldas (Photo: Rivero, 2010; Tracing: O. Rivero). D) Courbet Inc. 01, Courbet (Breuil and Saint-Périer, 1927). E) MAN 84661, Isturitz (Photo: Rivero, 2010; Tracing: O. Rivero). F) IST-I-34, Isturitz (Saint-Périer, 1930). G) Insturitz Inc. 01, Isturitz (Saint-Périer, 1930). H) IST-I-35, Isturitz (Saint-Périer, 1930). I) IST-II-73-5, Isturitz (Saint-Périer, 1936). J) MAN 86693-86694, Isturitz (Photo: M. García-Bustos; Tracing: M. García-Bustos). K) MAN 86716, Isturitz (Photo: Rivero, 2010; Tracing: O. Rivero). L) MAN 84830, Isturitz (Saint-Périer, 1936). M) IST-I-46, Isturitz (Saint-Périer, 1930; Tracing: O. Rivero). N) G-I-1000, La Garma (Photo: O. Rivero). O) GI-11, La Garma (Photo: MRPAC; Tracing: O. Rivero). Various scales.

2.2. The chronological framework and archaeological context of isolated legs

Chronologically, a clear pattern is the concentration of these representations in the Middle Magdalenian period (Table 1). Almost all reliably attributed pieces (especially those from well-documented stratigraphic contexts or with associated radiocarbon dates) fall between approximately 15 890 and 12 245 BP (uncalibrated), considering the temporal lag between cultures in the Cantabrian and Pyrenean regions. Sites such as Las Caldas, Enlène, Isturitz, Tuc d'Audoubert, and La Garma provide chronologies consistent with the material culture, suggesting a relatively homogeneous cultural context in which this iconographic motif is widespread. This type of iconography is also present, albeit to a much lesser extent, on the walls of some caves such as Bédeilhac (personal communication), Labastide (Simonnet, 2022), Alkerdi (Garate and Rivero, 2015), El Pindal (unpublished results) and Altxerri (Ruiz-Redondo, 2014). Most of these parietal legs date to the Middle Magdalenian period, with the possible exception of Altxerri, generally attributed to the Upper Magdalenian. Nevertheless, this case is exceptional, as the isolated paw belongs to a carnivore (a bear) and differs iconographically from the other indexed specimens, which are herbivores.

By contrast, many specimens derive from sites where early 20th-century excavations were conducted without systematic methods (Passemar, 1944; Saint-Périer, 1930; 1936; Breuil, 1902; 1903; Péquart and Péquart, 1960). As a result, they cannot be attributed to specific archaeological levels (see the “context” column in Table 1). This issue has been documented at sites such as Bédeilhac, Espalungue, Lortet, La Madeleine, Mas d’Azil, and Kesslerloch. In many cases, the pieces can only be relatively dated based on associated material culture and comparisons with nearby sites. Considering this, representations of isolated legs are generally attributed to the Middle Magdalenian. In some instances, however, insufficient documentation has resulted in broader attributions spanning the Middle and Upper Magdalenian, potentially extending this symbolic production beyond 13 000 BP. This situation is observed at Courbet, Laugerie-Basse, and Massat. The only specimen commonly considered to belong to later phases of the Magdalenian is the piece from Lortet (MAN 48618), which Chollot (1964) attributed to the Magdalenian V/VI phase (Fig. 3G). This interpretation, however, should be treated with caution, as the site was excavated by Piette (1907) without systematic recording of the recovered material culture. In sum, the evidence for the persistence of isolated-leg representations into the Upper Magdalenian remains uncertain and relies on assemblages whose material culture cannot be securely differentiated between the two periods.

On the other hand, the piece recovered from Les Taillis des Couteaux traces the origin of this type of representation back to the French Lower Magdalenian. The specimen consists of a reindeer antler débitage on which a hind leg of a herbivore has been engraved (Fig. 4J). The stratigraphic unit in which it was recovered (EG-IIIGF) corresponds to the Lower Magdalenian found at the site (16 950 ± 50, Beta-425813; 17 660 ± 60, Beta-425814; 17 670 ± 60, Beta-425815) (Gaussein and Primault, 2020; Primault *et al.*, 2020). Although this precedent exists, it is unclear whether this single piece represents the start of an iconographic tradition that later flourished in the Middle Magdalenian. Alternatively, it may simply reflect an isolated conception by a single artist, which did not achieve broader significance or dissemination at the time.

With respect to their archaeological context, it is important to note that none of these pieces derives from an isolated find. Instead, they form part of site-specific col-

lections of portable art. In certain contexts, portable art is comparatively rare, yet rock art is abundant, as is the case at Bédeilhac, Massat, and Tuc d’Audoubert. At other sites, material culture is abundant, yet rock art is scarce or absent, as observed at Las Caldas, Courbet, Enlène, Espalungue, Isturitz, Kesslerloch, Laugerie-Basse, Lortet, La Madeleine, Lafaye, and Plantade. Specimens have also been recovered from caves containing both portable and parietal art, including La Garma and Mas d’Azil. Consequently, it is unclear whether this figurative motif predominates at a given type of site according to this classification. What we can confirm is that these representations are notably recurrent in intensively occupied, multifunctional habitation contexts. At sites including Las Caldas, Enlène, Isturitz, and Tuc d’Audoubert, they occur in domestic areas featuring hearths, dense faunal remains, stone and bone tools, and other portable art. This indicates that their production and use were not limited to strictly ‘ritual’ or secluded spaces.

In summary, the limited exceptions to this trend, including Les Taillis des Couteaux (Lower Magdalenian) and some Middle/Upper Magdalenian sites (Courbet, Laugerie-Basse, Massat), do not undermine the overall pattern. They may, however, indicate an early emergence of the motif and its continued, though restricted, presence beyond the Middle Magdalenian in less clearly defined contexts.

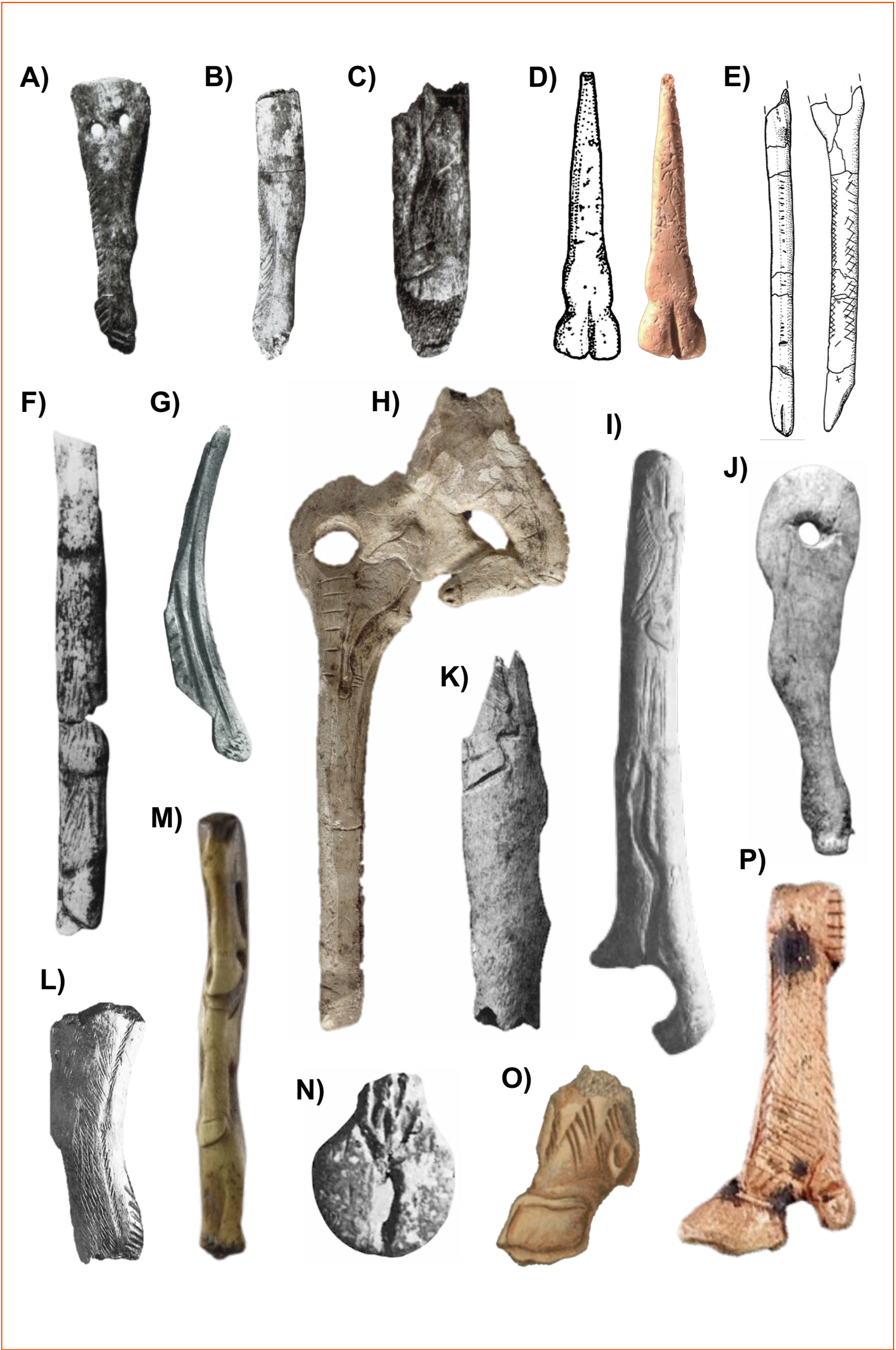


Figure 3. Corpus of legs from Espalungue, Plantade, Lortet and Mas d’Azil. A) MAN 47243, Espalungue (Chollot, 1964). B) MAN 49121, Espalungue (Chollot, 1964). C) MAN 49141, Espalungue (Chollot, 1964). D) MM P192, Plantade (Photo: E. Ladier; Tracing: Ladier, 2016). E) Lafaye Inc. 01, Lafaye (Ladier, 2016). F) MAN 48186, Lortet (Chollot, 1964). G) MAN 48618, Lortet (Chollot, 1964). H) MP 1086, Mas d’Azil (Photo: RMN-Grand Palais / Gérard Blot). I) MAN 47183, Mas d’Azil (Chollot, 1964). J) MP 712, Mas d’Azil (Chollot, 1964). K) MAN 47346, Mas d’Azil (Chollot, 1964). L) MAN 47770, Mas d’Azil (Chollot, 1964). M) MAN 47341, Mas d’Azil (Photo: RMN-Grand Palais / Thierry Le Mage) N) MAN 47551, Mas d’Azil (Chollot, 1964). O) MAN 47177, Mas d’Azil (Piette, 1907). P) MP 775, Mas d’Azil (RMN-Grand Palais / Gérard Blot). Various scales.

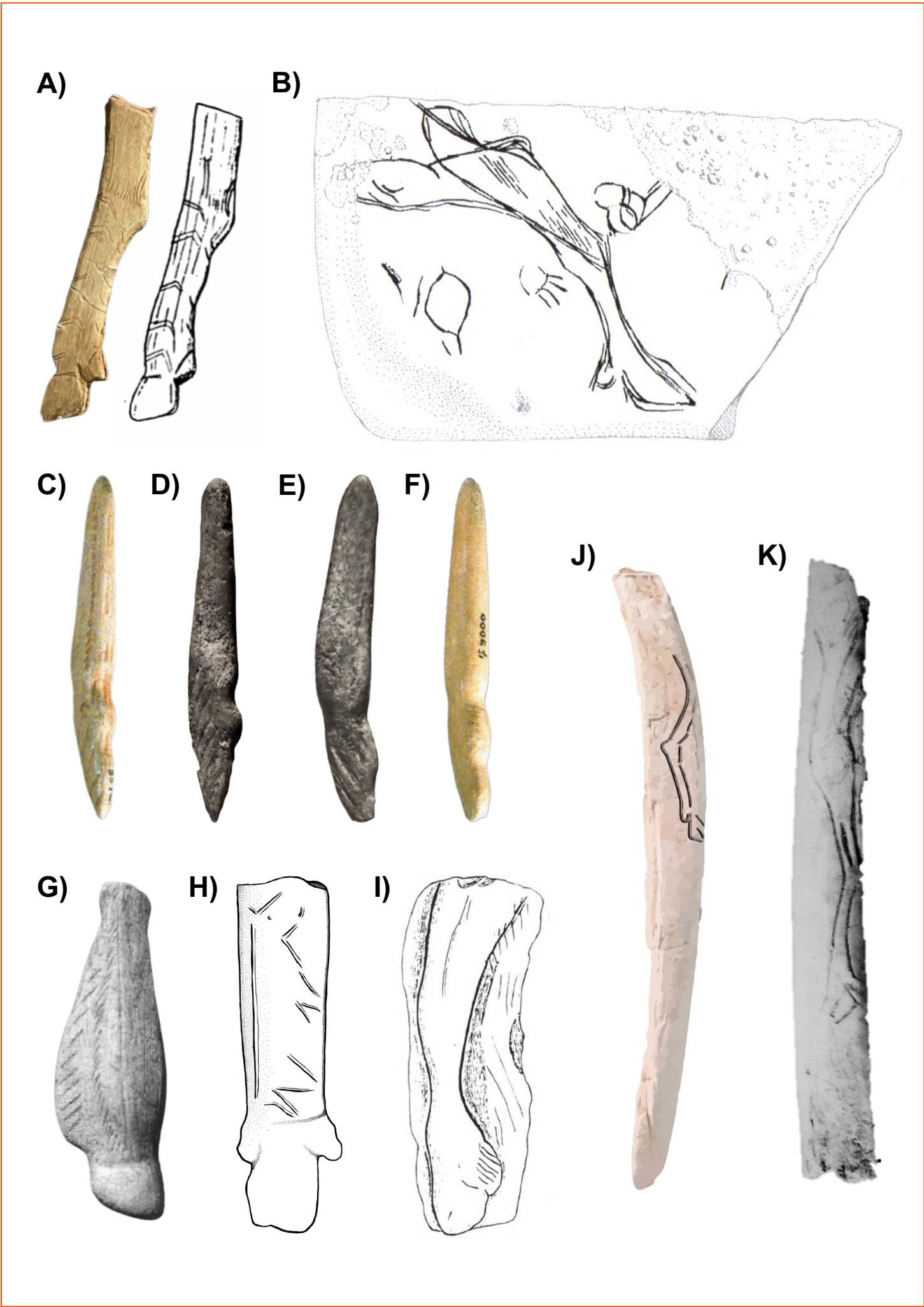


Figure 4. Corpus of legs La Madeleine, Tuc d'Audoubert, Kesslerloch, Rosenhalde im Freudenthal, Enlène, Laugerie-Basse, Bédeilhac, Taillis des Coteaux and Massat. A) Madeleine Inc. 01, La Madeleine (Photo: M. García-Bustos; Tracing: Thiault y Roy, 1996). B) MB 1157, Tuc d'Audoubert (Photo: G. Tosello). C) MA 8516, Kesslerloch (Arias and Ontañón, 2005). D) MA U8, Kesslerloch (Merk, 1875). E) MA 15348, Kesslerloch (Nüesch, 1904). F) MA 39000, Rosenhalde im Freudenthal (Arias and Ontañón, 2004). G) MB 2233, Enlène (Thiault and Roy, 1996). H) MAN 53869, Laugerie-Basse (Tracing of M. García-Bustos from a photograph of C. Lucas). I) MPRM G.3, Bédeilhac (Jauze and Sauvet, 1991). J) Taillis Inc. 01, Taillis des Coteaux (tracing of M. García-Bustos from a photograph in Primault *et al.*, 2020). K) Massat Inc. 01, Massat (Barrière, 1990). Various scales.

2.3. Dispersion and formal analysis of isolated legs

The database created consists of a total of 42 specimens, presented in Fig. 2-4. Geographically, the isolated legs are distributed between the Cantabrian region ($n = 5$), Quercy ($n = 3$), Aquitaine ($n = 3$), Central Europe ($n = 4$) and, especially, the Pyrenees ($n = 27$), where most of the recovered specimens are concentrated (Fig. 5A, Table 1). As shown in the heat map in Fig. 5B, the accumulation of isolated legs in the Pyrenean region may indicate the origin of this artistic motif, consistent with the idea that such sites functioned as aggregation points (Bahn, 1984; Conkey, 1980; 1992; Moure Romanillo, 1994; Sieveking, 1979; Utrilla and Bea, 2008) or centres of artistic production (Rivero, 2014). Leg representations are particularly prominent at Isturitz, Mas d’Azil and Espalungue, and less frequent at Lortet, Bédeilhac, Enlène, Massat and Tuc d’Audoubert (Fig. 6A). Isolated legs in peripheral regions are rare, and their presence can be attributed to the

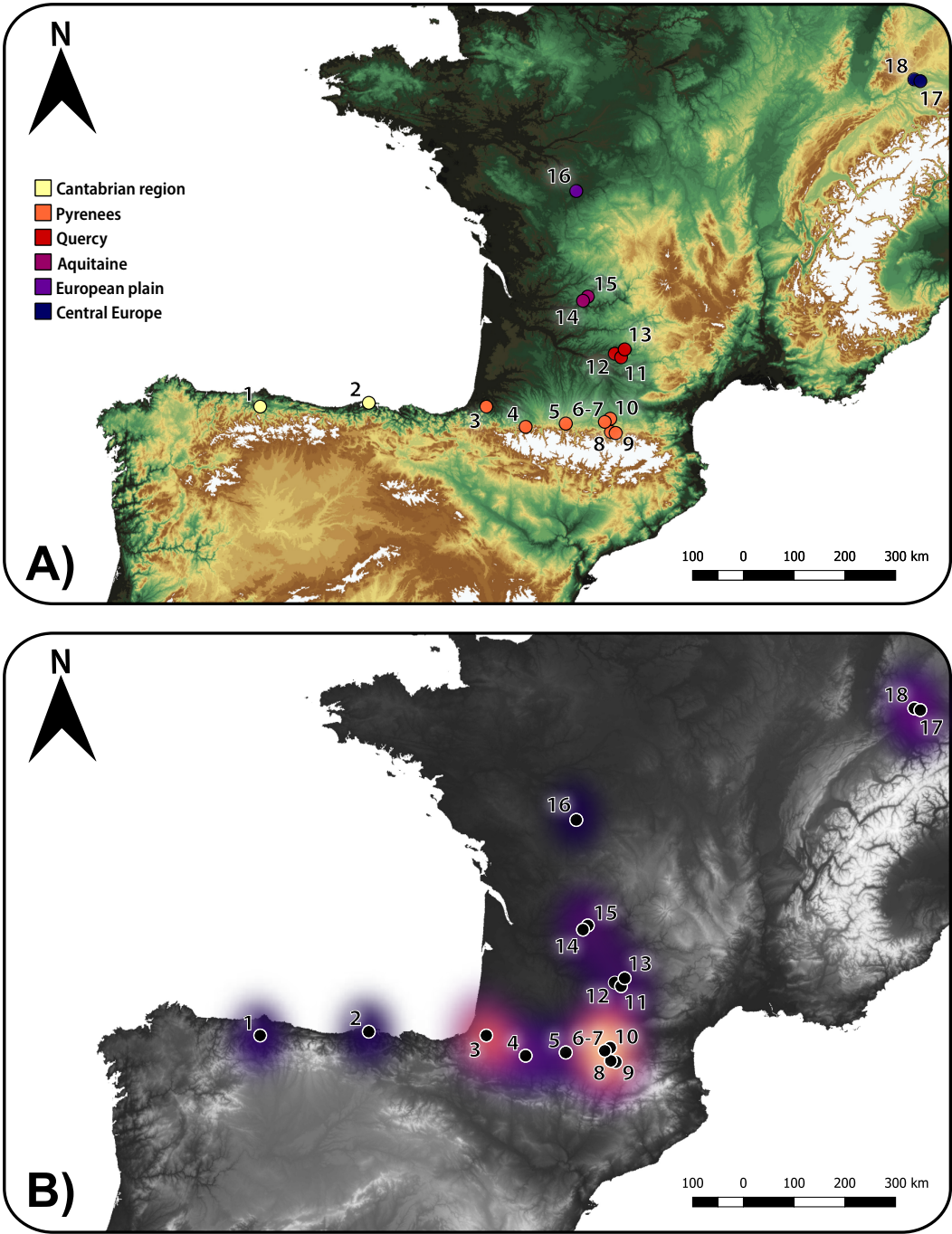


Figure 5. A) Map showing the sites from which representations of herbivore isolated legs have been recovered. 1) Las Caldas. 2) La Garma Galería Inferior. 3) Isturitz. 4) Espalungue. 5) Lortet. 6) Enlène. 7) Tuc d’Audoubert. 8) Massat. 9) Bédeilhac. 10) Mas d’Azil 11) Plantade. 12) Lafaye 13) Courbet. 14) Laugerie-Basse. 15) La Madeleine. 16) Taillis des Couteaux. 17) Rosenhalde im Freudenthal. 18) Kesslerloch. B) Heat map that shows the accumulation of samples included in the corpus.

mobility of groups or long-distance contacts. However, this interpretation should be approached with caution, as the apparent concentration may be due to more intensive discoveries, excavations, or publications in this region, compared with a relative lack of activity elsewhere.

Regarding the species depicted, the attribution to a specific animal is based on certain anatomical characteristics. However, as this anatomical segment is so indistinct, it has often not been possible to propose a taxonomic classification, especially if the leg has few details or the piece is poorly preserved. Consequently, the number of undetermined species in the corpus is high ($n = 15$).

In general, the Palaeolithic artist's preference for depicting the two main species represented in the Middle Magdalenian (García-Bustos and Rivero, 2023; Sauvet, 2024) is also reflected in this type of iconography. Indeed, the predominant themes are horses and bison (Fig. 6B). The leg of the horse (possibly *Equus ferus przewalskii* and/or *Equus ferus ferus* in this chronology) and the bison (*Bison bonasus* and/or *Bison priscus*) have certain anatomical and morphological differences. The horse has long, slender limbs with a single functional digit composed of three phalanges (Barone, 1999). Of these, the third phalanx is of particular interest, as it constitutes the internal structure of the convex hoof. In contrast, bison have thicker limbs with relatively shorter and wider metapods (Balkwill and Cumbaa, 1992). Unlike the horse, the bison is an artiodactyl with cloven hooves composed of two functional toes consisting of three phalanges (cf. Fig. 7). Among some pieces with an undetermined species, such as the specimens from Massat and Les Taillis des Couteaux (cf. Fig. 4J-K), it is suspected that they could be caprid or cervid limb, as they have a cloven hoof and thinner proportions than horses and bison apparently have.

Concerning the material used (Fig. 6C), free-standing legs are most frequently observed in antlers ($n = 25$). However, two other raw materials predominant in portable art were also employed: bone ($n = 13$) and mineral media ($n = 4$). In certain instances, the nature of the material dictates the form of the object produced (Fig. 6D). This is particularly evident in the predominance of carved legs ($n = 18$), for which antler provides the structural support required for carving. A comparable pattern can be observed in cut-out contours ($n = 6$), which are mainly produced on bone. In contrast, engraved ($n = 11$) and bas-relief legs ($n = 7$) show no clear relationship between the support and the final representation, as both techniques occur on organic and inorganic media.

The degree of detail varies considerably, from highly detailed legs to simple outlines of the limb, regardless of medium or technique. As expected, the principal details relate to the depiction of fur, which is rendered to varying extents across the leg. Indications of fur occur on the inner surface of the leg; however, only the Isturitz specimen displays such detailing along the entire length of the limb (Fig. 2E). This detail is more commonly observed in a specific part of the representation, either in the form of longitudinal lines or as a small portion of the decorated surface (see Fig. 3L, 3I, 3P, 4G). It is also notable that this characteristic is frequently depicted in the area opposite the hoof (see Fig. 2B, 2F, 3G, 3H, 4G), a feature that can be seen on long-haired herbivores such as bison and horses. In certain instances, this type of decoration is also intended to represent the atrophic toe; however, this is not a very common feature among the recovered specimens (see Fig. 2M, 4I).

In a minimal number of cases, we find zebra stripes (see Fig. 3J, 4A), like the ones seen on the parietal horses of Ekain or Tito Bustillo equids. Symbolic elements have also been identified within the outline of the leg, including a series of vertically aligned angles (Fig. 2J), a motif so far unique to Isturitz and without known parallels in parietal art.

In some cases, these legs are associated not only with signs, but also with other animals such as the piece by Courbet (Fig. 2D), Mas d’Azil (Fig. 3H), Tuc d’Audoubert (Fig. 4B) or Laugerie-Basse (Fig. 4H).

Finally, some pieces are perforated or multi-perforated, suggesting that they may have functioned as suspensory objects (see Fig. 2D, 3A, 3E, 3H-J). Most of the perforations are located at the distal or proximal ends of the piece, and never in intermediate areas. Among all the examples, it is worth mentioning the two cut outlines of a bison leg in frontal view from Isturitz (Fig. 2G) and Mas d’Azil (Fig. 3N), where the perforation is, uniquely, in the bifurcation of the hoof. Apart from one piece from Courbet and one from Lafaye, all other examples of this type of leg interpreted as possible pendants are confined to Pyrenean sites such as Isturitz, Mas d’Azil and Espalungue.

In terms of style, there is no general and constant similarity between the pieces beyond the theme represented. Unlike other examples of portable art, such as the *contour découpé* (on hyoid bone and decorated by engraving), the dissemination of isolated legs does not seem to be necessarily associated with a particular technique or media. Therefore, it can be concluded that what is truly significant is not the technique, the manufacturing process, or the final object, but rather the thematic concept itself: the representation of an isolated leg of a herbivore, depicted without any anatomical connection to the rest of the body. The Pyrenean region provides a clear example of this pattern, as it concentrates the largest number of occurrences and includes specimens with diverse characteristics, ranging from sculptures in the round to pieces made on bone and antler, executed using both engraving and cut-out techniques.

However, a more standardised type of production is observed in the database. These are the more schematic legs, with minimal detailing apart from traces of fur. They are elongated and bear a protuberance at one end that may represent an atrophic toe (Fig. 4C-F). This corpus is primarily attributed to the Middle Magdalenian at the sites of Kesslerloch and Rosenhalde im Freudenthal in Central Europe. Some authors have interpreted these pieces as pisciform

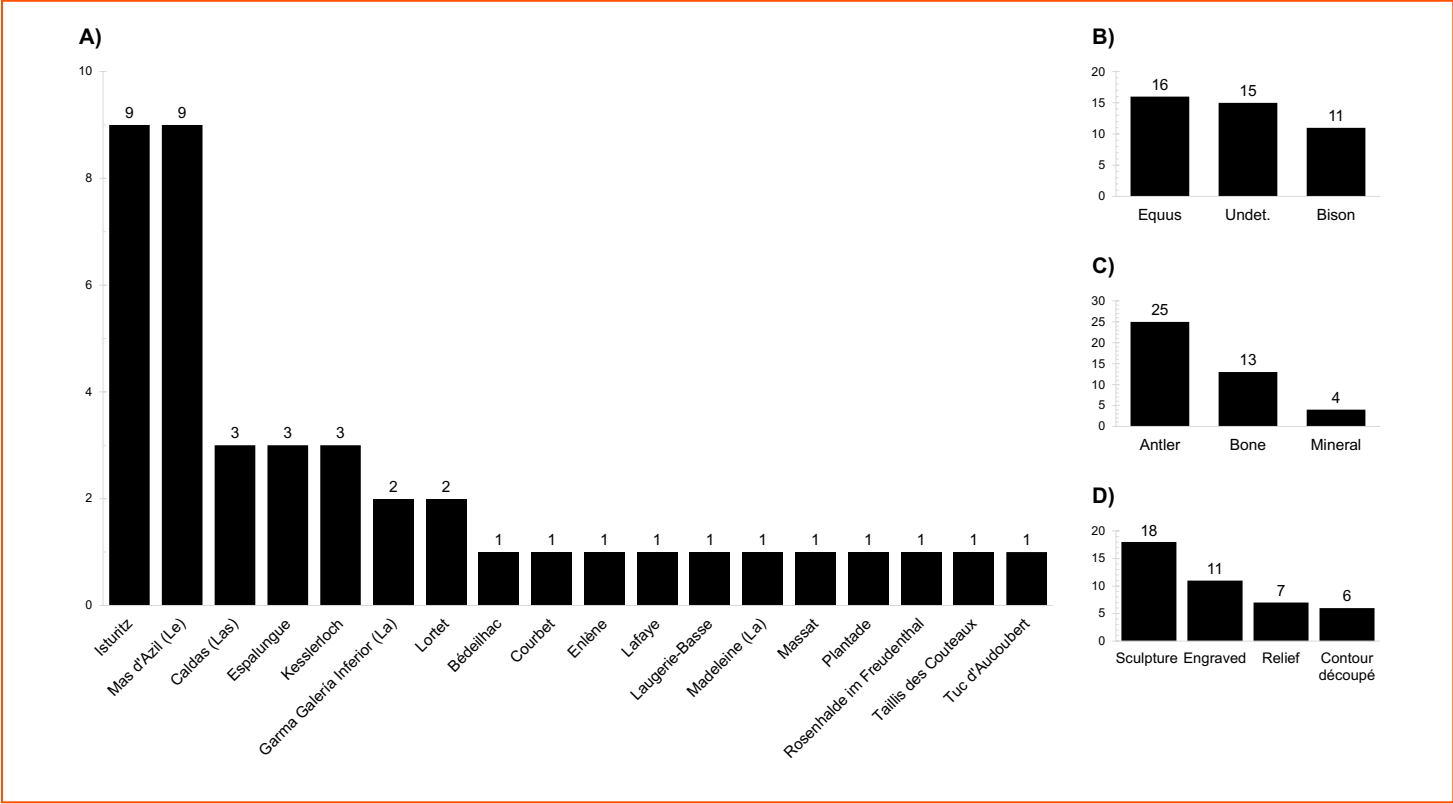


Figure 6. Bar chart of the number of isolated legs recovered. A) No. of specimens per site. B) No. of specimens per species. C) No. of specimens per medium. D) No. of samples per technique.

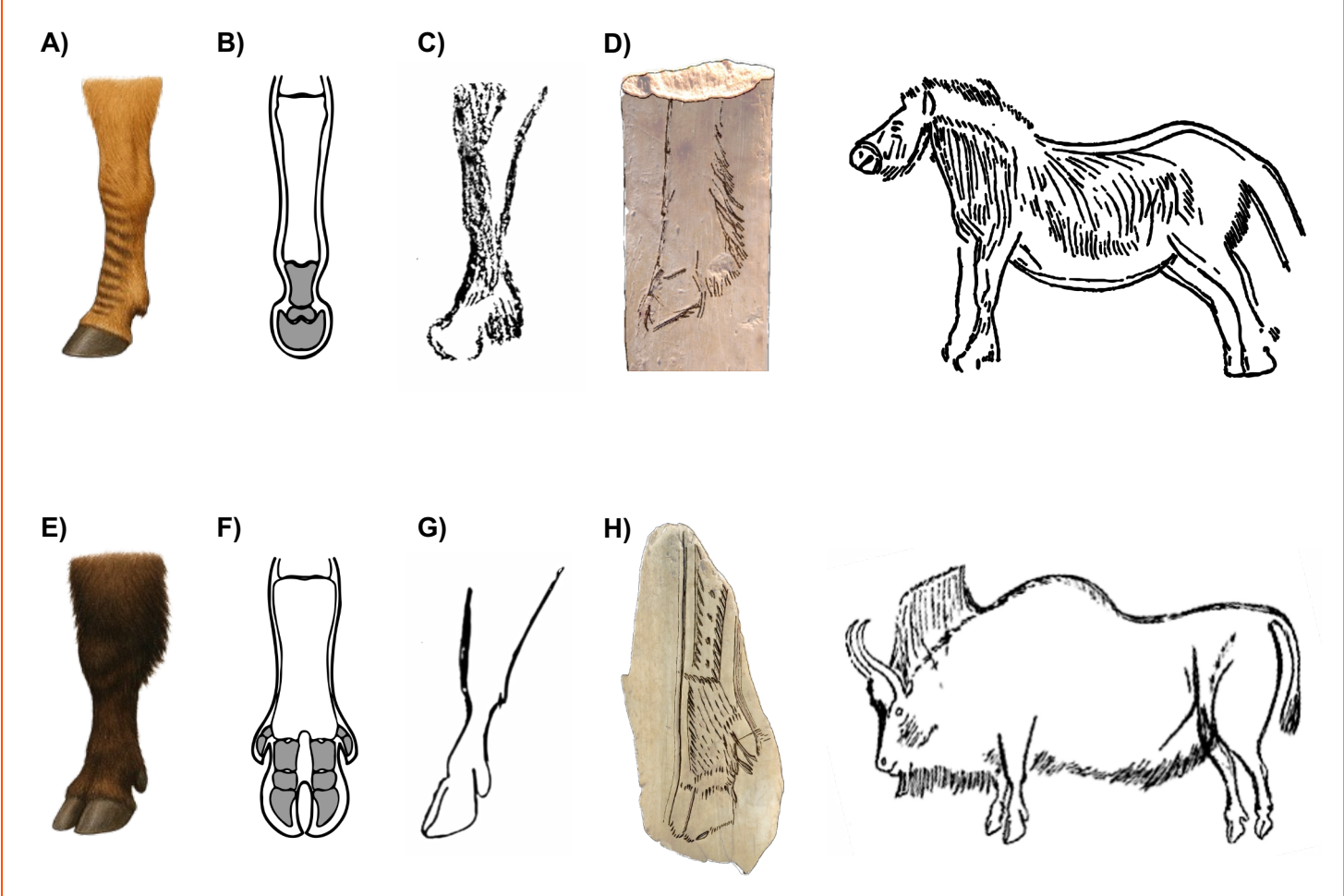


Figure 7. Examples of legs classified as horses (A-D) and bison (E-H). On the right side of the figure, complete horse from Niaux (Clottes, 1995) and complete bison from Les Trois Frères (Vialou, 1986). A) Model of a horse's leg (M. García-Bustos). B) Bone structure of a horse's leg (tracing of M. García-Bustos from Guthrie, 2005). C) Parietal leg of a horse from Niaux (from Clottes, 1995). D) Portable leg from Las Caldas (O. Rivero). E) Model of a bison's leg (M. García-Bustos). F) Bone structure of the bison leg (tracing of M. García-Bustos from Guthrie, 2005). G) Parietal leg of a bison from Les Trois-Frères (from Vialou, 1986). H) Portable leg from Isturitz (O. Rivero). Various scales.

representations, in which the head, fins, and even gills are indicated (Nûesch, 1904). Beyond this region, the most comparable piece is found at La Garma (Arias and Ontañón, 2005), with notable differences, including a more pronounced, globular atrophic toe and a possible attempt to distinguish the distal end of the leg from the beginning of the hoof (Fig. 20).

3. MAMMALIAN LIMBS IN OTHER SYMBOLIC ACTIVITIES OF PALAEOLITHIC TIMES

During the Upper Palaeolithic, the use of exempt animal parts sometimes transcended the merely utilitarian to acquire symbolic connotations. Animal limbs appear in contexts that suggest meaningful practices, perhaps linked to religious or spiritual beliefs. These findings provide valuable clues to the symbolic thinking of prehistoric societies and show how certain anatomical parts were carefully selected and arranged in various contexts (Arias, 2009). Although examples are scarce, some finds demonstrate that these limbs were intentionally used as graphic or symbolic supports. In particular, certain bones forming the animal's limb appear to have been manipulated in ways that suggest a deliberate association with specific symbolic practices. This indicates that the choice of these anatomical elements was not accidental but reflected a purposeful engagement with the material, linking the representation of the limb to broader cultural or ritual activities.

The first example is found in level 4 at El Juyo, dated to an earlier stage in the Lower Cantabrian Magdalenian (13 920 ± 240 BP; I-10 736) (González Echegaray and Freeman,

2015). Beneath what has been described as a large slab, up to three burial mounds of earth, deposited by one or more individuals, were identified, containing phalanges, flint fragments, pieces of ochre, and deer feet. These limbs were thrown in anatomical connection, without dismemberment, as a possible offering. In the later stages, during the Middle Magdalenian, another example is documented at La Garma. The front limbs of the animal found in Zone VI of the Lower Gallery form a notable assemblage, remarkable for its anatomical integrity. Comprising several carpal bones and phalanges, grouped into two deposits separated by just two metres, this assemblage exhibits morphological characteristics that allow a reasonably confident attribution to *Bison priscus* (Arias *et al.*, 2008).

The final example, perhaps the most symbolic, comes from two closely situated Pyrenean sites: Niaux and Bédeilhac. Le Guillou and Arceredillo (2022) examine Magdalenian deposits of goat limbs recovered from hard-to-access areas within both caves. In Niaux, two deposits were found, the most complete of which contains different bones compatible with a hind leg of a caprid. Notably, ochre was present around this deposit. Regarding the Bédeilhac deposit, less information is available due to efforts to preserve the area. The deposit comprises a right front leg of the same type of animal, with no apparent anatomical connection, although it may have been displaced in recent times. In both caves the deposits are considered of Magdalenian chronology, with more scientific evidence in the case of Niaux as C^{14} dating has returned dates consistent with the cave's parietal art. No traces of animal activity are observed on these legs, although this cannot be confirmed for the Bédeilhac specimen, and the few butchery marks present are attributable to the disarticulation of the limb.

On the other hand, additional examples exist in which certain mammal limb bones were used as supports for symbolic or graphic activity (Fig. 8), although these are considerably less frequent than other animal-derived materials such as scapulae, ribs, or cervid antlers. Examples include metapodials perforated at one end, such as a goat specimen from La Garma (Fig. 8C) and a horse metatarsal from the Romanian site of Crasnaleuca (Fig. 8A) (Pfeifer, 2024), both of Gravettian chronology (Arias and Ontañón, 2005). This is somewhat similar to the perforated spatulas on Magdalenian metatarsals found at Abauntz and Cova Rosa (Utrilla and Bea, 2008). In a more recent chronology, the paradigmatic example is a phalanx from a possible auroch (Fig. 8H), decorated with the same theme and a phantom figure (Arias *et al.*, 2008). Other examples include a horse phalanx from Las Caldas (Fig. 8B) (Rivero, 2011) and a reindeer metatarsal from Isturitz (Fig. 8D) (Rivero, 2011), which bears a depiction of a cervid. Furthermore, phalanges of herbivorous species may also have been used for another form of cultural activity: music. Evidence, some of which dates to earlier periods, indicates possible whistles made by perforating these bones, generally from reindeer (Fig. 8E–G). Although a possible whistle from Mousterian layers at La Quina is often cited (Dauvois, 1983), most of these artefacts are dated to the Magdalenian, from sites such as Mas d'Azil, Gourdan, Isturitz, and Laugerie-Basse.

Taken together, these examples underline that mammal limb bones, despite not being the most common raw material, were recurrently chosen to support symbolic or expressive activities that transcended their utilitarian value. Whether employed as decorated objects or sound instruments, their use reveals a cultural perception of these anatomical parts as meaningful entities in their own right. This observation reinforces the idea that the isolated representation of legs in Magdalenian portable art was not an

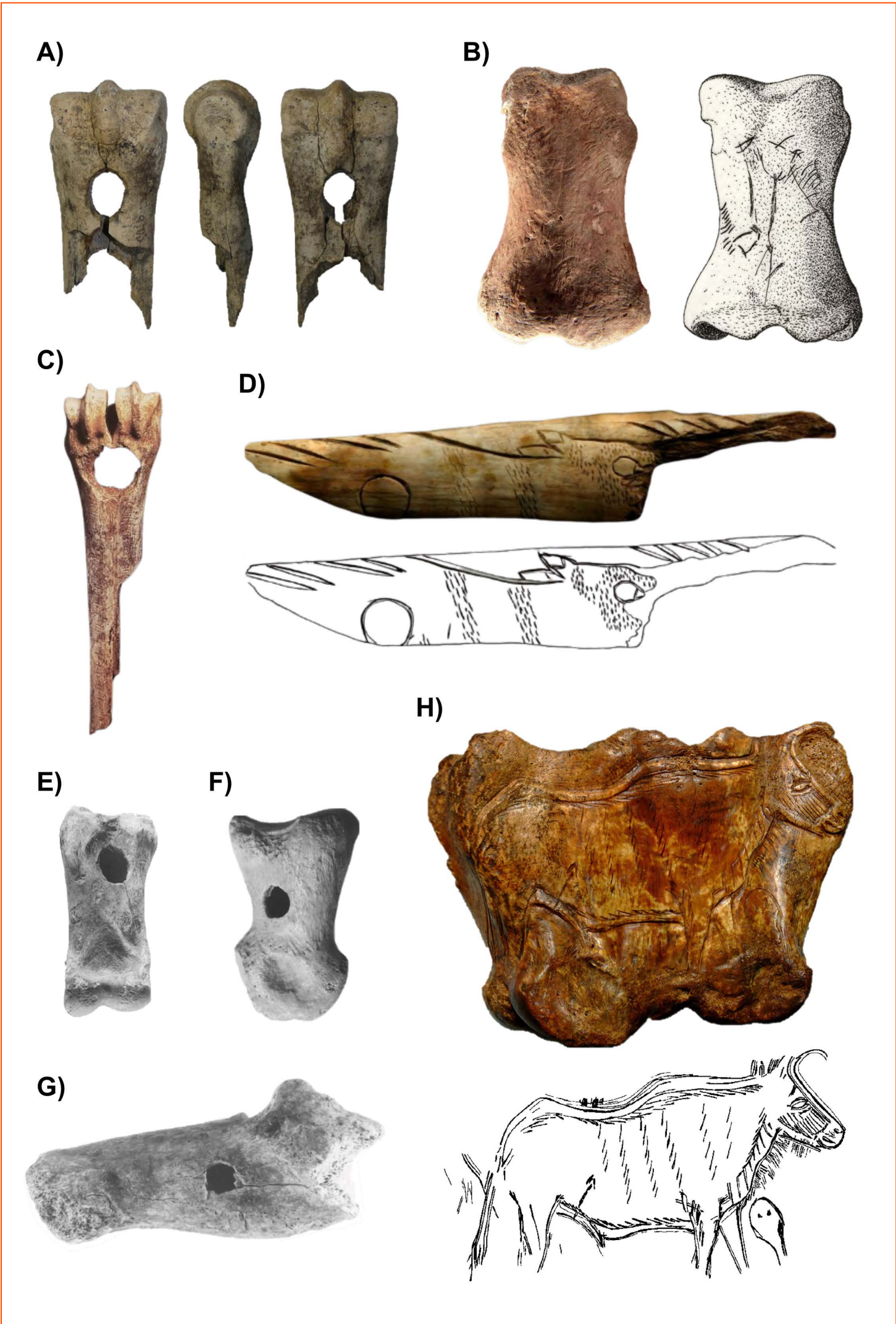


Figure 8. Graphic and symbolic activity on herbivore limb bones. A) Perforated horse metatarsus from Crasnaleuca (Pfeifer, 2024). B) Decorated horse phalanx from Las Caldas (Rivero, 2011). C) Perforated goat metacarpus from La Garma (Arias and Ontañón, 2005). D) Decorated reindeer metacarpus from Isturitz (Rivero, 2011). E) Perforated reindeer first phalanx from Mas d’Azil (Dauvois, 2018). F) Perforated reindeer phalanx from Saint-Jean-de-Verges (Dauvois, 2018). G) Perforated reindeer calcaneus from Isturitz (Dauvois, 2018). H) Decorated auroch phalanx from La Garma (Rivero, 2011). Various scales.

arbitrary motif, but part of a broader spectrum of practices in which limbs were singled out, transformed, and invested with symbolic roles.

4. CONCLUSION

The Middle Magdalenian (14 500-13 000 BP) represents a key period in European Prehistory due to the consolidation of an interconnected cultural network, evidenced by the portable art, parietal art and other symbolic elements. This period is characterised by a remarkable stylistic homogeneity and the wide diffusion of certain graphic innovations, such as perforated *rondelles* or *contours découpés*. In this context of characteristic morphotypes, an under-studied iconographic motif has been identified: the depiction of isolated herbivore legs in portable art.

This study presents a corpus of 42 examples of these representations, mostly distributed in the Pyrenees, suggesting a possible focus of origin and production. The pieces, executed on the main media of portable art (antler, bone or mineral), show both technical (sculpture, engraving, relief, cut-out) and stylistic diversity, although with a strong common thematic component. The most frequently represented species seem to be horse and bison. However, many examples are difficult to assign taxonomically due to their schematic nature, absence of diagnostic anatomical features, or poor state of preservation.

The dataset under consideration demonstrates a robust and consistent correlation between the presence of isolated herbivore leg representations and the Middle Magdalenian period. Most well-contextualised specimens, particularly those supported by stratigraphic evidence and radiocarbon dating, fall within the range of approximately 15 900 to 12 200 BP (uncalibrated), as evidenced at key sites including Las Caldas, Enlène, Isturitz, Tuc d'Audoubert, and La Garma. Occurrences that fall outside this timeframe are considered exceptional and, in some cases, are largely confined to contexts with limited stratigraphic reliability. These include a single Lower Magdalenian specimen from Les Taillis des Couteaux and a few assemblages that are broadly attributed to the Middle/Upper Magdalenian. Although these outliers may suggest an early origin and a brief persistence of the motif, they do not undermine the overall pattern, which firmly situates its primary development and widespread adoption within the Middle Magdalenian.

From a decorative point of view, there is no standardisation either. The depiction of fur and, to a lesser extent, geometric decoration is particularly noteworthy. Likewise, some of the legs show perforations that suggest their use as hanging ornaments, although it is surprising that most of the pieces have no identifiable function. This fact reinforces the symbolic value of this motif, which does not seem to be associated with any type of tool. On the other hand, although no uniform formal pattern can be recognised, the recurrence of the motif in different regions and its appearance on pieces of a portable nature reinforce the hypothesis of cultural exchanges between Magdalenian groups.

Overall, the evidence indicates that during the Upper Palaeolithic, mammal limbs and their anatomical components were at times invested with meanings that clearly exceeded their purely utilitarian role. Although these practices are not frequent, they encompass deliberate deposits of complete or articulated limbs, the selection of limb bones as supports for graphic expression, and their modification for sound production. These behaviours are indicative of a deliberate selection and conceptualisation of animal limbs as meaningful elements within broader symbolic systems. In this context, the

depiction of legs in Magdalenian portable art should not be regarded as an isolated or arbitrary motif, but rather as part of a broader set of cultural practices where specific anatomical parts were selected, modified and imbued with symbolic significance.

Funding

This work was supported by the Consejería de Educación de la Junta de Castilla y León and the European Social Fund through a pre-doctoral researcher contract [ORDEN EDU/875/2021] and PID2021-125166OB-I00 project, funded by MCIN/ AEI/10.13039/501100011033/ and FEDER *Una manera de hacer Europa* (PI: Olivia Rivero).

Contribution to authorship

- Conception and design: MG-B, OR
- Data analysis and interpretation: MG-B, OR
- Composition of figures: MG-B
- Statistical analysis: MG-B
- Critical review of the article: MG-B, OR
- Data collection: MG-B, OR

REFERENCES

- Alteirac, A. and Bahn, P. (1982) “Premières datations radiocarbone du Magdalénien moyen de la grotte du Mas d’Azil (Ariège)”, *Bulletin de la Société préhistorique ariégeoise*, 37, pp. 107–10.
- Álvarez-Fernández, E. (2002) “Perforated *Homalopoma sanguineum* from Tito Bustillo (Asturias): Mobility of Magdalenian Groups in Northern Spain”, *Antiquity*, 76 (293), pp. 641–646. <https://doi.org/10.1017/S0003598X00091043>
- Álvarez-Fernández, E. (2003) “Ejemplares perforados del gasterópodo *Homalopoma sanguineum* durante el Paleolítico Superior en Europa Occidental”, *Cypsela: Revista de Prehistòria i Protohistòria*, 14, pp. 43–54.
- Álvarez-Fernández, E. (2006) *Los objetos de adorno-colgantes del Paleolítico Superior y del Mesolítico en la cornisa cantábrica y en el valle del Ebro: una visión europea*. PhD Dissertation. Salamanca: Universidad de Salamanca (Available at https://www.academia.edu/935205/Los_objetos_de_adorno_colgantes_del_Paleol%C3%ADtico_superior_y_del_Mesol%C3%ADtico_en_la_Cornisa_Cant%C3%A1brica_y_en_el_Valle_del_Ebro_una_visi%C3%B3n_europea, accessed on July 2025).
- Álvarez-Fernández, E., Martín-Jarque, S. and Tarriño, A. (2021) “Flint & Shell: Raw Materials as Evidence of Long-Distance Contacts in Cantabrian Spain During the Magdalenian”, in Gauzinski-Windheuser, S. and Jöris, O. (eds.) *The Beef Behind All Possible Pasts – The Tandem Festschrift in Honour of Elaine Turner and Martin Street*. Monographien des RGZM. Mainz: Römisch-Germanisches Zentralmuseum, pp. 215–235. <https://doi.org/10.11588/propylaeum.868.c11322>
- Arias, P. (2009) “Rites in the dark? An evaluation of the current evidence for ritual areas at Magdalenian cave sites”, *World Archaeology*, 41 (2), pp. 262–294. <https://doi.org/10.1080/00438240902843964>

- Arias, P. and Ontañón, R. (eds.) (2005) *La materia del lenguaje prehistórico. El arte mueble paleolítico de Cantabria en su contexto*. Santander: Consejería de Cultura, Turismo y Deporte del Gobierno de Cantabria.
- Arias, P. and Ontañón, R. (2012) “La Garma (Spain): Long-term human activity in a karstic system”, in Bergsvik, K.A. and Skeates, R. (eds.) *Caves in context: the cultural significance of caves and rockshelters in Europe*. Oxford: Oxbow, pp. 191–117
- Arias, P., González Sáinz, C., Moure, A. and Ontañón, R. (2000) “Estudio integral de Complejo Arqueológico de La Garma (Omoño, Ribamontán al Monte)”, in Ontañón, R. (ed.) *Actuaciones arqueológicas en Cantabria 1984-1999*. Santander: Consejería de Cultura y Deporte de Cantabria, pp. 271-277.
- Arias, P., Ontañón, R., Álvarez-Fernández, E., Cueto, M., García, C. and Teira, L.C. (2008) “Falange grabada de la Galería Inferior de La Garma: aportación al estudio del arte mobiliario del Magdaleniense Medio”, *Veleia*, 24–25, pp. 97–129. <http://hdl.handle.net/10810/37025>
- Arias, P., Ontañón, R., Álvarez Fernández, E., Cueto, M., Elorza, M., García-Moncó, C., Güth, A., Iriarte, M.J., Teira, L.C. and Zurro, D. (2011) “Magdalenian floors in the Lower Gallery of La Garma: a preliminary report”, in Gaudzinski, S., Jöris, O., Sensburg, M., Street, M. and Turner, E. (eds.) *Come In ... and find out: opening a new door into the analysis of hunter-gatherer social organisation and behaviour. Proceedings of Colloquium 58. 15th UISPP*. Mainz: Römisch-Germanischen Zentralmuseums, pp. 31-51.
- Bahn, P.G. (1982) “Inter-Site and Inter-Regional Links During the Upper Palaeolithic: The Pyrenean Evidence”, *Oxford Journal of Archaeology*, 1 (3), pp. 247–268. <https://doi.org/10.1111/j.1468-0092.1982.tb00313.x>
- Bahn, P.G. (1984) *Pyrenean Prehistory: A Palaeoeconomic Survey of the French Sites*. Warminster: Aris & Phillips.
- Balkwill, D.M. and Cumbaa, S.L. (1992) *A Guide to the Identification of Postcranial Bones of Bos taurus and Bison bison*. Ottawa: Canadian Museum of Nature.
- Barandiarán, I. (2015) “La bramadera de Bone: análisis y discusión cronocultural”, *Kobie. Excavaciones Arqueológicas en Bizkaia*, 6, pp. 149–158.
- Barandiarán, I., Cava, A., Arrizabalaga, A. and Iriarte-Chiapusso, M.J. (2019) “Las varillas decoradas magdalenienses de Ezkuzta (País Vasco)”, *Munibe Antropologia-Arkeologia*, 70, pp. 35–63.
- Barge-Mahieu, H., Bellier, C., Camps-Fabrer, H., Cattelain, P., Mons, L., Provenzano, N., Taborin, Y., Didart, P., Bott, S. and Choi, S.-Y. (1991) *Objets de parure. Fiches typologiques de l'industrie osseuse préhistorique. Cahier IV*. Aix-en-Provence: Université de Provence.
- Barone, R. (1999) *Anatomie comparée des mammifères domestiques. Tome 1: ostéologie*. Paris: Vigot Frères.
- Barrière, C. (1990) *L'art pariétal du Ker de Massat*. Toulouse: Presses Universitaires du Mirail.
- Bégouën, R., Fritz, C., Tosello, G., Clottes, J., Pastoors, A. and Faist, F. (eds.) (2009) *Le sanctuaire secret des bisons. Il y a 14 000 ans dans la caverne du Tuc d'Audoubert*. Paris: Somogy.
- Bégouën, R., Pastoors, A. and Clottes, J. (2019) *La Grotte d'Enlène: immersion dans un habitat magdalénien*. Paris: Association Louis Bégouën/In Fine éditions d'art.
- Bellier, C. (1984) “Contribution à l'étude de l'industrie osseuse préhistorique: les contours découpés du type ‘têtes d'herbivores’”, *Bulletin de la Société Royale Belge d'Anthropologie et de Préhistoire*, 95, pp. 21–34.
- Boivin, L., Clot, A. and Heim, J.L. (1986) “Vestiges magdaléniens des déblais de la grotte de Lortet (Hautes-Pyrénées)”, *Préhistoire Ariégeoise*, 41, pp. 171-198.
- Bosinski, G. (1982) *Die Kunst der Eiszeit in Deutschland und in der Schweiz*. Bonn: R. Habelt.
- Boureux, C.J. (2004) “L'homme et l'argile au Paléolithique supérieur dans l'espace franco-cantabrique”, *Préhistoire, art et sociétés*, 59, pp. 93–108.
- Braun, I.M. (2018) “Upper Palaeolithic portable art objects in Central Germany and supra-regional parallels”, *PALEO. Revue d'archéologie préhistorique*, 29, pp. 55-74. <https://doi.org/10.4000/paleo.3756>
- Breuil, H. (1902) “Rapport sur les fouilles dans la grotte du Mas d'Azil”, *Bulletin archéologique du Comité des travaux historiques et scientifiques*, 1902, pp. 3-23.

- Breuil, H. (1903) "Rapport sur les fouilles dans la grotte du Mas d'Azil", *Bulletin archéologique du Comité des travaux historiques et scientifiques*, 1903, pp. 421-436.
- Breuil, H. and Saint Périer, R. (1927) *Les poissons, les batraciens et les reptiles dans l'art quaternaire*. Paris: Archives de l'Institut de Paléontologie Humaine.
- Brun, V. (1867) "Notice sur les fouilles paléontologiques de l'Age de Pierre exécutées à Bruniquel et Saint-Antonin", *Montauban*, 46, p. 7.
- Buisson, D., Fritz, C., Kandel, D., Pinçon, G., Sauvet, G. and Tosello, G. (1996) "Les contours découpés de têtes de chevaux", in Thiault, M.H. and Roy, J.B. (comis.) *L'art préhistorique des Pyrénées. Catalogue d'exposition*. Paris: Réunion des Musées Nationaux, pp. 225-227.
- Capitan, L. and Peyrony, D. (1928) "La Madeleine: son gisement, ses industries et ses œuvres d'art". Paris: Publications de l'Institut International d'Anthropologie.
- Cattelain, P. (2020) "Les propulseurs magdaléniens de type 3: un exemple d'association d'un même type de décor à un même type de support fonctionnel, du Magdalénien moyen au Magdalénien supérieur. Continuité et variations", in Paillet, E., Sepúlveda, M., Robert, É, Paillet, P. and Mélard, N. (eds.) *Caractérisation, continuités et discontinuités des manifestations graphiques des sociétés préhistoriques*. Oxford: Archaeopress, pp. 3-30.
- Cazals, N., Baena, J., Bartoli, R., Bon, F., Bracco, J.-P., Clemente, I., Fuertes Prieto, N., González Urquijo, J.E., Ibañez, J.J., Maillo Fernández, J., Mangado Llach, X., Ortega i Cobos, D., Ortega, I. and Terradas, X. (2005) "Des faciès et des hommes: réflexions sur les productions d'éclats au Paléolithique supérieur dans les Pyrénées françaises et espagnoles", in Jaubert, J. and Barbaza, M. (eds.) *Territoires, déplacements, mobilité, échanges*. Paris: CTHS, pp. 161-172.
- Chollot, M. (1964) *Musée des Antiquités Nationales. Collection Piette: art mobilier préhistorique*. Paris: Éditions des Musées Nationaux.
- Clottes, J. (1995) *Les cavernes de Niaux: art préhistorique en Ariège*. Paris: Seuil.
- Conkey, M. (1980) "The identification of prehistoric hunter-gatherer aggregation sites: the case of Altamira", *Current Anthropology*, 21, pp. 609-630. <https://doi.org/10.1086/202540>
- Conkey, M. (1992) "Les sites d'agrégation et la répartition de l'art mobilier, ou: y a-t-il des sites d'agrégation magdaléniens?", in Rigaud, J.-Ph., Laville, H. and Vandermeersch, B. (Dirs.) *Le peuplement magdalénien: paléogéographie physique et humaine*. Paris: Comité des Travaux Historiques et Scientifiques, pp. 19-25.
- Corchón, M. (2005) "Los contornos recortados de la cueva de Las Caldas (Asturias, España), en el contexto del Magdaleniense medio cántabro-pirenaico", *Munibe. Antropología-Arkeologia*, 57, pp. 113-134.
- Corchón, M.S. and Rivero, O. (2008) "Los rodets del Magdaleniense medio cantábrico", *Zephyrus*, 61, pp. 61-84.
- Corchón, M.S., Álvarez-Fernández, E. and Rivero, O. (2012) "Contactos extra-cantábricos en el Magdaleniense medio. Nuevos datos de la Cueva de Las Caldas (Oviedo, Asturias)", in Arias Cabal, P., Corchón, M.S., Menéndez Fernández, M. and Rodríguez Asensio, J.A. (Coords.) *El Paleolítico Superior Cantábrico: actas de la Primera Mesa Redonda, San Román de Candamo (Asturias)*. Santander: PubliCan, Ediciones de la Universidad de Cantabria, pp. 113-128.
- Corchón, M.S., Ortega, P. and Rivero, O. (2016) "The Magdalenian occupation of level IX of Las Caldas Cave (Asturias, Spain): a spatial approach", *Quaternary International*, 412, pp. 99-111. <https://doi.org/10.1016/j.quaint.2015.11.051>
- Dauvois, M. (1983) "Son et musique paléolithiques", *Les Dossiers de l'Archéologie*, 142, pp. 2-11.
- Dauvois, M. (2018) "Néandertal et Cro-Magnon, le renne et le son", *Revue de Paléobiologie (Genève)*, 37(2), pp. 457-468.
- Elorrieta, I. (2016) *Aprovisionamiento y disponibilidad de las materias primas silíceas en el Pirineo occidental durante el Paleolítico superior*. PhD Dissertation. Vitoria-Gasteiz: Universidad del País Vasco (Available at <http://hdl.handle.net/10810/18329>, accessed in October 2025).
- Esparza San Juan, X. (1990) *El Paleolítico superior de la cueva de Isturitz en la Baja Navarra (Francia)*. PhD Dissertation. Madrid: Universidad Nacional de Educación a Distancia.

- Fortea, J., Fritz, C., García, M.A., Sanchidrián, J.L., Sauvet, G. and Tosello, G. (2004) "L'art pariétal paléolithique à l'épreuve du style et du Carbone-14", in Otte, M. (Ed.) *La spiritualité*. Liège: Éditions ERAUL, pp. 163-176.
- Fritz, C. and Simonnet, R. (1996) "Du geste à l'objet: les contours découpés de Labastide, résultats préliminaires", *Technè*, 3, pp. 63-77.
- Fritz, C., Tosello, G. and Conkey, M.W. (2015) "Reflections on the identities and roles of the artists in European Paleolithic societies", *Journal of Archaeological Method and Theory*, 23, pp. 1307-1332. <https://doi.org/10.1007/s10816-015-9265-8>
- Fuentes, O., Lucas, C. and Robert, E. (2019) "An approach to Palaeolithic networks: the question of symbolic territories and their interpretation through Magdalenian art", *Quaternary International*, 503, pp. 233-247. <https://doi.org/10.1016/j.quaint.2017.12.017>
- Gambier, D., Valladas, H., Tisnérat-Laborde, N., Arnold, M. and Bresson, F. (2000) "Datation de vestiges humains présumés du Paléolithique supérieur par la méthode du Carbone 14 en spectrométrie de masse par accélérateur/Accelerator mass spectrometry radiocarbon dates of human remains from Upper Palaeolithic", *PALEO: Revue d'Archéologie Préhistorique*, 12 (1), pp. 201-212.
- Garate, D. and Rivero, O. (2015) "La 'Galería de los Bisontes': un nuevo sector decorado en la Cueva de Alkerdi (Urdazubi/Urdax, Navarra)", *Zephyrus*, 75, pp. 17-39.
- Garate, D., Rivero, O., Ríos-Garaizar, J., Medina-Alcaide, M.Á., Arriolabengoa, M., Intxaurbe, I., Ruiz-López, J.F., Marín-Arroyo, A.B., Rofes, J., García-Bustos, P., Torres, A. and Salazar, S. (2023) "Unravelling the skills and motivations of Magdalenian artists in the depths of Atxurra Cave (Northern Spain)", *Scientific Reports*, 13, 17340. <https://doi.org/10.1038/s41598-023-44520-w>
- García-Bustos, M. (2019) "Análisis de la composición en arte paleolítico mediante herramientas estadísticas", in García Atiéz, G. and Barciela, V. (eds.) *Sociedades prehistóricas y manifestaciones artísticas: imágenes, nuevas propuestas e interpretaciones*. Alicante: Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), pp. 79-86.
- García-Bustos, M. and Rivero, O. (2023) "Making a difference: Palaeolithic iconography as a trait of identity in the Iberian Peninsula", *Oxford Journal of Archaeology*, 42 (4), 282-300. <https://doi.org/10.1111/ojoa.12281>
- García-Diez, M., Ochoa, B., Vigiola-Toña, I., Garrido-Pimentel, D. and Rodríguez-Asensio, J.A. (2016) "Temps et réseaux de l'art paléolithique : la grotte de La Covaciella (Asturies, Espagne)", *L'Anthropologie*, 120(5), pp. 588-609. <https://doi.org/10.1016/j.anthro.2015.11.001>
- García-Diez, M., Ochoa, B., Vigiola-Toña, I., Pimentel, D.G. and Rodríguez-Asensio, A. (2021) "Reconstructing social networks through Palaeolithic art: graphic interactions in the Later Magdalenian", *Takurunna*, 11, pp. 367-386.
- Gaussein, P. and Primault, J. (2020) "La culture magdalénienne en place dès 17 700 BP? L'apport de l'art mobilier du Taillis des Coteaux (Antigny, Vienne)", in Paillet, E., Sepúlveda, M., Robert, E., Paillet, P. and Mélard, N. (eds.) *Caractérisation, continuités et discontinuités des manifestations graphiques des sociétés préhistoriques, Proceedings of the XVIII UISPP World Congress 2018, Paris, France, Vol. 3, Session XXVIII-4*. Oxford: Archaeopress, pp. 43-57.
- Girod, P. and Massenat, E. (1900) *Les Stations de l'Age du renne dans les vallées de la Vézère et de la Corrèze*. Paris: J.B. Baillière et Fils.
- González Echegaray, J. and Freeman, L. (2015) *Excavando la cueva de El Juyo: un santuario de hace 14 000 años*. Madrid: Ministerio de Educación, Cultura y Deporte.
- González Sainz, C. (2007) "Quelques particularités des centres pariétaux paléolithiques dans la région cantabrique", *Préhistoire, Art et Sociétés*, 62, pp. 19-36.
- Guthrie, R. D. (2005) *The nature of Paleolithic art*. Chicago: University of Chicago Press.
- Heras, C. de las, Barquín, R.M., Lasheras, J.A., Rasines, P. and Monforte, P.F. (2007-2008) "Dos rodets paleolíticos procedentes de las cuevas del Linar y Las Aguas, Alfoz de Lloredo (Cantabria)", *Veleia*, 24-25, pp. 161-174. <https://doi.org/10.1387/veleia.1987>
- Intxaurbe, I., Garate, D., Arriolabengoa, M. and Medina-Alcaide, M.Á. (2022) "Application of Line of Sight and Potential Audience Analysis to Unravel the Spatial Organization of Palaeolithic

- Cave Art”, *Journal of Archaeological Method and Theory*, 29, pp. 1158–1189. <https://doi.org/10.1007/s10816-022-09552-y>
- Intxaurbe, I., Garate, D. and Arriolabengoa, M. (2024) “Drawing in the depths: spatial organization patterns related to Magdalenian cave art”, *Archaeological and Anthropological Sciences*, 16, 104. <https://doi.org/10.1007/s12520-024-02007-3>
- Jáuze, B. and Sauvet, G. (1991) “Art mobilier magdalénien de la Grotte de Bedeilhac (Ariège) (Fouilles Jauze–Mandement 1927–1929)”, *Préhistoire Ariégeoise*, 46, pp. 19–57.
- Lacombe, S. (2005) “Territoires d’approvisionnement en matières premières lithiques au Tardiglaciaire. Remarques à propos de quelques ensembles pyrénéens”, *Actes des Congrès Nationaux des Sociétés Historiques et Scientifiques*, 126 (9), pp. 329–353.
- Ladier, E. (2016) “Objects inédits ou peu connus de Bruniquel et leur place dans l’art mobilier magdalénien de la vallée de l’Aveyron”, in Cleyet-Merle, J.-J., Geneste, J.-M. and Man-Estier, E. (Dir.) *L’Art au quotidien. Objects ornés du Paléolithique supérieur*. Actes du colloque international. Les Eyzies-de-Tayac, 2014. *Paleo*, numéro spécial, pp. 485–504.
- Langley, M.C., Škrdla, P., Kmošek, M., Nejman, L., Králík, M., Wright, D., Mlejnek, O., Way, A.M., Skopal, N., Přichystal, A. and Svoboda, J. (2026) “Engraved Limestone Block from Švédův stůl Cave, Czech Republic”, *Journal of Paleolithic Archaeology*, 9 (1), 4. <https://doi.org/10.1007/s41982-025-00247-w>
- Le Guillou, Y. and Arceredillo, D. (2022) “Dépôts magdaléniens de pattes de bouquetins dans les grottes de Niaux et de Bédailhac (Ariège, France). Une possible pratique rituelle inédite”, *Bulletin de la Société Préhistorique Ariège-Pyrénées*, 72, pp. 13–63.
- Lefebvre, A., Marín-Arroyo, A.B., Álvarez-Fernández, E., de la Rasilla Vives, M., Matías, E.D., Cueto, M., Tapia, J., Berganza, E. and Pétillon, J.-M. (2021) “Interconnected Magdalenian societies as revealed by the circulation of whale bone artefacts in the Pyreneo–Cantabrian region”, *Quaternary Science Reviews*, 251, 106692. <https://doi.org/10.1016/j.quascirev.2020.106692>
- Lucas, C., Cook, J., Pétillon, J.-M., Mcgrath, K., Van der Sluis, L., Cartwright, C., Ladier, E. and Grubert, M. (2023) “Industry and art on osseous materials from Courbet cave (Penne, Tarn, France) in the British Museum collections: evidence of Magdalenian connections”, *Bulletin de la Société préhistorique française*, 120 (2), pp. 135–160.
- Merk, K. (1875) “Der Höhlenfund im Kesslerloch bei Thayngen. Originalbericht des Entdeckers”, *Mitteilungen der Antiquarischen Gesellschaft in Zürich*, 19, pp. 1–44.
- Moure Romanillo, A. (1994) “Arte paleolítico y geografías sociales: asentamiento, movilidad y agregación en el final del Paleolítico cantábrico”, *Complutum*, 5, pp. 313–330.
- Nüesch, J. (1904) “Das Kesslerloch bei Thayngen, Kt. Schaffhausen: neue Grabungen und Funde, zweite Mitteilung”, *Anzeiger für schweizerische Altertumskunde: Neue Folge = Indicateur d’antiquités suisses: Nouvelle série*, 6 (4), pp. 185–208. <https://doi.org/10.5169/seals-650468>
- Ochoa, B., Ruiz-González, D., Arevalo-Muñoz, E., Alberdi-Urdalleta, J., Arruabarrena-Astiazaran, J.M. and Mujika-Alustiza, J.A. (2025) “Artistic variability and cultural dynamics in the Late Pleistocene: the Late Magdalenian portable art assemblage from Aizkoltxo (Gipuzkoa, Spain)”, *Journal of Paleolithic Archaeology*, 8(1), 34. <https://doi.org/10.1007/s41982-025-00233-2>
- Oliva, M. (2017) *Palaeolithic and Mesolithic of the Czech Lands (Moravia and Bohemia) in the European context*. Brno: Moravian Museum.
- Ontañón, R. (2003) “Sols et structures d’habitat au Paléolithique supérieur, nouvelles données depuis les Cantabres: La Galerie Inférieure de La Garma (Cantabrie, Espagne)”, *L’Anthropologie*, 107, pp. 333–363. [https://doi.org/10.1016/S0003-5521\(03\)00037-2](https://doi.org/10.1016/S0003-5521(03)00037-2)
- Passemar, E. (1944) *La caverne d’Isturitz en Pays basque*. Paris: Presses universitaires de France.
- Péquart, M. and Péquart, J. (1960) “Grotte du Mas d’Azil (Ariège), une nouvelle galerie Magdalénienne”, *Annales de Paléontologie*, 48, pp. 197–243.
- Peschaux, C., Chauvière, F.X. and Tymula, S. (2016) “La parure de la Garenne (Saint-Marcel, Indre) et les traditions de l’ornementation corporelle du début du Magdalénien moyen”, in Bourdier, C., Chehmana, L., Malgarini, R. and Połtowicz-Bobak, M. (eds.) *L’essor du Magdalénien: aspects culturels, symboliques et techniques des faciès à navettes et à Lussac-Angles*. Paris: Société préhistorique française, pp. 73–85.

- Pétillon, J.-M. (2004) “Lecture critique de la stratigraphie magdalénienne de la Grande Salle d’Isturitz (Pyrénées-Atlantiques)”, *Antiquités nationales*, 36, pp. 105-131.
- Pétillon, J.-M. (2013) “Circulation of whale-bone artifacts in the northern Pyrenees during the Late Upper Paleolithic”, *Journal of Human Evolution*, 65 (5), pp. 525–543. <https://doi.org/10.1016/j.jhevol.2013.06.006>
- Pétillon, J.-M. (2016) “Vivre au bord du golfe de Gascogne au Paléolithique supérieur récent : vers un nouveau paradigme”, in Dupont, C. and Marchand, G. (eds.) *Archéologie des chasseurs-cueilleurs maritimes. De la fonction des habitats à l’organisation de l’espace littoral*. Paris: Société préhistorique française, pp. 23–36. <https://shs.hal.science/halshs-01417291v1>
- Pétillon, J.-M. (2018) “Échos de l’océan: phoques et baleines en Europe au Paléolithique récent”, in Cattelain, P., Gillard, M. and Smolderen, A. (eds.) *Disparus? Les mammifères au temps de Cro-Magnon en Europe*. Treignes: Cedarc, pp. 335–354. <https://shs.hal.science/halshs-01916958v2>
- Pétillon, J.-M., Langlais, M., Kuntz, D., Normand, C., Barshay-Szmidt, C., Costamagno, S., Delmas, M., Laroulandie, V. and Marsan, G. (2015) “The human occupation of the northwestern Pyrenees in the Late Glacial: new data from the Arudy basin, lower Ossau valley”, *Quaternary International*, 364, pp. 126–143. <https://doi.org/10.1016/j.quaint.2014.09.022>
- Pfeifer, S. J. (2024) “The working of hard animal tissues in Eastern and Central Europe during the Last Glacial Maximum—current knowledge and perspectives”, *Journal of Paleolithic Archaeology*, 7, 35. <https://doi.org/10.1007/s41982-024-00198-8>
- Piette, E. (1907) *L’art pendant l’Age du Renne*. Paris: Masson.
- Primault, J., Brou, L., Bouché, F., Gabilleau, J., Langlais, M. and Soler, L. (2020) “L’émergence du Magdalénien: rythme des changements techniques au cours du 18e millénaire BP au Taillis des Coteaux (Antigny, Vienne, France)”, in Langlais, M., Laroulandie, V. and Pétillon, J.-M. (eds.) *Magdalenian chrono-stratigraphic correlations and Cultural Connections between Cantabrian Spain and Southwest France and beyond*. Séances de la Société préhistorique française, 15. Paris: Société Préhistorique Française, pp. 205-231.
- Rivero, O. (2009) “Les têtes de bisons gravées isolées du Magdalénien moyen franco-cantabrique: analyse des données technologiques et stylistiques”, *Bulletin de la Société Préhistorique Ariège-Pyrénées*, 64, pp. 73–82.
- Rivero, O. (2010) *La movilidad de los grupos humanos del Magdaleniense Medio de la región cantábrica y los Pirineos: una visión a través del arte*. PhD Dissertation. Salamanca: Universidad de Salamanca. (Available at <https://gredos.usal.es/handle/10366/108927>, accessed in October 2025).
- Rivero, O. (2011) “La noción de aprendizaje en el arte mobiliario del Magdaleniense Medio cántabro-pirenaico: la contribución del análisis microscópico”, *Trabajos de Prehistoria*, 68(2), pp. 275–295. <https://doi.org/10.3989/tp.2011.11070>
- Rivero, O. (2014) “Vers une caractérisation du gisement d’Isturitz (Pyrénées-Atlantiques) à travers sa production artistique”, *Bulletin de la Société Préhistorique Française*, 111 (2), pp. 255–274.
- Rivero, O. (2015) *Art mobilier des chasseurs magdaléniens de la façade atlantique*. Liège: Université de Liège.
- Rivero, O. and Sauvet, G. (2014) “Defining magdalenian cultural groups in Franco-cantabria by the formal analysis of portable artworks”, *Antiquity*, 88(339), pp. 64–80. <https://doi.org/10.1017/S0003598X00050225>
- Robert, É. (2006) *Les signes et leurs supports pariétaux: analyse comparée des rapports entre les représentations abstraites et les reliefs naturels dans les grottes ornées du Paléolithique supérieur au sein de l’espace franco-cantabrique*. Paris: Université Paris 1 - Panthéon Sorbonne (Available at <https://theses.hal.science/tel-01702797v1>, accessed in January 2026).
- Robert, É. (2022) “Ker de Massat, grotte (Massat, Ariège, France)”, in Averbouh, A., Feruglio, V., Plassard, F. and Sauvet, G. (eds.) *Bouquetins et Pyrénées*. Aix-en-Provence: Presses universitaires de Provence, pp. 66-75. <https://doi.org/10.4000/books.pup.59961>

- Ruiz-Redondo, A. (2014) *Entre el Cantábrico y los Pirineos: el conjunto de Altxerri en el contexto de la actividad gráfica magdaleniense*. PhD Dissertation. Santander: Universidad de Cantabria (Available at <http://hdl.handle.net/10902/5378>, accessed in October 2025).
- Ruiz-Redondo, A. (2019) “El arte rupestre del Magdaleniense reciente (14500–11500 BP) en la región cantábrica”, *Papeles del MUPAC. Revista de la Asociación de Amigos del Museo de Prehistoria y Arqueología de Cantabria*, 1, pp. 55–73.
- Saint-Périer, R. (1930) *La grotte d'Isturitz. I. Le Magdalénien de la salle de Saint-Martin*. Paris: Masson et Cie.
- Saint-Périer, R. (1936) *La grotte d'Isturitz. II. Le Magdalénien de la Grande Salle*. Paris: Archives de l'Institut de Paléontologie Humaine.
- Sánchez de la Torre, M. (2015) *Las sociedades cazadoras-recolectoras del Paleolítico superior final pirenaico: territorios económicos y sociales*. PhD Dissertation. Barcelona: Universitat de Barcelona (Available at <http://hdl.handle.net/10803/286779>, accessed in October 2025).
- Sauvet, G. (2019) *La première civilisation de l'image*. Tautem.
- Sauvet, G. (2024) “The lifeworld of hunter-gatherers and the concepts of territory”, *Quaternary International*, 503, pp. 191–199.
- Sauvet, G., Fortea, F.J., Fritz, C. and Tosello, G. (2008) “Crónica de los intercambios entre los grupos humanos paleolíticos: la contribución del arte para el período 20000–12000 años BP”, *Zephyrus*, 61, pp. 35–59.
- Sieveling, A. (1979) “Style and regional grouping in Magdalenian cave art”, *Bulletin of the Institute of Archaeology London*, 16, pp. 95–109.
- Simonnet, R. (2022) “Labastide, grotte”, in Averbouh, A., Feruglio, V., Plassard, F. and Sauvet, G. (eds.) *Bouquetins et Pyrénées*. Aix-en-Provence: Presses universitaires de Provence, pp. 130–137. <https://doi.org/10.4000/books.pup.59991>
- Szmidt, C., Pétilon, J.-M., Cattelain, P., Normand, C. and Schwab, C. (2009) “Premières dates radiocarbones pour le Magdalénien d'Isturitz (Pyrénées-Atlantiques)”, *Bulletin de la Société Préhistorique Française*, 106 (3), pp. 588–592. <https://doi.org/10.3406/bspf.2009.13880>
- Taborin, Y. (1993) *La parure en coquillage au Paléolithique*. Gallia Préhistoire: Supplément XXIX. Paris: CNRS.
- Thiault, M.H. and Roy, J.B. (1996) *L'Art préhistorique des Pyrénées*. Paris: Éditions de la Réunion des Musées Nationaux.
- Tisnerat-Laborde, N., Valladas, H. and Ladier, F. (1997) “Nouvelles datations carbone 14 en SMA pour le Magdalénien supérieur de la vallée de l'Aveyron”, *Bulletin de la Société préhistorique de l'Ariège*, 52, pp. 129–135.
- Utrilla, P. and Bea, M. (2008) “Sanctuaires rupestres comme marqueurs d'identité territoriale: sites d'agrégation et animaux «sacrés»”, *Préhistoire, art et sociétés*, 63, pp. 109–133.
- Vialou, D. (1986) *L'art des grottes en Ariège magdalénienne*. Paris: CNRS.

Table 1. Compilatory synthesis of samples with isolated herbivore legs. MA: Museum zu Allerheiligen; MAN: Musée Archéologie Nationale; MB: Musée Bergouën; MM: Musée de Montauban; MP: Musée de Préhistoire; MPRM: Musée de Préhistoire Régional de Menton. *For samples whose ID we do not know or have been unable to find, one has been created specifically for this article.

ID	Site	Culture/Chronology	Dating Reference	Context
MPRM G.3	Bèdeilhac	Middle Magdalenian	–	As indicated by Jauze and Sauvet (1991), the artefact was recovered from an unspecified location within the Mandement excavations. Although it seems to have been taken from the <i>deuxième terrasse</i> , where a hearth containing charcoal, faunal remains and artefacts was identified, these authors note that it may instead derive from Octobon’s excavations in the <i>première terrasse</i> , an area that is much poorer and possibly looted. The Bèdeilhac assemblage of portable art is generally attributed to the Pyrenean Magdalenian IV. This attribution is based on typological and stylistic analogies between the recovered material culture (propellers, <i>contours découpés</i> , specific decorative conventions, etc.) and that documented at other major regional sites such as Mas d’Azil, Enlène and Isturitz.
IXb-299	Las Caldas	Early Middle Magdalenian 13 370 ± 110 BP (Ua-10188)	Corchón <i>et al.</i> (2016)	The object was recovered from level IXb of Sala II, which corresponds to a possibly seasonal occupation characterised by delimited activity areas and relatively homogeneous archaeological material across sublevels Xa–Xc. Within this level, a possible concentration of organic combustion has been identified, associated with faunal remains and other artefacts exposed to heat at its base (Corchón <i>et al.</i> , 2016). Level IXb shows a higher density of archaeological material and evidence of more intensive human occupation.
IX-1904	Las Caldas	Early Middle Magdalenian 13 370 ± 110 BP (Ua-10188)	Corchón <i>et al.</i> (2016)	The object was recovered from level IXb of Sala II, which corresponds to a possibly seasonal occupation characterised by delimited activity areas and relatively homogeneous archaeological material across sublevels Xa–Xc. Within this level, a possible concentration of organic combustion has been identified, associated with faunal remains and other artefacts exposed to heat at its base (Corchón <i>et al.</i> , 2016).
IXc-1144	Las Caldas	Early Middle Magdalenian 133 70 ± 110 BP (Ua-10188)	Corchón <i>et al.</i> (2016)	<i>Supra.</i>
Courbet Inc. 01*	Courbet	Middle/Upper Magdalenian	–	The object was recovered from an undetermined area of the cave. Due to premature excavations, carried out without scientific method, almost nothing is known about the context in which its material culture was recovered. However, it is generally accepted that it belongs to the Middle and Upper Magdalenian periods. The cave was intensively inhabited and had contacts with the Pyrenean area (Lucas <i>et al.</i> , 2023).
MB 2233	Enlène	Middle Magdalenian 13 620 ± 70 BP (Poz-71332) 14 460 ± 70 BP (Poz-71335)	Bégouën <i>et al.</i> (2019)	The object was recovered in the Salle du Fond, an environment characterised by a rich stratigraphy of material culture. A variety of multifunctional activities were carried out there, including the production of stone and bone tools and symbolic activities involving the creation of portable art. Evidence suggests that it also served as a shelter, as demonstrated using combustion as a means of creating artificial light (Bégouën <i>et al.</i> , 2019). The most ancient dating corresponds to the initial occupation (lower layer 3), whilst the most recent corresponds to the primary level of occupation (levels ‘c’ to ‘e’), both of which are situated within the temporal scope of the Middle Magdalenian period.
MAN 47243	Espalungue	Middle Magdalenian 12 490 ± 60 BP (Poz-52975) 12 970 ± 160 BP (Lyon-3481) 13 120 ± 55 BP (OxA-28086) 13 630 ± 60 BP (OxA-28087) 14 145 ± 65 BP (OxA-26675)	Pétillon <i>et al.</i> (2015)	The object was recovered from an undetermined location within the cave. It is evident that the context in which the artefact was extracted is unknown due to the initial excavations being uncontrolled and unscientific. It is evident that Piette undertook excavations in the Great Hall (a site that would later be the focus of subsequent excavations) and the access corridor (Piette, 1907). In this hall, material culture has been identified, primarily from the Middle Magdalenian period, including stone and bone artefacts and portable art. Pétillon <i>et al.</i> (2015) dated different remains from the excavations by Laplace, Piette and Marsan, with results consistent with the Middle and Upper Magdalenian periods.
MAN 49121	Espalungue	Middle Magdalenian 12 490 ± 60 BP (Poz-52975) 12 970 ± 160 BP (Lyon-3481) 13 120 ± 55 BP (OxA-28086) 13 630 ± 60 BP (OxA-28087) 14 145 ± 65 BP (OxA-26675)	Pétillon <i>et al.</i> (2015)	<i>Supra.</i>
MAN 49141	Espalungue	Middle Magdalenian 12 490 ± 60 BP (Poz-52975) 12 970 ± 160 BP (Lyon-3481) 13 120 ± 55 BP (OxA-28086) 13 630 ± 60 BP (OxA-28087) 14 145 ± 65 BP (OxA-26675)	Pétillon <i>et al.</i> (2015)	<i>Supra.</i>
GI-11	La Garma	Middle Magdalenian	–	The object was recovered from the surface of Zone IV of the Lower Gallery. This area is distinguished not only by its rock art, which includes both negative handprints and fine engravings, but also by the presence of archaeological remains (stone and bone tools) deposited on the red ochre-covered floor. Among the various remains examined, a Magdalenian structure created by the circular arrangement of numerous stone blocks is of particular interest (Arias and Ontañón, 2005). The piece under discussion is dated to the Middle Magdalenian period, as evidenced by its direct correlation with other examples of portable art from the same period in the same area.
G-I-1000	La Garma	Middle Magdalenian 14 050 ± 110 BP (OxA-8721)	Arias <i>et al.</i> (2000)	The object was recovered from the surface of Zone I of the Lower Gallery, a vestibule which is considered to be a place of habitation. The artefact under consideration is located in proximity to a substantial quantity of lithic and bone remains (Arias <i>et al.</i> , 2011; Arias and Ontañón, 2012; Ontañón, 2003). C14 dating was applied to a bone, thereby obtaining a chronology that generally extends to this representation of an animal leg, interpreted as a propeller.

Table 1. (cont.)

ID	Site	Culture/Chronology	Dating Reference	Context
IST-I-46	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	The object was recovered at <i>Salle Saint-Martin</i> at level I/Ew, dated to the Middle Magdalenian (Esparza San Juan, 1990; Saint-Périer, 1930). Based on the bone industry, clearly homogeneous with Lussac-Angles points and a dozen single-bevel points, Szmidt <i>et al.</i> (2009) assume that occupation of this site was short-lived, unlike in stratigraphic layers II/E of the <i>Grande Salle</i> (Pétillon, 2004). The material culture recovered also includes fragments of half-cylindrical rods, rondelles matrices, propellers and <i>contours découpés</i> , which reinforce the similarity and contemporaneity of the layer of the same chronology in the <i>Grande Salle</i> .
MAN 84661	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
IST-I-35	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
Insturitz Inc. 01*	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
IST-I-34	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
MAN 86693-86694	Isturitz	Middle Magdalenian 13 910 ± 70 BP (OxA-19830) 14 075 ± 60 BP (OxA-19832) 14 110 ± 60 BP (OxA-19831)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
MAN 86716	Isturitz	Middle Magdalenian 12 245 ± 60 BP (OxA-19837) 13 605 ± 65 BP (OxA-19838)	Szmidt <i>et al.</i> (2009)	The object was recovered from level E/II of the <i>Gande Salle</i> . This area is regarded as a substantial, organised habitat, which has been repeatedly and seasonally inhabited by groups from the Middle Magdalenian period (Pétillon, 2004; Szmidt <i>et al.</i> , 2009). The dimensions of the hall, the intensity of natural light and the density of remains indicate a centralised location within the territory, which is conducive to domestic, social and symbolic activities, potentially functioning as a congregation site for groups.
MAN 84830	Isturitz	Middle Magdalenian 12 245 ± 60 BP (OxA-19837) 13 605 ± 65 BP (OxA-19838)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
IST-II-73-5	Isturitz	Middle Magdalenian 12 245 ± 60 BP (OxA-19837) 13 605 ± 65 BP (OxA-19838)	Szmidt <i>et al.</i> (2009)	<i>Supra.</i>
MA 8516	Kesslerloch	Middle Magdalenian	–	The object was recovered from an unspecified location within the cavity. Merk (1875) does not provide the specific layer for this and many other pieces, possibly due to the lack of systematic and scientific methods at the time.
MA U8	Kesslerloch	Middle Magdalenian	–	<i>Supra.</i>
MA 15348	Kesslerloch	Middle Magdalenian	–	This object was recovered during excavations led by Nüesch in 1898–1899. According to the extant literature, the artefact was discovered in a sealed hollow in uneven rocky terrain, which functioned as an undisturbed repository, thereby enabling its survival.
Lafaye Inc. 01*	Lafaye	Middle Magdalenian 15 290 ± 150 BP (GifA95047)	Gambier <i>et al.</i> (2000)	The object was recovered from an undetermined location in the shelter during excavations carried out by Brun (1867). The author describes a black layer devoid of harpoons, which he compares to the Middle Magdalenian layer of the nearby Plantade shelter. The remains comprised burials (one dated in Gambier <i>et al.</i> , 2000), lithic industry (especially pieces with serrated edges), bone industry (especially perforated sticks, awls and needles) and fauna (predominantly reindeer).
MAN 53869	Laugerie-Basse	Middle/Upper Magdalenian	–	Piece recovered from an undetermined layer in the excavation undertaken by Girod and Massenat (1900). These excavations are characterised by very shallow stratigraphy, based on general observations of levels without a precise record of the position of the objects. However, we know that there was an association between portable art and habitat levels, as decorated objects were found in clearly domestic contexts, mixed with animal remains, hearths and carving waste.
MAN 48186	Lortet	Middle Magdalenian	–	As Chollot (1964) asserts, the artefacts were recovered from a level corresponding to Magdalenian IV, although Piette (1907) did not undertake a scientific excavation. In their 1986 study, Boivin <i>et al.</i> (1986) described a series of stratigraphic layers that appeared to correspond to the Middle Magdalenian, Upper Magdalenian and Azilian periods. These layers were found to be logically related to the objects found in their stratigraphy, including both stone and bone artefacts and portable art. The characteristics of these artefacts were similar to those found in nearby Pyrenean caves, such as Gourdan.

Table 1. (cont.)

ID	Site	Culture/Chronology	Dating Reference	Context
MAN 48618	Lortet	Upper/Final Magdalenian	–	<i>Supra.</i>
Madeleine Inc. 01*	La Madeleine	Middle Magdalenian	–	This object was recovered from the lower level during the excavations carried out by Capitan and Peyrony between 1910 and 1913. These archaeologists worked in the central and eastern sectors of the shelter (Capitan and Peyrony, 1928). In their research, the authors established a differentiation between three archaeological levels. The artefact in question was discovered in the lower level, and was attributed to Magdalenian IV using sedimentological and archaeological evidence. The substantial quantity of archaeological remains (comprising portable art, lithic and bone tools, hearths and even a burial site) indicate that La Madeleine was a site of considerable habitation and a potential meeting point for Palaeolithic groups.
MP 712	Mas d’Azil	Middle Magdalenian 13 200 ± 100 BP (Gif-5680) 13 400 ± 100 BP (Gif-5679)	Alteirac and Bahn (1982)	The object was recovered at the <i>Galerie des Silex</i> , located on the right bank of the river. This area has been continuously occupied for an extensive period, as evidenced by substantial archaeological material from the Middle and Upper Magdalenian periods (Péquart and Péquart, 1960; Thiault and Roy, 1996).
MP 775	Mas d’Azil	Middle Magdalenian 13 200 ± 100 BP (Gif-5680) 13 400 ± 100 BP (Gif-5679)	Alteirac and Bahn (1982)	<i>Supra.</i>
MP 1086	Mas d’Azil	Middle Magdalenian Middle Magdalenian 13 200 ± 100 BP (Gif-5680) 13 400 ± 100 BP (Gif-5679)	Alteirac and Bahn (1982)	<i>Supra.</i>
MAN 47341	Mas d’Azil	Middle Magdalenian	–	The object was recovered from an unspecified area on the right bank of the Arizen River. Its chronology in the Middle Magdalenian period is assumed based on formal characteristics, techniques, and the large volume of portable art from this period in Mas d’Azil (Chollot, 1964; Thiault and Roy, 1996).
MAN 47177	Mas d’Azil	Middle Magdalenian	–	<i>Supra.</i>
MAN 47770	Mas d’Azil	Middle Magdalenian	–	<i>Supra.</i>
MAN 47346	Mas d’Azil	Middle Magdalenian	–	<i>Supra.</i>
MAN 47551	Mas d’Azil	Middle Magdalenian	–	<i>Supra.</i>
MAN 47183	Mas d’Azil	Middle Magdalenian	–	<i>Supra.</i>
Massat Inc. 01*	Massat	Middle/Upper Magdalenian	–	The object was recovered in an undetermined area of the cave, like the rest of the portable art from Massat. Barrière (1990) indicates that these objects and other undecorated remains come from ‘scientifically unreliable’ excavations and that many of them appear to come from the debris of ancient activities. The presence of harpoons, assegais and perforated needles in the vestibule (Vialou, 1986), as well as portable art comparable to that found at other sites in the Pyrenees, points to a period spanning the Middle and Upper Magdalenian. Pending further investigations, the poor presence of lithic material may lead us to consider Massat as a symbolic sanctuary, bearing in mind that only the remains of carnivores (bears, lions, hyenas) and hearths have been found, the location of which is also unknown from the published literature (Robert, 2022).
MM P192	Plantade	Middle/Upper Magdalenian 15 890 ± 160 BP (GifA94185)	Tisnérat-Laborde <i>et al.</i> (1997)	The object was recovered from an undetermined location in the shelter during excavations carried out by Brun (1867). Brun distinguished two levels (a third sterile level separating the two), and demonstrated continuous occupation since the Lower Magdalenian, but better characterised during the Middle and Upper Magdalenian. One of these (<i>Couche noire inférieure</i>) has been dated to the Middle Magdalenian (Tisnérat-Laborde <i>et al.</i> , 1997), a period which also corresponds to the Lussac-Angles points, the presence of half-cylindrical rods and the absence of harpoons.
MA 39000	Rosenhalde im Freudenthal	Middle Magdalenian	–	This object was possibly recovered during Karsten’s excavation in 1874 and subsequently highlighted in Bosinski’s catalogue (1982). The archaeological context of the artefact is not yet fully understood. The latter author indicates that the Magdalenian finds come from a 30 cm thick layer whose material culture (artifacts on lithic supports and a half-cylindrical rod with protuberances, among others) connects with that found in neighbouring Kesslerloch.
Taillis Inc. 01*	Taillis des Couteaux	Lower Magdalenian 16 950 ± 50 (Beta-425813) 17 660 ± 60 (Beta-425814) 17 670 ± 60 (Beta-425815)	Primault <i>et al.</i> (2020)	The object was recovered in layers EG-IIIGF (cave entrance). This is a significant layer in the entrance area with regard to portable art. The analysis of lithic remains and fauna in <i>Ensemble III</i> indicates that during the Lower Magdalenian, there was intermittent occupation of the site by small groups over specific temporal periods, particularly during the spring months (Gaussein and Primault, 2020).
MB 1157	Tuc d’Audoubert	Middle Magdalenian 13 920 ± 60 BP (Poz-17513) 14 120 ± 70 BP (Poz-17523)	Bégouën <i>et al.</i> (2009)	The object was recovered in the <i>Galerie du Bouquetin</i> , an area considered to be a domestic and production area, as evidenced by lithic finds, raw materials extracted from areas far from the cave, and fauna remains, predominantly reindeer and bison (Bégouën <i>et al.</i> , 2009). The gallery also houses rock and portable art, including the piece under consideration. The stratigraphic analysis reveals two distinct phases of occupation, suggesting that the site was not continuously occupied.