







## Materializing gender in Iberian prehistory: sex, age and decubitus in Bronze age burials

Alejandra Sánchez-Polo<sup>a,\*</sup> , Angélica Santa Cruz del Barrio<sup>a,b</sup>, Javier Velasco Vázquez<sup>c</sup> , Miguel del Nogal Sánchez<sup>d</sup>, Ana María Casas-Ferreira<sup>d</sup> , José Luis Pérez Pavón<sup>d</sup>, Carmen Patino Alonso<sup>e</sup>, Ángel Esparza Arroyo<sup>b,\*</sup> 

<sup>a</sup> PREHUSAL Research Group. Departamento de Prehistoria, Arqueología, Antropología Social y CC.TT. Historiográficas. Facultad de Filosofía y Letras. Universidad de Valladolid, Plaza del Campus Universitario s/n, 47010, Valladolid, Spain

<sup>b</sup> PREHUSAL Research Group. Departamento de Prehistoria, Historia Antigua y Arqueología. Facultad de Geografía e Historia. Universidad de Salamanca, C/ Cervantes s/n, 37071, Salamanca, Spain

<sup>c</sup> Servicio de Patrimonio Histórico. Cabildo de Gran Canaria, C/ Bravo Murillo 23, 35003, Las Palmas de Gran Canaria, Spain

<sup>d</sup> Departamento de Química Analítica, Nutrición y Bromatología. Facultad de Ciencias Químicas. Universidad de Salamanca, Plaza de los Caídos s/n, 37008, Salamanca, Spain

<sup>e</sup> Departamento de Estadística. Facultad de Medicina. Universidad de Salamanca, Campus Miguel de Unamuno s/n, 37001, Salamanca, Spain

### ARTICLE INFO

#### Keywords:

Gender studies  
Bronze Age  
Iberia  
Amelogenin peptide  
Statistics  
Mortuary practices  
Age groups

### ABSTRACT

Research on gender in prehistoric Iberia has focused largely on cemeteries with rich grave goods, while regions with sparse, atypical mortuary records remain understudied. We address this gap for the Middle–Late Bronze Age Cogotas I group (circa 1850–1150 cal BC) by testing whether lateralized burial position (left/right decubitus) expresses gendered norms once sex and age are known. We analysed 29 primary inhumations (13 males/16 females) from 15 sites in the northern Iberian sub-Plateau (Duero basin). Biological sex was assessed osteologically, in 23 cases by enamel peptide proteomics (AMELX/AMELY) and also using the available aDNA; age-at-death followed standard osteological criteria. We evaluated associations among sex, age, decubitus, deposit type and geography using statistical tests appropriate for small samples, complemented by exploratory multivariate analyses to visualize overall structure. The primary hypothesis was not supported: in the sample, sex and lateral decubitus were not associated, and neither regional quadrants nor logistic models yielded significant results. Age, however, modulated practices. Very young children occurred only in individual burials, whereas older children and adolescents were more frequent in multiple deposits. Sub-regional tendencies were qualitative rather than confirmatory: FR/ML in Western and Eastern *versus* FL/MR around the middle Douro/Duero basin. Multivariate plots suggested that infants cluster with female and right decubitus, adolescents with male and left, and adults at the opposite axis end, trends to be treated cautiously given small cell counts. It can be concluded that Cogotas I mortuary behaviour lacked a single rigid, gender-coded rule. Instead, gendered performances, that intersected with age, varied according to the territorial context, with the youngest children and some aged women standing outside normal patterns. This integrated osteological–proteomic–statistical approach, to combine with the ‘gender effects’, it will allow to refine social inferences where grave goods are minimal.

### 1. Introduction

As with other facets of identity, in every historical context gender is a construct grounded in cultural conventions, as are the attributes through which it is expressed. It comprises a variable array of elements related to bodily appearance or clothing, as well as gestures, speech, etc. In Prehistory specifically, recent interest in gender has encouraged new

research; for example, on Bronze Age societies with extensive necropolises and marked burial patterns, as in Central Europe (Rebay-Salisbury et al., 2022) and Britain (Brück, 2009).

This has also been the case in the Iberian Peninsula for Argaric burials (Lull et al., 2016). Yet other archaeological groups, such as those of the Inner Plateau, present a little-known mortuary record comprising some hundred or so individuals—largely lacking grave goods—might

\* Corresponding authors.

E-mail addresses: [alejandra.sanchez.polo@uva.es](mailto:alejandra.sanchez.polo@uva.es) (A. Sánchez-Polo), [esparza@usal.es](mailto:esparza@usal.es) (Á. Esparza Arroyo).

<https://doi.org/10.1016/j.jasrep.2026.105729>

Received 1 December 2025; Received in revised form 20 March 2026; Accepted 28 March 2026

Available online 7 April 2026

2352-409X/© 2026 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

appear inconsequential or of limited use for gender research. However, the absence of grave goods guards against simplistic gender attribution and can instead be understood as an incentive to focus on understudied aspects, such as burial practices or the skeletal remains themselves. Drawing on recent analytical results and theoretical perspectives, our study seeks to contribute to knowledge of the society associated with the Cogotas I archaeological group. It represents the Middle and Late Bronze Age of the Inner Plateau, ca. 1850–1150 cal BC. We combine data on the biological sex of individuals with other variables, such as activity-related skeletal markers, isotopic composition, and inhumation position, that can reveal concerns with the construction of gender identities. Statistics played a fundamental role in understanding possible geographical differences in the vast area under study. Here we present results from the analysis of the relationship between sex, age at death, and lateral decubitus as a first step toward characterizing genders.

## 2. Theoretical perspective: sex, age and gender intersection

As other researchers have already addressed, in this study we use the concepts of sex and gender in distinct and not interchangeable ways, with the expressions female–male and woman–man, respectively, to denote biological characterization as opposed to the social construction of individuals (Cintas-Peña and Herrero-Corral, 2020; Gaydarska et al., 2023; Pape and Jalongo, 2024: 2). In addition, we add another inseparable factor: age (Rebay-Salisbury and Pany-Kucera, 2020a).

Within the vast literature on gender in its archaeological dimension, the recent contribution by Sørensen (2024) is noteworthy. This Danish prehistorian distinguishes three interwoven dimensions of gender that can serve as effective guides for structuring an investigation such as the one presented here, focused on the mortuary record of a Bronze Age population on the Iberian Peninsula. Regarding the first dimension, the 'construction of gender', we can only conjecture that it would already begin at birth and continue throughout a person's life through rules and practices such as differentiated treatment of the body, clothing, etc. With respect to the second dimension, 'gender performances', burial would constitute one of the moments of the practical enactment of gender. In the population studied here, this may have entailed placing the inhumed individual in a lateral decubitus position with orientation differing between girls and boys, and between men and women—that is, presupposing already constituted genders with such intensity that they were applied even to a segment of the population recruited under anomalous circumstances, as will be listed below. Third, there are 'gender effects' on the body, which in the individuals whose remains were buried can be detected analytically, as we have begun to note in other strands of our research—for example, differences related to biological sex with respect to caries, dental wear and trauma, or isotopic indicators of diet.

The present study centers on the second dimension by analyzing how gender performance was materialized with the aim of testing the hypothesis of differential treatment by sex and age, as a first step toward contributing to the social characterization of Cogotas I communities. It should be noted at the outset that the categories to be employed—age and especially sex—are open to debate. Indeed, the customary binary conceptualization of biological sex has been questioned not only by the (minority) reality of other sexes, but also by the proposal that, like gender, sex would also be a construct rather than a pre-discursive reality (Butler, 1990: 7). Moving beyond this discussion, which has been developed elsewhere (Esparza et al., 2022), our starting point is to treat biological sex as an operative category: as Arnold (2002: 224) states, “the first task of the archaeologist should be to identify patterned correlations between morphologically identifiable sex and the material culture expression of gender”. It has likewise been noted that sex determination “has a clear role in providing categories that can be investigated in terms of their social relevance” (Sofaer, 2006: 157). In analyzing critiques of sex binarism, Sofaer (2013: 230) refers to the confusion between the spectrum of sex and the categories used in

osteological analysis (definite female, possible female, indeterminate, possible male, definite male), which will be applied to the skeletal material in this study. Moreover, it should not be forgotten that possible genders other than the two predominant ones would not necessarily derive from biological sex; rather, “gender variations” would be of a personal and cultural nature (Lang and Kuhnle, 2008).

As for age, each discipline defines age groups according to different variables. From ethnography, it is not difficult to find bibliographic references to age groups in traditional societies. There is often a set of age classes—that is, stages into which individuals are successively integrated, assuming different responsibilities. This organizational principle frequently combines with that of gender, so that the duties of each age class tend to have a predominantly male or female orientation from the earliest stages onward. Children participate in food preparation, water and firewood carrying, or in agriculture and herding; they also assimilate the social uses of space and time—all as part of the progressive shaping of their gender identities, which become especially consolidated upon reaching puberty (i.e., Nimurukundo, 1981).

The importance of these age classes is obvious, and in the case of our Bronze Age population those involving the transition to adult life are of particular interest. Here the recent formulation by Gaydarska et al. (2023: 272) is relevant: “it is not at all clear how children or the elderly fit into the binary Bronze Age gender system.” Specifying these classes are not straightforward, since age division is also a social construct, and extensive ethnographic and historical literature records very significant variations. For example, the transition between childhood and adulthood usually occurs through phases such as adolescence and youth. That means that puberty is related to “biological process controlled by hormones [...] resulting in reproductive competence” whereas adolescence means that “both biological growth and social change which results in the acquisition of new social roles and responsibilities” (Doe et al., 2025: 17). Archaeological research has therefore turned to ethnology and cultural anthropology for guidance on the role of children in archaic societies. Studies of small-scale African societies detail the tasks (and time allocations) assigned to subadults, specifying the different segments of childhood. In Sudan (Katz, 1986) and the former Zaire (Economic Commission, 1975), children's tasks are shown to increase with age with greater involvement during adolescence and to differentiate by gender from an early stage. It has also been observed that children's tasks and games serve to prepare boys and girls for subsistence activities, as well as for the assimilation of gender norms, values, and roles (Lew-Levy and Boyette, 2018).

In addition to these sociocultural stages, decisive support is provided by the biomedical sciences through the identification of biological milestones in development (Roksandik and Armstrong, 2011: 340-43). Examples include those observed in dental eruption as well as indicators of skeletal maturation induced by hormonal changes that begin around ages 10–13 in girls and 12–16 in boys, culminating in the end of long-bone growth around age 18 in women and 19–20 in men. For instance, the emergence of the deciduous dentition, eruption of the first permanent molar around age 6, complete eruption of the second permanent molar around age 14, etc. Awareness of these milestones that punctuate biological development gives rise to the assignment of individuals to life stages: early childhood, late childhood, puberty/adolescence, youth, and adulthood, with menarche being of particular importance which—whether or not it coincides with the onset of reproductive capacity—has near-universal social implications.

Finally, there are also specifically archaeological references based on criteria such as those mentioned above. For example, in the Uneticean cemetery of Prag-Miskovice (ca. 2200–1700 cal BC) in Czech Republic, a comparison of grave goods from female burials in relation to the ages of the inhumed shows that from age 14 onward the deceased are no longer buried as girls but as adult women (Rebay-Salisbury, 2017: 173). Thus, from the intersection of sex, anthropological age, and attire, the new role of girls from age 14 is inferred. The same age for social recognition as a is exemplified for the Middle Bronze Age (ca. 1700–1400 cal BC) by the

girl in grave 57 of the Austrian cemetery of Pitten, with her rich attire (Rebay-Salisbury et al., 2020: 76).

The combination of different approaches leads to numerous proposals, especially for “subadults”, as exemplified by Table 1 in Halcrow and Tyler (2008), which synthesizes classification schemes based on medical, osteological, and bioarchaeological criteria, distinct from those collected by Fahlander (2011: 17) from another research tradition. A recent volume (Rebay-Salisbury and Pany-Kucera, 2020b) likewise compiles the wide variety of situations relating to age classes, concluding in its final commentary that, unlike in our own society, adulthood likely did not coincide with biological maturity; rather, adolescence would have been the stage in which social obligations were acquired. In light of this, the present study employs some forms of classification based on criteria from multiple authors that combine osteological, biological, sociocultural, and other elements (Halcrow and Tyles, 2008; Roksandik and Armstrong, 2011; Scheuer and Black, 2000: 468-9; Baker et al., 2005)

In sum, using bioanthropological sex and age groups as the basic categories—with particular attention on puberty (roughly between ages 10 and 20)—we undertake here this first approach to gender focused on burial lateralization. Gender (and its possible alignment with sex) is not the premise but the objective, which will in turn be strengthened through multivariate treatment of this and other components.

### 3. The mortuary domain in the Middle and Late Bronze age of the northern Iberian Plateau

The population examined in this study belongs to the Cogotas I “archaeological group”, contemporaneous with other better-known groups such as the Argaric, the Motillas, or the Bronze do Sudoeste. It has been identified across a very broad area of the interior of the Plateau, especially the Central Plateau, as well as parts of the Ebro Valley and Extremadura (Fig. 2). Here we focus on the sector corresponding to the Northern Plateau, largely coincident with the Duero basin and the present-day Comunidad Autónoma de Castilla y León, a region of ca. 95,000 km<sup>2</sup>. Chronologically, the Proto-Cogotas I (or Formative) phase corresponds to the Middle Bronze Age (ca. 1850–1450 cal BC)—henceforth MBA—, while the final phase, Full Cogotas I, corresponds to the Late Bronze Age (ca. 1450–1150 cal BC)—henceforth LBA.

This archaeological group—progressively characterized by its various traits (see Abarquero Moras, 2005; Blanco-González, 2014; Rodríguez-Marcos, 2012; in English: Abarquero Moras et al., 2013; Arnáiz Alonso and Montero Gutiérrez, 2011; Fernández Castro, 1995; Harrison, 1994; Lull et al., 2013)—poses particular problems with respect to the mortuary sphere. Unlike other coeval archaeological groups that possess formal cemeteries and numerous burials yielding abundant grave goods, amenable to analyses of status and gender (see Lull et al., 2016; Soriano et al., 2021), Cogotas I burials are very scarce and odd: firstly, barely 90 individuals from 24 sites, single buried preferably in pits (Fig. 1A-C) but also through the reuse of old dolmens, tumulus or in caves (Delibes, 2004; Velasco-Vázquez and Delgado, 2005; Velasco-Vázquez, 2010; Esparza, 2024). This is a surprisingly small number given the vast territorial extent and some seven centuries of duration. Secondly, multiple burials of two or more individuals are frequent (Fig. 1D), an unlikely outcome if so many simultaneous deaths were purely accidental. And thirdly, the paleodemographic profile of the assemblage, ranging from very young (Fig. 1A) to senile individuals (Fig. 1C), with a predominance of young women and male subadults differs markedly (Fig. 1A and B) from what would be expected under “natural mortality.” Fourthly, the growing prevalence of secondary human remains in a wide array of contexts has come to the fore. These secondary remains often outnumber their primary counterparts, thus demanding attention. All of this evidence points to the conclusion that the interred assemblage reflects a socially regulated recruitment, such that all the primary burials found would rather be exceptional (Esparza et al., 2012a). What, then, would have been the predominant funerary

rite? Without ruling out other possibilities—such as non-formal corpse abandonment or water interment—the most plausible hypothesis is the exposure of corpses, already supported by several cases that have undergone detailed bioanthropological analysis, as at the pit field of Tor-dillos (Salamanca) (Esparza et al., 2012b, 2019; Velasco-Vázquez et al., 2018).

This dualistic treatment of death fits squarely with a well-characterized reality, documented since the early nineteenth century in ethnographic literature (i.e., Lévy-Bruhl, 1922: chap. IX) across different periods and continents: a type of mortuary behaviour in which a “hierarchy of deaths” translates into a “classificatory hierarchy of the deceased” (Pradelles de Latour, 1996: 138). It often contrasts the rites accorded to men and women, but above all it conceptualizes two ways of dying: good death (*bonne mort*) and bad death (*mauvaise mort*) (Seale and Van der Geest, 2004). A good death is typically that of a person after a long life, in their dwelling, at peace with their family and social surroundings. Conversely, there is broad intercultural agreement on what constitutes a bad death (Counts, 1977; Goody, 1962: 52, 146; Thomas, 1982: 101ff; Van der Geest, 2004: 904-5): those who die at a young age, or without descendants; women who die in childbirth; victims of drowning, fire, or certain culturally stigmatized diseases; and even suicides, social outcasts, the executed, and so forth. Such ill-fated deaths are expressed through a wide variety of practices. To cite a single example: among the Akan of Ghana, those who suffer this kind of death are denied the usual rites; any rites performed are brief, perfunctory, and hurried, and the corpse is neither washed nor publicly displayed, there is no wake, and no funerary goods are presented (Adinkrah, 2020). The various formulas share a common denominator: the withholding of the normative rites granted to those who have died a good death.

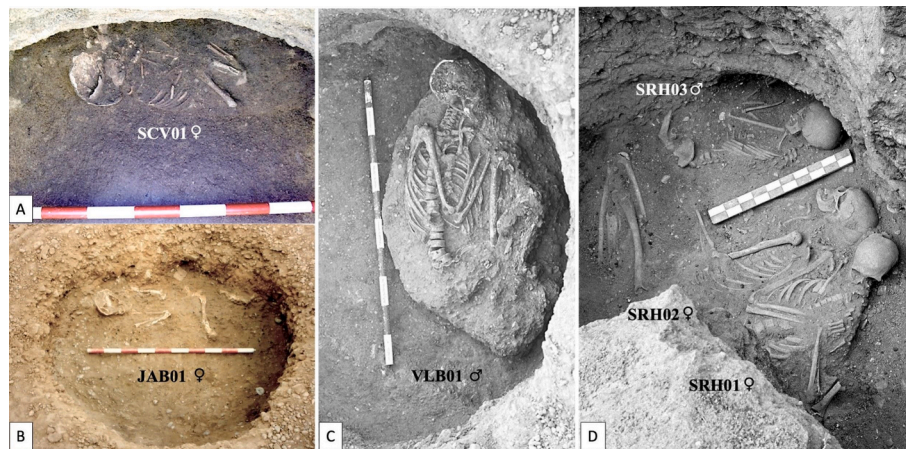
This dualistic typology—given its broad cross-cultural reach, as noted above in anthropological literature—has been incorporated into archaeological research for example by Weiss-Krejci (2011) and Insoll (2015: 155). A precedent can even be recovered in Ucko’s classic work on *Ethnography and Archaeology* (1969: 271), which mentions an example of dualistic mortuary treatment—exposure/burial—among the Nandi of Kenya. There, the normative custom was the exposure of the corpse so that hyenas would convey the spirit, while only those who died very old and completely toothless, as well as children who died before any tooth had erupted, were buried in shallow graves (Huntingford, 1953: 138).

These theoretical points of reference have informed, in the specific case of the Cogotas I mortuary sphere, a hypothesis to account for the observed materiality. As noted, those who died in a “normal” manner at an advanced age would have been subject to the rite of corpse exposure, documented in several cases; by contrast, those summarized by the concept of “bad death” was a portion of the population recruited under very particular circumstances— and finally, they were deposited in pit burials devoid of accompanying objects (Esparza et al., 2012b). The odd grave burials can be related to the emergence of faint signs of hierarchy within a population that sought to preserve an egalitarian social structure underpinned by mortuary ideology. Despite the exceptional nature of the interred assemblage, its remains contain indications amenable to diverse approaches for converting them into socially relevant information, and it is for this reason that they are the focus of the present study.

It is also worth noting that statistical approaches have been applied to Cogotas I twice to explore possible associations between sex and body position, yielding near-significant results:  $p = 0.053$  (Esparza, 1990: 127) and  $p = 0.066$  (Esparza et al., 2012a: 283). However, these early attempts were limited by even smaller sample sizes, uneven application of bioarchaeological methods, and the inability to determine sex for most non-adults. This problem motivated the proteomic analysis of dental enamel performed in the present study, which also includes a larger number of cases.

**Table 1**  
Biological sex identification based on osteological, DNA and proteomics analyses at Cogotas I groups.

n	Localisation Province	Locality	Site	Pit	Sample ID	Age at death(y or m)	Sex diagnostic Osteo- logy	DNA	Proteomics	Sex determi- nation	Lateral decubitus	Burialtype	Cogotas I Phase	References
1	Burgos	La Horra	<i>El Cerro</i>	10	HOR01	12–13 y	F?	XX	XX	F	R	Triple	Proto	Palomino et al., 1999; Palomo-Díez et al., 2019; Sánchez-Polo and Blanco-González, 2014
2					HOR02	7–8 y	F	XX	XX	F	R			
3					HOR03	11 y	M	XY	XY	M	L			
4	Burgos	Quintanadueñas	<i>Los Rompizales</i>	64	RPZ02	15–17 y	F		XX	F	R	Quadruple	Proto	Velasco-Vázquez and Esparza, 2016
5					RPZ03	7–8 y	M?		XX	F	R			
6					RPZ04	12–13 y	M		XY	M	L			
7	Burgos	Ubierna	<i>Los Pilones</i>	25	PIL01	> 20 y	M		XY	M	L	Individual	Proto	Strato, 2024
8				36	PIL02	> 20 y	M		XY	M	L	Individual	Proto	
9	León	Jabares de los Oteros	<i>Las Vegas</i>	BG-10	JAB01	25–30 y	F		XX	F	R	Individual	Proto	Rodríguez-Marcos et al., 1999
10				AG-22	JAB02	9–15 y	M?		XY	M	L	Individual	Proto	
11				D-33	JAB03	6 m	F		–	F	L	Individual	Proto	
12	Salamanca	Castellanos de Villiquera	<i>La Septa</i>	8	SCV01	1,5 y	F?		–	F	L	Individual	Proto	Alacet Arqueólogos, 2009
13	Segovia	Cuéllar	<i>Barco de los Habares</i>	17	BHC01	17–20 y	F?		XY	M	R	Individual	Proto	Esparza et al., 2022; Vega Melero, 1996
14	Segovia	La Lastrilla	<i>Las Zumaqueras/ El Mirador</i>	164/5/6	LLM02	20–40 y	M		XY	M	L	Individual	Proto	Martín García et al., 2008
15				n. 3	LLM03	33–40 y	M		XY	M	R	Individual	Proto	
16	Soria	Caracena	<i>Los Tolmos</i>	Sector B	LTB01	20–25 y	F	XX	XX	F	L	Double	Proto	Esparza et al., 2017; Jimeno Martínez, 1984
17					LTB02	30–40 y	F	XX	–	F	R			
18	Valladolid	Alaejos	<i>El Tablón</i>	44–35	ALA02	4–5 y	M?		XY	M	R	Individual	Proto	Dominguez Bolaños, 1998; Esparza et al., 2022
19	Valladolid	San Román de Hornija	<i>La Requejada</i>	Burial pit	SRH01	17–20 y	F	XX	XX	F	L	Triple	Full	Delibes, 1978; Esparza et al., 2012b; Olalde et al., 2019
20					SRH02	60–70 y	M?	XX	XX	F	R			
21					SRH03	7–9 y	M?	XY	–	M	R			
22	Valladolid	Tordesillas	<i>Carreastro</i>	6	TCC01	2–3 y	F		XX	F	R	Individual	Full	Palomino et al., 2021
23				27	TCC02	20–25 y	F		XX	F	L	Individual	Full	
24	Valladolid	Tudela de Duero	<i>Soto de Tovilla</i>	113	TST02	3–4 y	M		XY	M	R	Individual	Proto	Cruz Sánchez et al., 2008; Esparza et al., 2022
25	Valladolid	Valladolid	<i>Fuente la Mora</i>	31	FMV01	20–25 y	F?	XX	XX	F	L	Individual	Proto	Olalde et al., 2019; Strato, 2009
26				32	FMV02	3–4 y	M		XY	M	R	Individual	Proto	
27				33/37	FMV03	25–30 y	F?		–	F	R	Individual	Proto	
28	Zamora	Villaralbo	<i>El Juncal</i>	8	VLB01	17–20 y	M		XY	M	L	Individual	Proto	Esparza et al., 2008
29	Zamora	Zamora	<i>Plaza de la Catedral</i>	327	ZAM02	9 m	F?		XX	F	R	Individual	Full	Caro Dobón and Fernández Suárez, 2007; Esparza et al., 2018, 2022



**Fig. 1.** Different pit burials of the Cogotas I group: A) infant inhumation from La Septa (Castellanos de Villiquera, Salamanca); B) single adult burial from Las Vegas (Jabares de los Oteros, León); C) adolescent inhumation from El Juncal (Villaralbo, Zamora); and D) triple inhumation from La Requejada (San Román de Hornija, Valladolid). Images from: A) [Alacet Arqueólogos, 2009](#); B) [Rodríguez-Marcos et al., 1999](#); C) [Esparza et al., 2008](#); D) [Delibes, 1978](#).

#### 4. Material and methods

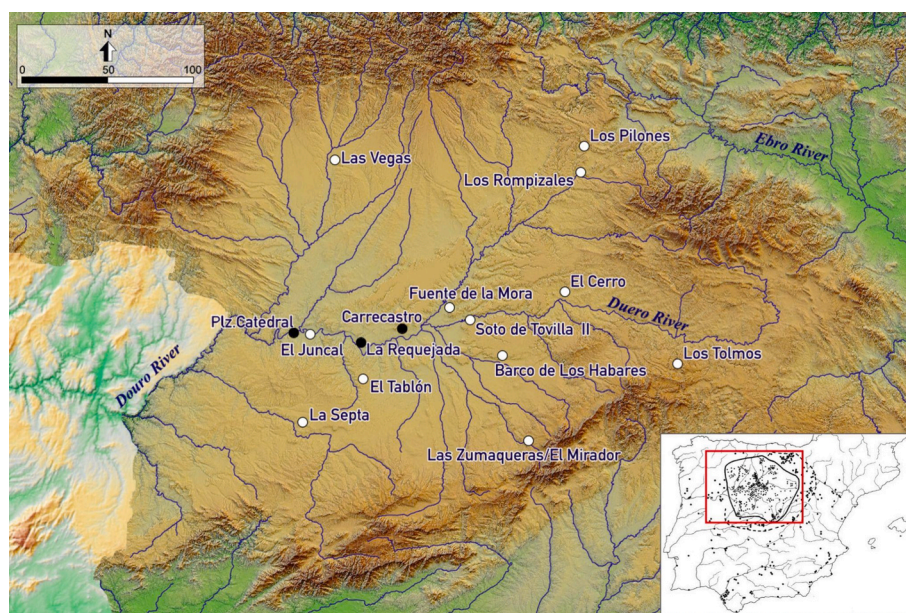
##### a. Human remains from Cogotas I archaeological group

A set of human remains from 29 individuals, recovered from 22 burials at 15 Cogotas I sites in the Duero basin, has been analyzed (Table 1); their locations are shown on the map in Fig. 2. This dataset comprehends burials where the skeleton appeared lateralised. It came from excavations from the last 50 years in the Comunidad Autónoma de Castilla y León, some of them as part of university campaigns, i.e. La Requejada or Los Tolmos— while the remainder was excavated as part of infrastructure construction, such as highways, high-speed trains, or eolic parks. So, these human bones suffered from different methodologies when excavating and post-process treatments. After all, they were kept in seven different provincial museums across the Castilla y León Autonomous Community.

All the individuals studied were found during excavations of pit fields (Fig. 1), a type of site so called for the numerous structures that were originally subterranean silos or granaries adjacent to the huts.

Once these were exhausted, many were reused for burials, although in some instances pits were opened *ad hoc*.

Evidently, a study investigating a possible opposition in lateral decubitus by sex and age must focus on primary inhumations, not on the increasingly abundant—though often partial or incomplete—human remains that constitute secondary deposits. To this end, the selection criteria for the individuals included in the analysis were based on their state of preservation and anatomical representation. Only those burials that allowed a reliable reconstruction of the initial deposition position were selected. Consequently, partial deposits or burials affected by post-depositional disturbances that prevented a confident assessment of this key variable were excluded. Yet, the full corpus of currently known primary burials could not be included, because the lateral decubitus was unidentifiable in certain instances; for example, the first burial known for the group, at Renedo de Esgueva (Valladolid), was initially described as “squatting” (Wattenberg, 1957: 189) and later as “in a foetal position” (Palol and Wattenberg, 1974: 27), without the side of inhumation being known. We have also excluded from this study those skeletons—six in total—that were deposited in non-lateral positions. First, four in prone



**Fig. 2.** Map of the northern sub-plateau with studied burials of the Cogotas I group, Portugal territory in lighter colours. White dots = Proto-Cogotas I phase (MBA); Black dots = Full Cogotas I phase (LBA). Inside the black line, the area of the Cogotas I group; dashed line, area under strong influence of Cogotas I.

positions: two from Cerro de la Cabeza (Ávila) (Velasco-Vázquez et al., 2018); one from Los Rompizales (Quintanadueñas, Burgos) (Velasco-Vázquez and Esparza, 2016); and one from Carrelasvegas (Santillana de Campos, Palencia). In addition, the burial at Las Cañamonas (San Cristóbal de Entreviñas, Zamora) shows an exceptional supine decubitus. The perinatal LTB03 from Los Tolmos (Caracena, Soria) is also excluded, a probable full-term foetus retained in the uterine cavity and expelled after the burial of the mother, LTB01, mainly because it was impossible to secure its burial position—the bones from LTB03 were scattered over her (Esparza et al., 2017).

In the present study we have tentatively considered certain variables that often combine with burial position in the construction of gender identities: for example, orientation of the body with respect to the cardinal points, or the specific positioning of the head. In our particular case, the heterogeneous quality of the record precludes having such details for our corpus as a whole. Furthermore, a statistical approach would be complicated by the burial modality, as in the case of double burials (Los Tolmos) or triple burials (La Horra, San Román de Hornija), where the orientation of each individual seems adjusted to the overall effect; especially in the case of the four individuals from Los Rompizales, three of whom were placed against the wall of the pit encircling the fourth, buried in prone decubitus (Velasco-Vázquez and Esparza, 2016). Here, the enigmatic ritual entailed adaptation to the setting, and one might say that the ‘aesthetics of deposition’ (*sensu* Pollard, 2001) appears to have taken precedence over the precise orientation of each interred individual.

#### b. Bioanthropological aspects: determination of individuals' sex and age, and of the burial position

For the purposes of this study—focused on primary deposits—the determination of the two variables sex and age was crucial and had to be adapted to the state of preservation and anatomical representation of the skeletal materials, as well as to the biological characteristics of the individuals examined.

For the estimation of sex (Table 1) in the adult individuals included in the study, we observed the morphological features of the skull and the os coxae, following standard bioanthropological protocols used in this type of research (Buikstra and Ubelaker, 1994; Schaefer et al., 2010). In the hip bones we assessed all parameters that could serve as basic distinguishing elements: pubic symphysis, subpubic angle, ischiopubic ramus, greater sciatic notch, presence or absence of a preauricular sulcus, and the general morphology of the bone. In the skull, we evaluated the size and morphology of the supraorbital margin, the nuchal crest, the mastoid processes, the robustness and morphology of the mandible, and, in general, the areas of muscle attachment. In subadults, we applied sex-discrimination criteria specifically proposed by various authors, essentially those observable in the ilium, mandible, and skull (Cox and Mays, 2000: 121–125; Lewis, 2007: 47–54).

Age at death in adults was estimated from the degree of skeletal maturation and the closure of the spheno-occipital synchondrosis (Schaefer et al., 2010), taking into account molar wear and changes observable in the pubic symphysis, the auricular surface of the pelvis, and the acetabulum (Buikstra and Ubelaker, 1994; Cox and Mays, 2000; Rissech et al., 2006; Scheuer and Black, 2000). In non-adults, age was estimated from the degree of dental development and eruption (Buikstra and Ubelaker, 1994) and, where possible, from long-bone lengths and the stage of epiphyseal fusion (Buckberry, 2018; Schaefer et al., 2010; Scheuer and Black, 2000). Table 1 also lists the ages assigned to the individuals, as well as the age groups mentioned in the introduction.

With respect to burial position, the archaeological literature shows a certain tendency to interpret the position observed at excavation as the original one, overlooking the complex processes involved in bodily decomposition. Only specialized bioarchaeological recording, carried out in the course of archaeological fieldwork, can permit a rigorous determination of the burial position; this was not possible in the present

research, which has at least sought to analyze—through a bioarchaeological lens—the available written and graphic documentation, not always detailed. In this way, the systematic observation of details such as the maintenance (or not) of each and every articulation and particularly labile connections, partial rotations, indications of decomposition in a filled space or a void, etc. (Duday, 2017), has allowed us to infer the type of decubitus—lateral, supine, prone, mixed, and so forth. Mixed cases are not uncommon, with differing placements of trunk and limbs; consequently, we assessed body position based on the majority of the skeleton, focusing on the elements that had not been rotated.

#### c. Proteomic sex determination of the buried individuals

Two peptides were analysed, AMELX-(44–52) and AMELY-(58–64), which correspond to the amino acid sequences SIRPPYPSY and SM(ox)IRPPY, respectively (Stewart et al., 2016, 2017). Dental samples that presented both peptides were assigned to the male sex, while those that presented only the AMELX peptide (absence of the AMELY isoform, encoded by the Y sex chromosome) were assigned to the female sex.

The samples were prepared using a modification of a method previously published by Stewart et al. (2016, 2017). Briefly, the strategy consisted of four steps: (i) cleaning the tooth, (ii) extracting peptides from the enamel (acid etch), (iii) washing to remove the acid, and finally (iv) cleaning and preconcentrating the peptides using a Zip-Tip® pipette tip containing a C18 resin. The extract was analysed by flow injection analysis coupled to a mass spectrometer with an electrospray ionisation source and a triple quadrupole analyser (FIA-ESI-MS/MS). Three transitions ( $m/z$ ) were selected for each of the selected peptides (AMELX: 540.3 to 366.2, to 714.4 and to 879.5 and AMELY: 440.2 to 279.1, to 532.3 and to 645.4). The analysis time was 1.0 min. Details of the sample treatment procedure and analysis are described in previous publications (Esparza et al., 2022: 279–280; Casas-Ferreira et al., 2022). As it was not possible to remove the dental samples from the museums, it was necessary to carry out the first three steps of sample treatment (i–iii) in the museums themselves. To do this, a kit was prepared containing all the necessary materials and reagents. The fourth step (iv) and the measurement of the samples were carried out in an external laboratory. This method is especially relevant to sex children under 10 years, due to undifferentiated physical characteristics, but also to other adolescents and adults who present sex estimation challenges.

#### d. Statistical analyses

Possible associations between bioanthropological variables (sex, age) and contextual variables (decubitus, deposit type, geographic region) were assessed through contingency tables, using Pearson's chi-square test and Fisher's exact test when expected cell counts were low. To examine both overall and quadrant-stratified results, we used contingency tables incorporating geographic stratification. We also fitted a binary logistic regression model with decubitus (left/right) as the dependent variable and sex and region as predictors.

To explore broader patterns and generate graphical representations, we performed a correspondence analysis (CA) examining the relationship between subregion and combined sex–decubitus categories, and conducted multiple correspondence analysis (MCA) incorporating sex, age, and decubitus. These multivariate analyses were used for exploratory purposes—to visualize trends in the sample rather than to establish confirmatory associations.

All analyses were carried out with IBM SPSS Statistics, version 30.0 (IBM Corp., Armonk, NY, USA), and the R programming environment, version 4.x (R Core Team, Vienna, Austria). In all cases, the significance threshold was set at  $p < 0.05$ , although trends approaching this cutoff are also noted.

5. Results: Exploratory analyses of the data

Given that some of the human remains studied bioanthropologically exhibited insufficient traits for sex assignment, genetic and proteomic analyses were especially important. Proteomic results were obtained for 24 individuals (in 5 cases no signal was recovered), and aDNA analyses conducted in other projects were available for nine individuals: three from El Cerro (Palomo-Díez et al., 2019), two from Los Tolmos (Esparza et al., 2017), one from Fuente la Mora, and three more from La Requejada (Olalde et al., 2019). In this way, sex could be determined for the indeterminate or uncertain cases, leaving only three individuals for whom osteological diagnosis was the sole option. In sum, of the 29 cases analyzed, 89.6% were determined by at least two methods, with no contradictions among the procedures. The final decision is reported in the “Sex determination” column of Table 1; this is the “Sex” variable that, in the statistical analyses, has been combined with lateral decubitus and with various ways of considering age ranges, mainly those presented in Table 2. The osteological ages are presented in Table 2 alongside two columns where they are assigned to age groups. These groups essentially follow the criteria of Roksandik and Armstrong (2011) and Buikstra and Ubelaker (1994). However, given the small number of individuals for each age-at-death, and even their absence in certain ranges—i.e., between 40 and 60 years; or the only one older than 60 years old, different modifications to the groups have been tested: in one column, all infants have been pooled together, while in the second, they are subdivided into babies and children; in both cases, adults have been merged into a single older age group. Following some authors (Halcrow and Tyles, 2008; Rebay-Salisbury and Pany-Kucera, 2020a: 3; Doe et al., 2025), the transition from childhood to puberty was marked with a slight difference by sex, 10–13 for females and 12–16 for males, with the end of this period set at 19 and 20–21, respectively.

Fig. 3 displays the distribution of the analysed sample by sex (F, M), lateral decubitus (R, L) and age group. In addition to the three-group subdivision shown in Fig. 3B, four and even five groups were also tested at various points in the analysis, splitting the youngest category into Baby and Children (Fig. 3A).



Fig. 3. Mortuary patterns in the studied sample of the Cogotas I group: A) Proportion of females and males by fifth age groups and their percentage of the total; B) Sex and decubitus across the three age groups used in the statistical analyses, according to “3 age groups” from Table 2.

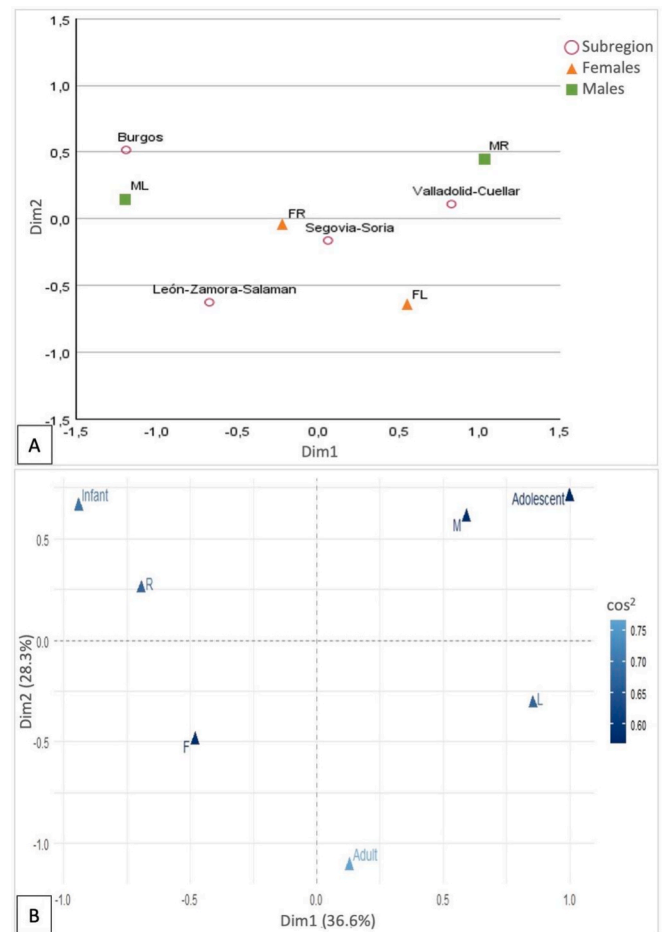
Table 2  
Used categories in the statistical analyses.

N	Sample Id	Sex	Decubitus	Age at death (y or m)	3 Age Groups	4 Age Groups	Geographical Quadrant	Sub-Region
1	HOR01	F	R	12–13 y	Adolescent	Adolescent	NE	Burgos
2	HOR02	F	R	7–8 y	Infantil	Child	NE	Burgos
3	HOR03	M	L	11 y	Infantil	Child	NE	Burgos
4	RPZ02	F	R	15–17 y	Adolescent	Adolescent	NE	Burgos
5	RPZ03	F	R	7–8 y	Infantil	Child	NE	Burgos
6	RPZ04	M	L	12–13 y	Adolescent	Adolescent	NE	Burgos
7	PIL01	M	L	> 20 y	Adult	Adult	NE	Burgos
8	PIL02	M	L	> 20 y	Adult	Adult	NE	Burgos
9	JAB01	F	R	25–30 y	Adult	Adult	NW	León-Za-Sal
10	JAB02	M	L	9–15 y	Adolescent	Adolescent	NW	León-Za-Sal
11	JAB03	F	L	6 m	Infantil	Baby	NW	León-Za-Sal
12	SCV01	F	L	1,5 y	Infantil	Baby	SW	León-Za-Sal
13	BHC01	M	R	17–20 y	Adolescent	Adolescent	SE	Vall-Cuellar
14	LLM02	M	L	20–40 y	Adult	Adult	SE	Sg-Soria
15	LLM03	M	R	33–40 y	Adult	Adult	SE	Sg-Soria
16	LTB01	F	L	20–25 y	Adult	Adult	SE	Sg-Soria
17	LTB02	F	R	30–40 y	Adult	Adult	SE	Sg-Soria
18	ALA02	M	R	4–5 y	Infantil	Child	SW	Vall-Cuellar
19	SRH01	F	L	17–20 y	Adolescent	Adolescent	NE	Vall-Cuellar
20	SRH02	F	R	60–70 y	Adult	Adult	NE	Vall-Cuellar
21	SRH03	M	R	7–9 y	Infantil	Child	NE	Vall-Cuellar
22	TCC01	F	R	2–3 y	Infantil	Baby	NW	Vall-Cuellar
23	TCC02	F	L	20–25 y	Adult	Adult	NW	Vall-Cuellar
24	TST02	M	R	3–4 y	Infantil	Child	NW	Vall-Cuellar
25	FMV01	F	L	20–25 y	Adult	Adult	NW	Vall-Cuellar
26	FMV02	M	R	3–4 y	Infantil	Child	NW	Vall-Cuellar
27	FMV03	F	R	25–30 y	Adult	Adult	NE	Vall-Cuellar
28	VLB01	M	L	17–20 y	Adolescent	Adolescent	NW	León-Za-Sal
29	ZAM02	F	R	9 m	Infantil	Baby	NW	León-Za-Sal

Although the study sample represents only a subset of all available (complete or incomplete) skeletons, some demographic observations can be made. Our present dataset includes 13 males and 16 females (45% and 55%), yielding an overall male-to-female sex ratio of 0.81, very close to that recorded for infants (0.83). Ratios are noteworthy among individuals aged 13–20 years (1.33) and among adults (0.57). Compared with a previous study focused on Cogotas I remains preserving teeth (Velasco-Vázquez and Esparza, 2016), which analysed 43 individuals from both primary and secondary burials, it was found similar numbers of adult males and females, an equivalence that held after adding subadults (<20 y) with proposed sex assignments. Despite the small sample, previously observed features recur: an over-representation of female children, male youths, and adult women—patterns more consistent with selective recruitment driven by cultural factors than with a natural mortality profile.

Guided by archaeological context, we first tested the primary hypothesis of an association between lateral decubitus and sex, seeking evidence for a gendered mortuary practice in Cogotas I. We secondly explored potential variation by age, geographic sector and other variables. The primary hypothesis was not supported. In the overall comparison of left (L) versus right (R) lateral decubitus ( $n = 29$ ), Fisher's exact test returned  $p = 0.467$ , indicating no association. To assess geographic effects, the study area was partitioned into four quadrants. Stratified analyses again showed no significant associations. In the NE quadrant, which contains all Burgos burials, the  $\chi^2$  test showed a suggestive tendency ( $p = 0.079$ ), but this was not confirmed by Fisher's exact test ( $p = 0.242$ ), more appropriate given small counts. No meaningful differences emerged in the SE, SW, or NW quadrants. A contingency-table framework crossing sex (F, M) and decubitus (L, R) and stratified by quadrant likewise confirmed the absence of statistically significant associations. A binary logistic regression with decubitus (L/R) as the outcome and sex and region as predictors also detected no effects (sex: OR = 0.45;  $p = 0.318$ ; regions: global  $p = 0.927$ ). Overall, the data do not support a systematic linkage between sex and lateral decubitus. Age, however, introduced notable nuances. When individuals were regrouped into three bands (0–3, 3–9, >9 years), a statistically significant association with decubitus emerged ( $p = 0.046$ ), suggesting differential treatment of the youngest relative to others. A sub-regional analysis based on archaeologically grounded zones—while sample-size limited—revealed qualitative tendencies: Burgos and the León–Zamora–Salamanca block exhibit an FR/ML tendency, whereas Valladolid–Cuéllar shows the inverse FL/MR pattern; Segovia and Soria lack a stable pattern. Although these contrasts did not reach significance in global tests, they align with archaeological expectations. A CA of sub-region versus sex–decubitus categories likewise found no significant associations but provided a helpful visualisation of these exploratory trends (Fig. 4A). Deposit type (individual vs multiple) showed no significant association with sex ( $\chi^2 p = 0.137$ ; Fisher  $p = 0.249$ ). Using three age classes (childhood, adolescence, adulthood) also yielded non-significant results ( $\chi^2 p = 0.441$ ; Fisher  $p > 0.05$ ). However, with four categories (younger children, older children, adolescents, adults) the association became significant ( $\chi^2 = 12.45$ ;  $p = 0.006$ ): younger children occurred exclusively in individual burials (Fig. 1A), whereas older children and adolescents were more frequent in multiple deposits (Fig. 1D). Given several low cell counts, this result should be interpreted cautiously.

Joint analysis of sex and decubitus within age groups was likewise non-significant (Fisher's exact test: infants  $p = 0.464$ ; adolescents  $p = 0.464$ ; adults  $p = 0.545$ ), though some tendencies were apparent—e.g., adolescent males more often on the left, adolescent females on the right. To facilitate interpretation of the correspondence analysis,  $\text{Cos}^2$  (squared cosine) was used as an indicator of the quality of representation of each category on the factorial plane; higher  $\text{Cos}^2$  values indicate that a category is well represented by the first two dimensions and that its position on the map can therefore be interpreted with greater confidence (Fig. 4B). Multiple Correspondence Analysis (MCA) of sex, age and



**Fig. 4.** A) SCA graphic with sub-regions and sex–decubitus categories. The spatial proximity between categories reflects their degree of association. B) MCA of associations among sex, age group, and decubitus. The blue colour gradient ( $\text{Cos}^2$ ) reflects how clearly each category is expressed in the analysis, with darker blue tones indicating categories that are more reliably represented.

decubitus supports these impressions (Fig. 4B): infants cluster near right decubitus in the low-dimensional projection; adolescents cluster closer to male sex and left decubitus; and adults at the opposite end of the axis, hinting at differentiated practices. These patterns must be treated prudently given the small sample.

In sum, while acknowledging the constraints of sample size, the analyses indicate the absence of a single rigid mortuary rule across the assemblage. Instead, practices vary contextually, with age acting as a modulating factor, and sub-regional scale differences remaining qualitative rather than statistically robust. The SCA points to the value of further exploring how age and sector may structure sub-regional patterns.

## 6. Discussion

The initial aim of identifying a rigid, recurrent pattern of lateralized decubitus as a function of the gender of the inhumed individuals has not been corroborated by the exploratory data analysis. This absence of a single pattern must be explained, or at least understood, looking at different variables such as burial categories, chronology, or geographical distribution, among others.

### 6.1. A culture without a single burial rule

The absence of a single pattern for decubitus/sex/age would only be

surprising from the older monothetic conception of archaeological entities. Since Clarke (1968: 35–37), however, it has been understood that cultures are rather polythetic, in other words heterogeneous to some degree and not a rigid, totalizing assemblage of cultural traits. In Cogotas I, such heterogeneity is not only discernible in specific particularities of pottery production across sub-sectors (Rodríguez-Marcos and Fernández-Manzano, 2012), but also it might well extend to the lateral decubitus, which may have been tied to local or regional practices. In the same vein, recall that the Cogotas I mortuary typology includes not only pit inhumations but also some cave burials and tumulus and even the reuse of megaliths (Delibes, 2004; Velasco-Vázquez, 2010; Velasco-Vázquez and Delgado, 2005; Esparza et al., 2012a: 269-75). Particularly instructive is the comprehensive study of the Argaric Bronze Age, where two predominant patterns, FR and ML, have been identified, yet they are met in only 85% and 74% of women’s and men’s burials, respectively, and the “anomalies” cannot be explained chronologically or by the number of individuals interred (Lull et al., 2016: 45).

Research on European cemeteries from the Neolithic to the Bronze Age has likewise noted the apparent anomaly of burials whose lateral decubitus is reversed relative to the predominant pattern for their sex and age. In this regard, some specialists on the Central European Bronze Age mortuary record have expressed reservations about interpreting such “mixed-message burials” as belonging to gender-fluid individuals or a third gender, since proteomic analysis in these cases has revealed errors in traditional sex assignment (Rebay-Salisbury et al., 2025). In the Argaric case cited above, Lull et al. (2016: 46) suggest that certain exceptional burials with intersecting gender indicators may reflect transgression or the privileged recognition of particular individuals.

Finally, as Hofmann (2009) argues, rather than strict oppositions between “male” and “female,” we may be dealing with a situation in which gender contrasts intensify at some segments of the biological life course while fading in others.

6.2. A chronological issue?

Other possibilities cannot be ruled out, like variation in the norm

related to chronology. This has been observed at Motilla del Azuer, a site on the Southern Plateau contemporary with Cogotas I, where burials embedded within a complex stratigraphic sequence show hesitations in the gender pattern that becomes consolidated only in the final phase (Nájera et al., 2012). In our study, such an explanation is unlikely, above all because of the marked imbalance between the number of skeletons with lateral decubitus corresponding to the Formative phase (n = 23) and those of the Full Cogotas I phase (n = 6) (Fig. 5). This disparity supports the traditional characterization of the Full phase as featuring a decline in primary burials and an increase in secondary remains (Blasco Bosqued, 1997: 188), some of which may have served in communal ceremonies or even as relics (Esparza et al., 2018, 2020). Such an asymmetric distribution would undermine statistical analysis.

Moreover, two sites are particularly relevant here as both present the same case: the opposite decubitus between female children and young adult women. At Las Vegas (Jabares), an adult FR (Fig. 1B) and a baby in FL, while at Carreastro (Tordesillas) a similar differentiation is seen, an adult FL and a child in FR. However, while the two burials at the former locality belong to the Formative phase, at the latter fall within the Full Cogotas I phase. In other words, the divergence in funerary treatment between the youngest children and adults appears to persist over time.

Nevertheless, before ruling out a chronological explanation altogether, it is worth noting that the variability observed among the four female infants (two FL and two FR) may be attributable to their chronology. The first two (JAB03 and SCV01, Fig. 1A) belong to the Formative phase, whereas the other two (ZAM02 and TCC01) correspond to the Full phase.

6.3. Regionalisation of the phenomena

Another possible explanation for the absence of a single decubitus/sex pattern may be territorial in nature. Although the statistical exploration did not reach significance, a closer look at the burial distribution map, considering sex, decubitus, and age group, seems to reveal interesting features (Fig. 5). First, there is a subset formed by the sites located in the provinces of León, Zamora, and Salamanca—marked by the

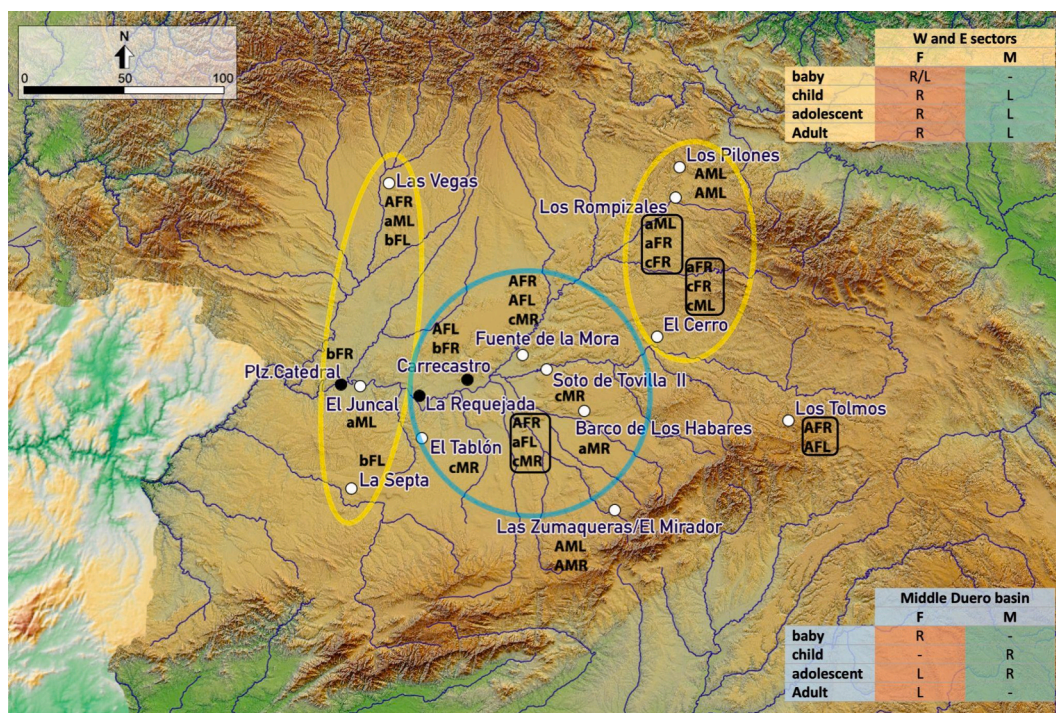


Fig. 5. Sub-Regional trends into the Cogotas I mortuary gestures. White dots = Proto-Cogotas I phase, MBA; Black dots = Cogotas I phase, LBA; Rectangles = multiple burials.

Western yellow ellipse—a zone noted for its particular connectivity (Blanco-González and Esparza, 2019) and even for an exclusive ceramic decorative motif (Sánchez-Polo, 2011). This subset would be characterized by the FR and ML pattern (Fig. 1B and 1C), which may have operated from adolescence through adulthood. There is no infant individual who might have reinforced that pattern. By contrast, the youngest three girls show the arrangements FR ( $n = 1$ ) and FL ( $n = 2$ ) (Fig. 1A). The other subset comprises the sites in the present-day province of Burgos—Eastern yellow ellipse—with the same pattern as the previous one: FR (two girls and two adolescents) and ML (one boy, one adolescent, and two adult males). A third subset brings together the five sites of the middle Duero valley, that is, those in the province of Valladolid plus Cuéllar in Segovia—blue ellipse. Here the inverse pattern seems to operate: MR (with four children and one adolescent) and FL (two), although FR is also present (two adult women; there is also one infant) (Fig. 1D).

Outside these three groupings are the two sites closest to the mountainous rim in the southwest of the region, Las Zumaqueras and Los Tolmos, each of which exhibits different configurations: ML and MR at the former, and FR and FL at the latter, but inhumated together in this case.

#### 6.4. Ages and gender: an intersectional approach

Setting aside the four individuals from Las Zumaqueras and Los Tolmos—which could partially fit the other patterns—it is possible to emphasize the interesting relationship observed between age group, sex, and decubitus (Fig. 5):

- In the W and E zones, where the FR/ML pattern was followed, it is observed among adults (one FR + two ML), adolescents (two FR + three ML), and children (two FR + one ML). By contrast, the infants under three years of age (three individuals, all female) do not coincide in their lateralization (one FR + two FL), and the latter two girls would depart from the dominant pattern.
- In the Middle Duero basin, the inverse pattern, FL/MR, appears to operate, and it is likewise met for adults (two FL), adolescents (one FL + one MR), and older children (Infants II) (four MR). There are, however, exceptions in this zone as well, such as two adult women with the opposite pattern (two FR)—explained in the next section—and an infant girl under 3 years also in FR.

In short, it can be proposed that, once past early childhood, from about age 3 onward, boys and girls began to be buried according to the performative practices corresponding to their sex; that is, they became gendered persons. This is relevant because it serves to reject the initial suspicion that gender assignment might have occurred with the transition to adolescence.

This feature would mark a contrast with earlier chronologies, such as the Bell Beaker and the Early Bronze Age. Indeed, whereas in Central European Bell Beaker groups there is a clear expression of status through non-ceramic grave goods, the gender rule relating decubitus and sex also operates (Müller, 2001: 598). By contrast, in Iberian Bell Beaker groups—there is no clear association between sex and decubitus (Soriano et al., 2021), but with emphasis on the individual and the prestigious items that materialize superior social standing (Bueno Ramírez et al., 2005: 79). The same situation seems to have persisted into the Early Bronze Age: if in EBA European necropolises, in addition to the display of wealth, gendered mortuary practices were applied to children from an early age in accordance with their biological sex (Rebay-Salisbury et al., 2022), in the Northern Plateau the emphasis on status rather than on inhumation position appears to have remained at this time. The girl buried with a rich assemblage at Villafáfila (Zamora) (Delibes et al., 1998) lay on her right side, as did another 14–15-year-old adolescent interred in Sector A of Los Tolmos, likewise reclined on his right side and furnished only with a cord around his neck (Garralda and

Galera, 1984). In sum, in marked contrast to earlier chronologies, in Cogotas I gender and age, together with kinship, would have been socially operative categories.

Comparisons with other Iberian populations of the same period are also instructive. For example, at Motilla del Azuer, in the Southern Plateau, men were buried on the right side, whereas women and children were interred on the left (Nájera et al., 2012), so that children could in a sense be “feminine” by default (a “women’s matter”). In Cogotas I the situation is different: boys and girls were buried according to gendered norms, which suggests they were already regarded like everyone else, whereas infants (<3 years)—in our case specifically four girls—would not have lived long enough to be subject to normalized gender practices... or were simply not considered persons, that is, members of the community with full rights and duties, most likely because at that stage they were not independent of their mothers. Thus, unlike some contemporary Bell Beaker and Bronze Age societies in Europe (Soriano et al., 2021: 12), in Cogotas I gendered treatment was applied to children beyond early infancy, while the youngest were not yet socially recognized as persons.

#### 6.5. Special burials with special women of La Requejada and Los Tolmos

At this point, it is necessary to revisit two well-known “cold cases” in Iberian scholarship, in which the individuals’ initial sex attribution has shaped subsequent social interpretations that now require critical reassessment. Both burials have been known since the 1980’s (Delibes, 1978; Jimeno Martínez, 1984) and were interpreted as a nuclear family (Esparza, 1990: 126), an assumption later rejected once DNA analysis became available (Esparza et al., 2017: 237–38). Now, in the context of this gender-focused approach, these two burials stand out in particular: the triple burial of La Requejada (Fig. 1D) and the double burial of Los Tolmos. The focus has been placed on these two burials because, by containing multiple individuals, they allow us to observe contrasts in funerary treatment of women of different ages.

In the latter, the mother LTB01, still carrying a full-term foetus, was in FL position, whereas the accompanying adult, LTB02, was FR (Esparza et al., 2017: 238). At La Requejada the young woman, possibly the mother of SRH03, was in FL, and the elderly accompanying woman in FR. In other words, in both cases the youngest women were accompanied by aged women laid in the opposite, apparently “masculine,” position. Might this detail be taken to signal a third gender, a special status—LTB02 must have been the paternal aunt or grandmother of LTB03, and SRH02 the same regarding SRH03—or perhaps the performance of a role equivalent to the paternal one? Age could also be the issue. Indeed, the apparently “changed” gender may not have been so throughout life, but only from a certain moment in the life course, following the postulate of Gaydarska et al. (2023: 273): “Gender, rather than being static, changes through an individual’s lifecycle”. Given that in both sites there are aged women, an ethnographic illustration is apt: as Anderson (2011: 130) notes, in some traditional North American societies older women came to occupy a special position, assuming masculine roles such as pipe smoking and even participating and speaking alongside men in community assemblies, activities forbidden to younger women.

Finally, moving beyond the specific inhumation positions, these multiple burials may be understood from another angle: that of relational identities. As Hernando (2018) argues, women’s identities have historically been constructed more fluidly from and toward their relationship with the group, particularly with other women, a point also proposed by Brück (2009) for the British Bronze Age. In our two cases, whatever the event in which the various women died, the decision was taken not to bury them separately but together, perhaps to highlight the relational ties of the younger women with their offspring (LTB03 and SRH03) and at the same time with the aged women (LTB02 and SRH02) to whom they were very likely related by affinity. In the case of La Requejada, which was exceptional—perhaps because in Full Cogotas I

egalitarianism had begun to break down—in that it contained a couple of bronze grave goods (a prism with the young mother and an earring with the child), an elbow fibula was also found above the rough flagstone that sealed the burial space. Its discoverer already considered the fibula a possible offering directed to the three deceased (Delibes, 1978: 229). Today it could be interpreted as yet another element of a mortuary practice that, by manifesting the ties among the buried and also between them and their community, contributes to the maintenance of collective identity, instead of a growing individualism.

Ultimately, in contrast to the exaltation of the individual and his/her status that characterized the Bell Beaker period, the two burials discussed here embody a complex social discourse that expresses a three-fold intersection between the communal, relational identity, gender identity, and the stages of the life course.

#### 6.6. A theatrical performance: concluding remarks, future directions

This study has focused on the lateralized placement of Cogotas I individuals: a gender performance, a mortuary enactment that was in some sense “theatrical,” through which the notion of gender was materialized, contributing to its continuity and development. Yet this initial approach to gender addresses only one part of what is possible; just one of the six major lines in the comprehensive research programme on gender advocated by Hollimon (2011). In our case, beginning with mortuary analysis has allowed us to sketch the first of these lines, but there were undoubtedly other important elements in the ongoing construction and maintenance of genders, such as other practices of daily life that are archaeologically recognizable through ‘gender effects’—that is, the impact of activities on the body. Some of these have already been identified in our research, including gender-based differences in the incidence of dental caries (Velasco-Vázquez and Esparza, 2016: 49). Females display a higher prevalence of caries, possibly linked to hormonal factors associated with puberty, menstruation, and pregnancy (Lukacs and Largaespada, 2006), as exemplified by individual LTB01, who died between 20 and 25 years of age at the end of her pregnancy, having already lost four teeth and presenting five carious lesions. In addition to these physiological aspects, the discussion also considers gender-related cultural factors, including food-preparation practices—whereby women may have frequently tasted food during cooking (Schepartz et al., 2017: 166). Secondly, ongoing isotopic analyses may reveal sex-based differences in the consumption of plant- versus animal-derived foods. Initial osteological evidence of sex differentiation is being observed in marks associated with enthesopathies and repetitive or strenuous work, suggesting a gendered division of labour (Esparza et al., 2012a). Finally, the high proportion of young females among the buried individuals, commonly linked to pregnancy and childbirth (Sayer and Dickinson, 2013), can likewise be regarded as an indicator of gendered living conditions, inasmuch as it points to risks associated with an early age of motherhood, such as the apparent poor provision of care for women, or even neglect, when in this condition.

Other possibilities have opened up on the basis of determining the gender of the Cogotas I human remains. Although in this archaeological group the burial types— not true normative graves—initially point to a peculiar mode of recruitment, that of “unusual” deaths, they have begun, unintentionally, to yield valuable information for social characterization. From a historical standpoint, new directions would be outlined to explore in future works. For example, the possible structure of domination/subordination warrants closer investigation. Certainly, Cogotas I burials cannot be compared with those of coeval societies such as the Argaric where one can correlate the lateralization of men and women with their respective grave goods to infer women’s subordinate position even vis-à-vis men of the same rank. Other avenues are nevertheless feasible, such as analytical contrasts between age and gender groups, and ethnographic references could also be used, at least heuristically. Bearing in mind Ucko’s (1969) circumspect position regarding the utilisation of ethnographic references in archaeological

inference, it is noteworthy to mention certain cases that are of particular interest. These include the practices observed within specific African oral societies concerning the burial of the deceased in a lateral position, a practice that reflected an ideology which assigned women a role that was not only distinct from, but subordinate to, that of men. As well illustrated, among the Akamba of East Africa, Lindblom (1920: 104) recorded that men were buried on the right side with the head resting on the right hand, and women the reverse; adding that, according to A. Walker, a specialist in Bantu languages, the hands were explicitly termed “the men’s hand” and “the women’s hand,” and, above all, “the strong hand” and “the inferior hand,” respectively, and the Kaguru add to such meanings those of “clean” and “unclean” (Beidelman, 1961: 256). In the same vein, Wieschhoff (1938) provides a substantial compilation of similar cases equating Right side–Men–Good or Superior versus Left side–Women–Bad or Inferior. Consequently, the asymmetrical body symbolism would justify exploring this ethnographic approach to the burials at Cogotas I, which should be integrated with the ongoing research on ‘gender effects’ mentioned above. Taken together, they could point toward a recurring pattern of female subordination.

## 7. Conclusions

Was there in Cogotas I a marked expression of gender—indeed, a robust gender system? Addressing this question has been methodologically challenging, since the human remains available likely do not reflect the general funerary rite but rather deaths at anomalous ages and under unusual circumstances, with a high proportion of subadults. Progress has been possible through the combined use of osteological and analytical methods—especially proteomic analysis of dental enamel—which allowed the biological sex of 29 individuals interred in lateral decubitus to be established. This is a basic variable for analyses directed toward demography, division of labour, social structure, and the gender inquiry presented here, conceived as the first phase of a research programme that will continue with other objectives, such as identifying ‘gender effects’ in skeletal remains via paleopathological methods and isotopic analyses.

With the data corpus now available, twice in size compared to earlier attempts, the simplest hypothesis can be rejected: there is no rigid correlation between sex and lateral decubitus expressive of a gender system. The successive steps of the exploratory analysis, seeking relationships between those two variables and others like various age-groupings, the nature of the funerary deposit, head position, and even geographic subdivisions, yielded results that were not statistically significant. However, some partial results, involving possible age distinctions and an archaeologically justified zonation, led to the detection of two potential patterns operating in different sectors of the study region.

These sub-regional mortuary patterns of women in right lateral decubitus and men on the left in the western and eastern zones of the distribution area, and the reverse (women left, men right) in the middle Duero valley, appear to have applied in the burials of adults as well as adolescents and even children over three years of age. Thus, an intersectional approach provides initial evidence concerning the gender system in Cogotas I mortuary practice. Its performative character helped consolidate a social order rooted in kinship and showing few distinctions beyond those of gender and age, probably as an ideological mechanism countering emerging tendencies toward hierarchization. Exceptions to the lateralization rule can be explained in several ways, including local variation and, in some cases, life-course stages.

As a construct, the apparently binary gender system may not have been completely stable, and must also have taken into account certain stages of life in which it could have operated with less rigidity: this would be the case for both ends of the life course, exemplified by the two aged women at La Requejada and Los Tolmos, and for early childhood. Except for infants under three years, boys and girls were regarded as persons, judging by their mortuary treatment analogous to that of adolescents and adults. Their misfortune, i.e. the circumstances of their

lives and/or deaths, imposed on all a routinized burial practice in simple pits without grave goods, yet with a careful placement that reveals traces of their gender system.

#### Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used ChatGPT in order to check the English spelling. After using this tool/service, the authors reviewed and edited the content as needed and took full responsibility for the content of the published article.

#### CRedit authorship contribution statement

**Alejandra Sánchez-Polo:** Writing – review & editing, Writing – original draft, Visualization, Investigation, Formal analysis, Data curation, Conceptualization. **Angélica Santa Cruz del Barrio:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Javier Velasco Vázquez:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Miguel del Nogal Sánchez:** Writing – review & editing, Writing – original draft, Methodology, Investigation. **Ana María Casas-Ferreira:** Writing – review & editing, Investigation. **José Luis Pérez Pavón:** Writing – review & editing, Investigation. **Carmen Patino Alonso:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis. **Ángel Esparza Arroyo:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization.

#### Funding

This contribution was funded by the Spanish System of Science, Technology and Innovation (SECTI), with the research projects HUM2005-00139/HIST (funded by the Ministry of Education and Science), HAR2009-10105 and HAR2013-43851-P (funded by the Ministry of Economy and Innovation), whose PI was AE-A. AS-P was “Juan de la Cierva-Formación” Postdoctoral Research Fellow (Grant agreement: FJC2021-046615-I), funded by MCIN/AEI/<https://doi.org/10.13039/501100011033> and the NextGenerationEU/PRTR programme. She is currently a UVa Postdoctoral Research Fellow. ASC-B was beneficiary of a Postdoctoral “Margarita Salas” Fellowship 2021-23 (Ministry of Universities).

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgements

We are sincerely grateful to the Castile and Leon Regional Government (Junta de Castilla y León) for granting the permits required for the field and laboratory work, to the directors of the museums of Castile and Leon, and to the archaeologists who recovered the human remains during the excavations: Miguel Ángel Arnáiz Alonso, Ricardo de Cáceres Sastre, Luis Caro Dobón, Manuel Crespo Díez, Pedro Javier Cruz Sánchez, Alonso Domínguez Bolaños, José Ignacio Herrán Martínez, Alfredo Jimeno Martínez, Clara Martín García, Jesús Misiego Tejada, Ángel Luis Palomino Lázaro, Javier Quintana López, Pilar Ramos Fraile, José Antonio Rodríguez Marcos, Mónica Salvador Velasco, Domiciano Vega Melero, Luis Villanueva Martín and Ana Viñe Escartín. We also wish to thank Prof. Germán Delibes de Castro for his tireless encouragement and collaboration. The authors are grateful to the Mass Spectrometry Service (Nucleus) of the University of Salamanca for its valuable assistance.

#### Data availability

Data will be made available on request.

#### References

- Abarquero Moras, F.J., 2005. Cogotas I. La difusión de un tipo cerámico durante la Edad del Bronce. Junta de Castilla y León, Valladolid.
- Abarquero Moras, F.J., Blanco-González, A., Esparza Arroyo, A., Rodríguez Marcos, J.A., 2013. The Central Iberian Meseta at the time of the Thera eruption: an overview. In: Meller, H., Bertemes, F., Bork, H., Risch, R. (Eds.), 1600 - Kultureller Umbruch im Schatten des Thera-Ausbruchs? Landesmuseums Für Vorgeschichte Halle, Halle, pp. 315–326.
- Adinkrah, M., 2020. ‘If you die a bad death, we give you a bad burial’: Mortuary practices and ‘bad death’ among the Akan in Ghana. *Death Stud.* 46 (3), 695–707. <https://doi.org/10.1080/07481187.2020.1762264>.
- Alacet Arqueólogos, 2009. Informe técnico sobre los trabajos de control arqueológico de la obra de construcción de la ‘Autovía A-66. Tramo Calzada de Valdunciel-Salamanca’ (Salamanca). Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Salamanca.
- Anderson, K., 2011. Life Stages and Native Women. Memory, Teachings, and Story Medicine. Manitoba University Press, Winnipeg.
- Arnáiz Alonso, M.A., Montero Gutiérrez, J., 2011. Funerary expression and ideology in the Cogotas Culture settlements in the northern Meseta of the Iberian Peninsula. In: Moore, T., Armada, X.L. (Eds.), Atlantic Europe in the First Millennium BC: Crossing the Divide. Oxford University Press, Oxford, pp. 558–574.
- Arnold, B., 2002. ‘Sein Und Werden’: Gender As Process in Mortuary Ritual. In: Nelson Milledge, S., Rosen-Ayalon, M. (Eds.), In Pursuit of Gender: Worldwide Archaeological Approaches. AltaMira Press, Walnut Creek.
- Baker, B.J., Dupras, T.L., Tocheri, M.W., 2005. The Osteology of Infants and Children. Texas A&M University Press, College Station.
- Beidelman, T.O., 1961. Right and Left Hand among the Kaguru: A Note on Symbolic Classification. *Africa: J. Int. Afr. Inst.* 31 (3), 250–257.
- Blanco-González, A., 2014. Sitios en altura y vasijas rotas: reconsiderando la etapa de ‘plenitud’ de Cogotas I (1450–1150 AC) en la Meseta. *Trabajos de Prehistoria* 71 (2), 305–329.
- Blanco-González, A., Esparza Arroyo, Á., 2019. Conectividad en la Edad del Bronce del occidente de la península ibérica. Examinando la relación entre sitios y vías pecuarias mediante SIG. *Trabajos de Prehistoria* 76 (1), 67–83.
- Blasco Bosqued, M.C., 1997. Manifestaciones funerarias de la Edad del Bronce en la Meseta. *Saguntum* 30, 173–190.
- Brück, J., 2009. Women, death and social change in the british bronze age. *Nor. Archaeol. Rev.* 42 (1), 1–23. <https://doi.org/10.1080/00293650902907151>.
- Buckberry, J., 2018. Techniques for identifying the age and sex of children at death. In: Crawford, S., Hadley, D., Shepherd, G. (Eds.), *The Oxford Handbook of the Oxford University Press, Oxford*, pp. 55–70.
- Bueno Ramírez, P., Barroso Bermejo, R., Balbín Behrmann, R. de, 2005. Ritual campaniforme, ritual colectivo: la necrópolis de cuevas artificiales del Valle de las Higueras, Huecas, Toledo. *Trabajos de Prehistoria* 62 (2), 67–90. <https://doi.org/10.3989/tp.2005.v62.i2.69>.
- Buikstra, J.E., Ubelaker, D.H. (Eds.), 1994. Standards for Data Collection from Human Skeletal Remains: Proceedings of a seminar at the Field Museum of Natural History. Arkansas Archeological Survey, Fayetteville.
- Butler, J., 1990. Gender trouble: Feminism and the subversion of identity. Routledge, New York.
- Caro Dobón, L., Fernández Suárez, M.E., 2007. Enterramiento en fosa del Bronce final en la ciudad de Zamora. In: Barca Durán, F.J., Jiménez Ávila, J. (Eds.), *Enfermedad, Muerte y cultura en las sociedades del pasado. Actas del VIII Congreso Nacional de Paleopatología*. Fundación Academia Europea de Yuste, Cáceres, pp. 91–100.
- Casas-Ferreira, A.M., Nogal-Sánchez, M. del, Esparza Arroyo, Á., Velasco Vázquez, J., Pérez-Pavón, J.L., 2022. Fast methods based on mass spectrometry for peptide identification. Application to sex determination of human remains in tooth enamel. *Microchem. J.* 181, 4–11. <https://doi.org/10.1016/j.microc.2022.107645>.
- Cintas-Peña, M., Herrero-Corral, A.M., 2020. Missing prehistoric women? sex ratio as an indicator for analyzing the population of Iberia from the 8th to the 3rd millennia B.C. *Archaeol. Anthropol. Sci.* 12 (11), 263. <https://doi.org/10.1007/s12520-020-01215-x>.
- Clarke, D.L., 1968. *Analytical Archaeology*. Methuen, London.
- Cunts, D.R., 1977. The good death in Kalai: preparation for death in Western New Britain. *Omega* 7 (4), 367–372.
- Cox, M., Mays, S. (Eds.), 2000. *Human Osteology in Archaeology and Forensic Science*. Greenwich Medical Media Ltd., London.
- Cruz Sánchez, P.J., San Gregorio Hernández, D., Martín Rodríguez, E., Martín Vela, R., 2008. Informe correspondiente a los trabajos de seguimiento y excavación arqueológica en el Soto de Tovilla de Tudela de Duero (Valladolid). Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Valladolid.
- Delibes de Castro, G., 1978. Una inhumación triple de facies Cogotas I en San Román de la Hornija (Valladolid). *Trabajos de Prehistoria* 35, 225–250.
- Delibes de Castro, G., 2004. La impronta de Cogotas I en los dolmenes del occidente de la cuenca del Duero o el mensaje megalítico renovado. *Mainake XXVI*, 211–231.
- Delibes de Castro, G., Viñe, A., Salvador, M., 1998. Santioeste, una factoría salinera de los inicios de la Edad del Bronce en Otero de Sariegos (Zamora). In: Delibes de Castro, G. (coord.) (Ed.), *Minerales y metales en la prehistoria reciente. Algunos testimonios de*

- su explotación y laboreo. (Studia Archaeologica, 88). Universidad de Valladolid, Valladolid, pp. 155–197.
- Doe, J., Cambra, M., González, A., 2025. Taking the leap from biological to social: puberty and adolescence from a bioarchaeological point of view. In: Sánchez Romero, M., Alarcón, E., Rivera, A. (Eds.), *Pequeños cuerpos con grandes biografías. Una mirada a la infancia desde la (bio)arqueología*. Comares, Granada, pp. 17–40.
- Domínguez Bolaños, A., 1998. Primera campaña de excavación arqueológica en el yacimiento de El Tablón (Alaejos, Valladolid), Autovía de Castilla, N-620, Tramo Alaejos-Cañal. 1997-1998. Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Valladolid.
- Duday, H., 2017. L'archéothanologie. In: de Beaune, S., Francfort, H.P. (Eds.), *L'archéologie à découvert: Hommes, objets, espaces et temporalités*. CNRS, Paris, pp. 62–71. <https://doi.org/10.4000/books.editions.cnrs.11213>.
- Economic Commission for Africa, 1975. The role of women in African development. World Conference of the International Women's years (Mexico City 1975). <https://digitallibrary.un.org/record/3800456?ln=es&v=pdf>.
- Esparza-Arroyo, Á., 1990. Sobre el ritual funerario de Cogotas I. *Boletín del Seminario de Estudios de Arte y Arqueología* 56, 105–143.
- Esparza-Arroyo, Á., 2024. El mundo de la Muerte en la Edad del Bronce: Prácticas mortuorias de Cogotas I. In: Escribano, C., Rojo, M., Del Val, J. (Eds.), *Investigaciones Arqueológicas en Castilla y León en el siglo XXI*. Universidad de Valladolid, Valladolid, pp. 417–438.
- Esparza-Arroyo, Á., Delibes de Castro, G., Ramos Fraile, P., Salvador Velasco, M., Velasco Vázquez, J., 2008. Una nueva sepultura del Grupo Cogotas I en 'El Juncal' (Villaralbo, Zamora). *Zephyrus LXI*, 155–175.
- Esparza-Arroyo, Á., Velasco Vázquez, J., Delibes de Castro, G., 2012a. In: Rodríguez Marcos, J.A., Fernández Manzano, J. (Eds.), *HUM 2005-00139: Planteamiento y primeros resultados de un proyecto de investigación sobre la muerte en Cogotas I*, pp. 259–320.
- Esparza-Arroyo, Á., Velasco Vázquez, J., Delibes de Castro, G., 2012b. Exposición de cadáveres en el yacimiento de Tordillos (Aldaseaca de la Frontera, Salamanca). Perspectiva bioarqueológica y posibles implicaciones para el estudio del ritual funerario de Cogotas I. *Zephyrus LXIX*, 95–128. <https://revistas.usal.es/uno/index.php/0514-7336/article/view/9031/9636>.
- Esparza-Arroyo, Á., Palomo Díez, S., Velasco Vázquez, J., Delibes, G., Arroyo Pardo, E., Salazar García, D.C., 2017. Familiar Kinship. Palaeogenetic and isotopic evidence from a triple burial of the Cogotas I archaeological culture (Bronze Age, Iberian Peninsula). *Oxf. J. Archaeol.* 36, 223–242. <https://doi.org/10.1111/ojoa.12113>.
- Esparza-Arroyo, Á., Sánchez-Polo, A., Velasco-Vázquez, J., 2018. Damaged burials or *reliquiae cogotenses*? On the accompanying human bones in burial pits belonging to the Iberian Bronze Age. *Archaeol. J. World Archaeol. Congress* 14 (3), 346–376. <https://doi.org/10.1007/s11759-018-9351-0>.
- Esparza-Arroyo, Á., Velasco-Vázquez, J., Delibes de Castro, G., 2019. No todos los muertos son iguales: Tratamiento mortuario heterogéneo en el yacimiento Cogotas I de Canto Blanco (Sahagún/Calzada del Coto, León). *Norba. Revista de Historia* 32, 109–131.
- Esparza-Arroyo, A., Velasco-Vázquez, J., Sánchez-Polo, A., 2020. Manipulación de restos humanos en el Bronce Medio meseteño: el fragmento fronto-facial hallado en el yacimiento de La Huelga (Dueñas, Palencia). *Complutum* 31 (1), 49–69. <https://doi.org/10.5209/cmpl.71649>.
- Esparza-Arroyo, A., Velasco-Vázquez, J., Nogal-Sánchez, M. del, Casas-Ferreira, A.M., Pérez Pavón, J.L., 2022. Una contribución a la problemática del sexo bioantropológico mediante análisis proteómico del esmalte dental de restos humanos de la Prehistoria reciente de la submeseta norte ibérica. *Trabajos de Prehistoria* 79 (2), 274–290. <https://doi.org/10.3989/tp.2022.12299>.
- Fahlander, F., 2011. Subadult or subaltern? Children as serial categories. In: Lally, M., Moore, A. (Eds.), *(re)Thinking the Little Ancestor: New Perspectives on the Archaeology of Infancy and Childhood*. Archaeopress [BAR IntSer 2271], Oxford, pp. 14–23.
- Fernández Castro, M.C., 1995. *Iberia in Prehistory*. Blackwell, Oxford.
- Garralda, M., Galera, V., 1984. La sepultura individual de Los Tolmos de Caracena (Soria). *Edad del Bronce. Boletín de la Sociedad Española de Antropología Biológica* 5, 39–45.
- Gaydarska, B., Rebay-Salisbury, K., Ramírez Valiente, P., Fries, J.E., Hofmann, D., Augereau, A., et al., 2023. To gender or not to gender? Exploring gender variations through time and space. *Eur. J. Archaeol.* 26 (3), 271–298. <https://doi.org/10.1017/ea.2022.51>.
- Goody, J., 1962. *Death, Property and the Ancestors: A Study of the Mortuary Customs of the Lodagaa of West Africa*. Routledge, London-New York.
- Halcrow, S.E., Tyles, N., 2008. The bioarchaeological investigation of children and childhood and social age: problems and prospects. *J. Archaeol. Method Theory* 15, 190–215.
- Harrison, R.J., 1994. *The Bronze Age in Northern and Northeastern Spain 2000-800 BC*. In: Mathers, C., Stoddarts, S. (Eds.), *Development and decline in the Mediterranean Bronze Age*. University of Sheffield Press, Sheffield, pp. 73–97.
- Hernando, A., 2018. *La fantasía de la individualidad. Sobre la construcción sociohistórica del sujeto moderno*. Traficantes de Sueños, Madrid.
- Hofmann, D., 2009. Cemetery and settlement burials in the lower Bavarian LBK, 220–234. In: Hofmann, D., Bickle, P. (Eds.), *Creating Communities. New Advances in Central European Neolithic Research*. Oxbow, Oxford.
- Hollimon, S.E., 2011. Sex and Gender in Bioarchaeological Research: Theory, Method, and Interpretation. In: Agarwal, S., Glencross, B. (Eds.), *Social Bioarchaeology*. Blackwell, Oxford, pp. 149–182.
- Huntingford, G.W.B., 1953. *The Nandi of Kenya. Tribal Control in a Pastoral Society*. Routledge & Keagan Paul, London.
- Insoll, T., 2015. Constructing Ancestors in Sub-Saharan Africa. In: Renfrew, C., Boyd, M. J., Morley, I. (Eds.), *Death rituals, social order and the archaeology of immortality in the ancient world: 'Death Shall Have No Dominion'*. Cambridge University Press, Cambridge, pp. 153–167.
- Jimeno Martínez, A., 1984. *Los Tolmos de Caracena (Soria). Campañas de 1977, 1978 y 1979 (Excavaciones arqueológicas en España, 134)*. Ministerio de Cultura, Madrid.
- Katz, C., 1986. Children and the environment: work, play and learning in rural Sudan. *Children's Environ. Quart.* 3 (4), 43–51.
- Lang, C., Kuhnle, U., 2008. Intersexuality and Alternative Gender Categories in Non-Western Cultures. *Hormone Res.* 69, 240–250. <https://doi.org/10.1159/000113025>.
- Lévy-Bruhl, L., 1922. *La mentalité primitive*. Presses Universitaires de France, Paris.
- Lewis, M., 2007. *The bioarchaeology of children. Perspectives from biological & forensic anthropology*. Cambridge University Press, Cambridge.
- Lew-Levy, S., Boyette, A.H., 2018. Evidence for the adaptive learning function of work and work-themed play among Aka forager and Ngandu farmer children from the Congo basin. *Hum. Nat.* 29, 157–185. <https://doi.org/10.1007/s12110-018-9314-6>.
- Lindblom, G., 1920. *The Akamba in British East Africa*. Appelbergs, Uppsala.
- Lukacs, J.R., Largaespada, L.L., 2006. Explaining sex differences in dental caries prevalence: saliva, hormones, and "life-history" etiologies. *Am. J. Hum. Biol.* 18 (4), 540–555. <https://doi.org/10.1002/ajhb.20530>.
- Lull, V., Micó, R., Rihuete Herrada, C., Risch, R., 2013. *Bronze Age Iberia. In: Fokkens, H., Harding, A. (Eds.), The Oxford Handbook of the European Bronze Age*. Oxford University Press, Oxford, pp. 594–616.
- Lull, V., Micó, R., Rihuete Herrada, C., Risch, R., 2016. *Argaric Society: Sex and Death. Complutum* 27 (1), 31–62. <https://doi.org/10.5209/Cmpl.53216>.
- Martín García, C., Obregón Peris, T., De Cáceres Sastre, R., 2008. Excavación arqueológica del poblado protohistórico de 'Las Zumaqueras' en la Lastrilla, Segovia. In: *La gestión del patrimonio: hacia un planteamiento sostenible (VI Congreso Internacional Restaurar la Memoria, Valladolid: 2008)*. Junta de Castilla y León, Valladolid, pp. 253–258.
- Müller, A., 2001. Gender differentiation in burial rites and grave-goods in the Eastern or Bohemian-Moravian group of the bell beaker culture. In: Nicolis, F. (Ed.), *Bell Beakers Today: Pottery, People, Culture, Symbols in Prehistoric Europe*. Ufficio Beni Archeologici, Trento, pp. 589–599.
- Nájera, T., Jiménez Brobeil, S.A., Molina González, F., Delgado, A., Laffranchi, Z., 2012. La aplicación de los métodos de la antropología física a un yacimiento arqueológico: la Motilla del Azuer. *Cuadernos de Prehistoria y Arqueología de la Universidad de Granada* 22, 149–182.
- Nimurukundo, N., 1981. Les âges et les espaces de l'enfance dans le Burundi traditionnel. *J. Afr. Stud.* 15 (1–2), 217–234. <https://doi.org/10.3406/jafr.1981.2026>.
- Olalde, I., Reich, D., et al., 2019. The genomic history of the Iberian Peninsula over the past 8000 years. *Science* 363, 1230–1234. <https://doi.org/10.1126/science.aav40404>.
- Palol, P. de, Wattenberg, F., 1974. *Carta arqueológica de España*. Valladolid. Diputación de Valladolid, Valladolid.
- Palomino, A., Negro, M., Abarquero, F.J., 1999. Cabañas, basureros, silos y tumbas en el yacimiento de El Cerro, La Horra (Burgos): a vueltas sobre el significado de un campo de hoyos en la Edad del Bronce de la Meseta. *Nvmentia* 1995–1996 7, 21–41.
- Palomino, A., Crespo Díez, M., Centeno Cea, M.L., 2021. Excavación en el yacimiento de 'Carrecastro' (Tordesillas y Velilla). Aportaciones de la arqueología comercial a la investigación del Bronce Final en el valle medio del Duero. In: *Conocer Valladolid. XII Curso de patrimonio cultural 2018/19*. Real Academia de Bellas Artes Purísima Concepción / Ayuntamiento de Valladolid, Valladolid, pp. 61–88.
- Palomo-Díez, S., Baeza-Richer, C., Eparza-Arroyo, Á., Velasco-Vázquez, J., Gomes, C., Sánchez-Polo, A., López-Parra, A.M., Blanco-González, A., Arroyo-Pardo, E., 2019. Kinship analysis on skeletal ancient remains: the case of 'El Cerro de La Horra' (Burgos, Spain). *Forensic Sci. Int.: Genet. Suppl. Ser.* 7 (1), 279–281. <https://doi.org/10.1016/j.FSIGSS.2019.09.110>.
- Pape, E., Ialongo, N., 2024. Error or minority? the identification of non-binary gender in prehistoric burials in central Europe. *Camb. Archaeol. J.* 34 (1), 43–63. <https://doi.org/10.1017/S0959774323000082>.
- Pollard, J., 2001. The aesthetics of depositional practice. *World Archaeol.* 33 (2), 315–333.
- Pradelles de Latour, C.H., 1996. Les morts et leurs rites en Afrique. *L'Homme* 36 (8), 137–142. <https://doi.org/10.3406/hom.1996.370080>.
- Rebay-Salisbury, K., 2017. *Bronze Age Beginnings: The Conceptualization of Motherhood in Prehistoric Europe*. In: Cooper, D., Phelan, C. (Eds.), *Motherhood in Antiquity*. Palgrave Macmillan, Cham, pp. 169–196.
- Rebay-Salisbury, K., Pany-Kucera, D. (Eds.), 2020a. *Ages and Abilities: the Stages of Childhood and Their Social Recognition in Prehistoric Europe and beyond*. Archaeopress, Oxford.
- Rebay-Salisbury, K., Pany-Kucera, D., 2020b. Introduction. Children's developmental stages from biological, anthropological and archeological perspectives. In: *Rebay-Salisbury and Pany-Kucera, 2020a*, pp. 1–9.
- Rebay-Salisbury, K., Galeta, P., Parson, W., Pany-Kucera, D., Spannagl-Steiner, M., Strobl, C., 2020. Ages and life stages at the middle bronze age cemetery of Pitten, Lower Austria. In: *Rebay-Salisbury and Pany-Kucera 2020a*, pp. 69–84.
- Rebay-Salisbury, K., Bortel, P., Janker, L., Bas, M., Pany-Kucera, D., Salisbury, R.B., Gerner, C., Kanz, F., 2022. Gendered burial practices of early Bronze Age children align with peptide-based sex identification: a case study from Franzhausen I Austria. *J. Archaeol. Sci.* 139, 105549. <https://doi.org/10.1016/j.jas.2022.105549>.
- Rebay-Salisbury, K., Berner, M., Wiltshcke-Schrotta, K., Herrero-Corral, A.M., Wolf, M., Kanz, F., 2025. More Error than Minority: Gendered Burial Practices Align with Peptide-based Sex Identification in Early Bronze Age Burials in Central Europe. *Camb. Archaeol. J.* 1–16. <https://doi.org/10.1017/S095977432500006X>.

- Rissech, C., Estabrook, F., Cunha, E., Malgosa, A., 2006. Using the acetabulum to estimate age at death of adult males. *J. Forensic Sci.* 51 (2), 213–229.
- Rodríguez-Marcos, J.A., 2012. Algunas notas acerca del proceso formativo de la cultura de Cogotas I. In: Rodríguez-Marcos & Fernández-Manzano 2012, pp. 147–164.
- Rodríguez-Marcos, J.A., Fernández-Manzano, J. (Eds.), 2012. Cogotas I. Una cultura de la Edad del Bronce en la península ibérica. Universidad de Valladolid, Valladolid.
- Rodríguez-Marcos, J.A., Marcos, G.J., Martín, M.A., Misiego, J.C., Sanz, F.J., 1999. Excavaciones arqueológicas en 'Las Vegas' (Jabares de los Oteros). In: Vidal Encinas (Ed.), *Protección del patrimonio cultural y obras públicas. Actuaciones Arqueológicas en la autopista del Camino de Santiago (1994–1997)*. Junta de Castilla y León – GICAL, Valladolid, pp. 48–70.
- Roksandik, M., Armstrong, S.D., 2011. Using the life history model to set the stage(s) of growth and senescence in bioarchaeology and paleodemography. *Am. J. Phys. Anthropol.* 145 (3), 337–347.
- Sánchez-Polo, A., 2011. Aproximación espacial a una composición decorativa en cerámicas de Cogotas I. In: López García, J.P., Hernández Sánchez, D., García Sánchez, J. (Eds.), *Los vínculos entre el hábitat y el paisaje. Actas del I Congreso de Arqueología de Chamartín (Ávila 2010)*. La Ergástula, Madrid, pp. 105–116.
- Sánchez Polo, A., Blanco-González, A., 2014. Death, Relics, and the Demise of Huts: Patterns of Planned Abandonment in Middle Bronze Age Central Iberia. *Eur. J. Archaeol.* 17 (1), 4–26. <https://doi.org/10.1179/1461957113Y.0000000048>.
- Sayer, D., Dickinson, S.D., 2013. Reconsidering obstetric death and female fertility in Anglo-Saxon England. *World Archaeol.* 45 (2), 285–297. <https://doi.org/10.1080/00438243.2013.799044>.
- Schaefer, M., Black, S., Scheuer, L., 2010. *Juvenile Osteology: A Laboratory and Field Manual*. Academic Press, Amsterdam.
- Schepartz, L.A., Stocker, S.R., Davis, J.L., Papathanasiou, A., Miller-Antonio, S., Murphy, J.M.A., Malapani, E., 2017. Mycenaean Hierarchy and Gender Roles: Diet and Health Inequalities in Late Bronze Age Pylos, Greece. In: Klaus, H.D., Harvey, A. R., Cohen, M.N. (Eds.), *Bones of Complexity. Bioarchaeological Case Studies of Social and Societal Biology*. University Press Florida, Gainesville, pp. 141–172. <https://doi.org/10.5744/florida/9780813062235.003.0006>.
- Scheuer, L., Black, S., 2000. *Developmental Juvenile Osteology*. Elsevier, San Diego-London.
- Seale, C., Van der Geest, S., 2004. Good and bad death: introduction. *Soc. Sci. Med.* 58 (5), 883–885. <https://doi.org/10.1016/j.socscimed.2003.10.034>.
- Sofaer, J., 2006. Gender, bioarchaeology and human ontogeny. In: Gowland, R., Knüsel, C. (Eds.), *The Social Archaeology of Funerary Remains*. Oxbow, Oxford, pp. 155–167.
- Sofaer, J., 2013. Bioarchaeological Approaches to the Gendered Body. In: Bolger, D. (Ed.), *A Companion to Gender Prehistory*. Wiley-Blackwell, London, pp. 226–243.
- Soriano, I., Herrero-Corral, A.M., Garrido-Pena, R., Majó, T., 2021. Sex/gender system and social hierarchization in Bell Beaker burials from Iberia. *J. Anthropol. Archaeol.* 64, 101335. <https://doi.org/10.1016/j.jaa.2021.101335>.
- Stewart, N.A., Molina, G.F., Mardegan Issa, J.P., Yates, N.A., Sosovicka, M., Vieira, A.R., Line, S.R.P., Montgomery, J., Gerlach, R.F., 2016. The identification of peptides by nanoLC-MS/MS from human surface tooth enamel following a simple acid etch extraction. *Royal Soc. Chem. Adv.* 6, 61673–61679. <https://doi.org/10.1039/c6ra05120k>.
- Stewart, N.A., Gerlach, R.F., Gowland, R.L., Gron, K.J., Montgomery, J., 2017. Sex determination of human remains from peptides in tooth enamel. *Proc. Nat. Acad. Sci. USA* 114, 13649–13654. <https://doi.org/10.1073/pnas.1714926115>.
- Strato, 2009. In: Excavación arqueológica en el yacimiento de Fuente la Mora (Valladolid) en las obras de la Autovía VA-30, Ronda Exterior Este. Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Valladolid.
- Strato, 2024. Trabajos arqueológicos integrados en la ejecución del proyecto de construcción de la Autovía A-73, Burgos-Aguilar de Campoo, Tramo: Quintanaortuño-Montorio (Provincia De Burgos). Intervención en el yacimiento Los Pilones, previa a su utilización como préstamo de materiales. Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Burgos.
- Sørensen, M.L. Stig, 2024. The Construction, Performance, and Effects of Gender: Reflection on the evidence from prehistoric burials. In: Moen, M., Pedersen, U. (Eds.), *Routledge Handbook of Gender Archaeology*. Routledge, London, pp. 211–222.
- Thomas, L.V., 1982. *La Mort africaine: Idéologie funéraire en Afrique Noire*. Payot, Paris.
- Ucko, P.J., 1969. Ethnography and archaeological interpretation of funerary remains. *World Archaeol.* 1 (2), 262–280.
- Van der Geest, S., 2004. Dying peacefully: considering good death and bad death in Kwahu-Tafo, Ghana. *Soc. Sci. Med.* 58, 899–911. <https://doi.org/10.1016/j.socscimed.2003.10.041>.
- Vega Melero, D., 1996. Memoria Arqueológica. Variante de Cuéllar P.P. 3,900 a P.K. 4,160. Cuéllar (Segovia). Unpublished report at Servicio Territorial de Cultura de la Junta de Castilla y León, Segovia.
- Velasco-Vázquez, J., 2010. Los restos humanos del Túmulo de El Morcuero (Gemuño, Ávila): una perspectiva bioarqueológica. *Munibe. Antropología-Arkeología* 61, 213–219.
- Velasco-Vázquez, J., Delgado Darías, T., 2005. Consideraciones preliminares sobre los restos humanos de la Cueva de La Revilla (Atapuerca, Burgos). *Boletín del Seminario de Estudios de Arte y Arqueología. Arqueología LXXI*, 128–136.
- Velasco-Vázquez, J., Esparza-Arroyo, Á., 2016. Muertes ritualizadas en la Edad del Bronce de la Península Ibérica: un enterramiento inusual en Los Rompizales (Quintanadueñas, Burgos). *Munibe Antropología-Arkeología* 67, 75–103.
- Velasco-Vázquez, J., Esparza-Arroyo, Á., Alberto Barroso, V., 2018. A vueltas con la exposición de cadáveres en Cogotas I: La evidencia del Cerro de la Cabeza (Ávila). *Boletín del Seminario de Arte y Arqueología. Arqueología LXXXIV*, 134–167.
- Wattenberg, F., 1957. Hallazgos arqueológicos en Renedo de Esgueva (Valladolid). *Boletín del Seminario de Estudios de Arte y Arqueología XXIII*, 189–192.
- Weiss-Krejci, E., 2011. The formation of mortuary deposits: implications for understanding mortuary behavior of past populations. In: Agarwal, S.C., Glencross, B.A. (Eds.), *Social Bioarchaeology*. Wiley-Blackwell, Chichester, pp. 68–106.
- Wieschhoff, H.A., 1938. Concepts of Right and Left in African cultures. *J. Am. Orient. Soc.* 58 (1), 202–217.