Multidisciplinary Journal of Psychology and Sociology
Volume 10 Issue 3, July-September 2022
ISSN: 2995-3766
Impact Factor: 6.70
http://kloverjournals.org/journals/index.php/ps

FROM SHANIDAR 1 TO SOCIAL RELEVANCE: NEANDERTHAL PRETREATMENT EXPLORED

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Abstract
Funerary practices, encompassing pretreatment, mortuary treatment, and commemorative behaviors, have been an integral part of human culture since time immemorial. However, our understanding of these practices within Neanderthal groups remains enigmatic. This paper delves into the enigmatic realms of Neanderthal funerary practices, shedding light on two critical aspects: pretreatment practices and commemorative behaviors.
Little is known about Neanderthal pretreatment practices, which involve preparing the dying for death. While there is sparse evidence, the care provided to elderly or disabled individuals, as exemplified by Shanidar 1, hints at a possible form of pretreatment. This paper delves into the available archaeological and anthropological data to unearth the hidden facets of Neanderthal pretreatment practices.
Commemorative behaviors, such as rituals, offerings, or shrines, play a crucial role in understanding the cultural and social dimensions of a group. Neanderthal commemorative behaviors have remained largely uncharted territory. Some findings suggest the inclusion of materials like animal remains and stone tools as grave goods, indicating possible ritualistic significance. Additionally, the repeated placement of individuals in specific areas within sites raises questions about the social and symbolic importance of these locations. This study explores the available evidence, seeking to uncover the meaning and significance of Neanderthal commemorative behaviors.
Intriguingly, this research also contemplates the possibility that Neanderthal burial sites were more than just repositories for the deceased, proposing that these sites might have held important social functions.
By addressing the gaps in our knowledge regarding Neanderthal pretreatment practices and commemorative behaviors, this study contributes to a deeper understanding of Neanderthal culture and provides valuable insights into the ways in which they honored and remembered their dead.

Keywords: Neanderthals, Funerary practices, Pretreatment, Commemorative behaviors, Burial sites

INTRODUCTION

All human groups deal with their dead in some manner. Such funerary systems typically include some sort of pretreatment (e.g., preparing the dying for death), an initial mortuary treatment to prepare the body (e.g., from washing to mummification) for a final mortuary treatment (e.g., burial), plusvarious commemorative behaviors (e.g., rituals, offerings, or shrines) (Sutton 2021). For Neanderthal groups, virtually nothing is known about pretreatment practices, although care of elderly or disabled individuals such as Shanidar 1 (Trinkaus 1983; Trinkaus and Villotte 2017; also see Steiner 2017:257),may qualify.
Similarly, very little is understood about Neanderthal commemorative behaviors. In a few cases, some materials, such as animal remains and stone tools, might have been included with individuals as grave goods (Steiner 2017:255), suggestive of ritual behavior. Further, it seems that people were repeatedly

placed in the same (presumably significant) areas within sites (Steiner 2017:255) and Pettit (2002) suggested the possibility that some burial sites themselves may have been important social locations.
More is known about Neanderthal mortuary practices, primarily final dispositions. More than 200 Neanderthal individuals have been identified, a number of which appear to have been deliberately and meaningfully (apart from sanitary purposes) buried (Trinkaus 1995; Pettitt 2002, 2011; Churchill 2014:361-362; Rendu et al. 2014; Steiner 2017;Balzeau et al. 2020; but see Dibble et al. 2015). Most burials appear to have been single interments (no cremations have been reported) (Steiner 2017:257). The remains range from essentially complete and articulated skeletons (e.g., La Chapelle-aux-Saints1; Boule 1911), to the scattered but relatively intact disarticulated remains of specific individuals (e.g., Feldhofer 1; Schmitz et al. 2002), to a few isolated fragments (e.g., at Denisova Cave; Krause et al. 2007).
Finally, highly fragmented, scattered, and apparently modified Neanderthal remains havebeen documented at a small number of sites in Europe. The apparent modificationsincludecut, scraping,and percussion marks, fragmentation, and burning. In many cases, it appears that the fragmentary human materials exhibit the same patterns of modification as processed game animals. In addition, many of the fragmented human bones were found in the same deposits as the discarded animal remains.
A number of ideas have been offered to explain these patterns. Natural taphonomic processes such as soil pressure, bioturbation, animal gnawing, carnivore scavenging, and soil disturbances by later people have been suggested (e.g., Camarós et al. 2017).However, it seems clear that the bodies from these sites were processed by being purposefully defleshed, disarticulated, and fragmented.
A common cultural explanation isthe processing of the body for either nutritionalor ritual cannibalism (Ullrich 2004, 2005, 2006; Yustos and de losTerreros 2015; Saladié and Rodríguez-Hidalgo 2017; Defleur and Desclaux 2019; but see Slimakand Nicholson 2020; Defleuret al. 2020), possibly with theremains disposed of with the other food refuse. Another possibility is the compassionate preparation of the body for a disarticulated interment (Russell 1987a; Le Mort 1989; Frayer et al. 2006; Garralda 2009). Other practices that might result in a similar signature (e.g., Pickering 1989; Ullrich 2004) include the preparation of the body for an unusual final disposition, such as that afforded the Chinchorro of Peru and Chile (Aufderheide et al. 1993) or the Tibetan Sky burial (e.g., Malville 2005). Another possibility is manipulation of the body without "anyprecise intentionality" (Garralda et al.2005:195).
Finally, the observed patterns might be the result of violence committed by other Neanderthal groups and/or anatomically modern humans (AMH) (Gat 1999; also see Hortolà and Martínez-Navarro 2013). Once people were killed, their bodies may have been subjected to any number of unsympathetic mortuary treatments, even including cannibalism. Bodies might also have been processed in an effort to "erase" them from the cultural landscape, as has been proposed to explain similar patterns of human skeletal remains in the American Southwest (Martin 2015; also see Martin 2016; Osterholtz 2012, 2016; Osterholtz and Martin 2017).
In this study, the demographic profiles of the recovered remains at the Neanderthal sites where modified human remains have been recovered were compiled. In most cases, the dataare consistent

with small integrated social units, that is, families. Analysis of mtDNA at several of the sites suggest close genetic relationships between some of the individuals, also supportive of the idea of family units. These patterns lead to thesuggestionthat the highly fragmented and modified Neanderthal remains at many of these sites were not the result of regular and sympathetic mortuary treatment of individuals that accrued through time but ofsudden and extreme violence directed against specific family groups by competing Neanderthal social units; that is, family annihilation. The motivations for these events is unclear, but may be related to factors (e.g., climate change; cf. Defleurand Desclaux 2019) resulting in competition for resources (e.g., food, territory, or occupation locales), as a mechanism for social control, or possibly even criminal behavior.

THE SITES

A total of nine sites with modified and fragmented remains of Neanderthal individuals have been documented, all within Western and Central Europe (Figure 1, Table 1). These sites date between 130 and 40 kya. Of course, there are both earlier and later sites with similar evidence, most of which have been generally interpreted as reflecting cannibalism (e.g., Carbonell et al. 2010; Saladié and Rodríguez-Hidalgo 2017).

KRAPINA, CROATIA

The Krapina site is located on the northern Croatia (see Figure 1). It was excavated more than a century ago (Gorjanović-Kramberger 1909; Ullrich 1978, 1989) and is believed to date to about 130 kya (MIS-5e). More than 900 fragments of human boneidentified as Neanderthal were recovered and represent about 23 individuals of both sexes and all age classes (Trinkaus 1995:126; also see Trinkaus 1975, 1985; Wolpoff 1979; Wolpoff and Caspari 2006).

Analyses of the Krapina remains show that many of the fragments have cut marks and percussion pits, had been purposefully fragmented, and that some had been burned (Ullrich 2005, 2006; White and Toth 2007:292; Orschiedt 2008; but see Frayer et al. 2020). In addition, hominin tooth marks were discovered on a few of the fragments (White and Toth 2007:294), and one specimen (a femur shaft fragment) was apparently used as a retouching tool (Patou-Mathis 1997; Rougier et al. 2016).The fragmented human remains were found mixed with faunal remains of game animals (Ullrich 2004).

Trinkaus (1995:126, Table 1; also seeWolpoff 1979:Table 2; Bocquet-Appel and Arsuaga 1999:Table 1) calculated a total NMI of 23 individuals at Krapina with a demographic profile (see Table 1) of seven adults, 10 adolescents, fourjuveniles, and twoinfants, with both sexes being represented (Estabrook 2007). It was hypothesized that the remains reflected two or more events of simultaneous deaths (Bocquet-Appel andArsuaga 1999), perhaps due to a demographic crisis from severe environmental fluctuation (e.g., Defleur and Desclaux 2019) although the possibility of mass killings was also considered (Bocquet-Appel and Arsuaga 1999:335).

The interpretation of the Krapina remains is varied. Some researchers view the alterations to be the result of natural processes (Trinkaus 1985; Orschiedt 2008; Russell 1987b). Others view them as anthropogenic. Patou-Mathis (1997) and White and Toth (2007) believe that the materials reflect nutritionalcannibalism.Russell (1987a; also see Ullrich 2004, 2005; Frayer et al. 2006) suggested that the trauma on the bone was more consistent with the preparation of bodies for secondary burials rather

than cannibalism, although ritual cannibalism was possible (Frayer et al. 2020). Estabrook and Frayer (2013) noted that some of the traumas hadhealed, suggestive of ongoing interpersonal violence (also see Zollikofer et al. 2002; Beier et al. 2018). The presence of eagle talons suggested ritual activities (Frayer et al. 2020).

MOULA-GUERCY (AKA ABRI MOULA), FRANCE

TheMoula-Guercy site is located in the Rhone River Valley of southern France (see Figure 1). The site was excavated several times, most recently in the 1990s (e.g., Defleur et al. 1993a, 1993b, 1999), and dates to roughly 120 kya(MIS-5e) (Willmes et al. 2016). Approximately 120 fragments of bone from seven Neanderthal individuals were recovered.

Many of the pieces exhibited cut marks, percussion pits, and fragmentation, suggestive of defleshing and dismemberment (Defleur et al. 1999; Valensi et al. 2012; Willmes et al. 2016; Defleur and Desclaux 2019). The human remains appear to have been processed in the same manner as the other large animals at the site, although there was a greater number of cut marks on the humanmaterials (Valensi et al. 2012), and they were discarded along with faunal remains of game animals (Defleur et al. 1999).

The demographic profile (see Table 1) includes one mature adult male, one young adult female aged ≈18 to 21.0 years, oneadolescent female aged ≈ 15-16 years, an adolescent aged≈ 10/11 years, and two children (aged ≈4/5 and ≈ 7/8 years) (Defleur et al. 1999; Mersey et al. 2013a, 2013b; Richards et al. 2021). Defleur and Desclaux (2019:122) argued that the ages of the individuals fit within the natural mortality profiles for hunter-gatherers and so were likely natural deaths. However, the demographic profile is also consistent with a single social unit (family?) with simultaneous deaths.

The remains from Moula-Guercyare commonly interpreted as reflectingritual or nutritional cannibalism

(Defleur et al. 1993a, 1993b, 1999; Valensi et al. 2012; Willmes 2016; Defleur and Desclaux 2019). Defleur and Desclaux (2019; also see Defleur et al. 2020) argued that the change in climate during the Last Interglacial (MIS-5e) resulted in a decline in available resources and a collapse in Neanderthal populations, resulting in a rise in endocannibalism for nutritional reasons.

COMBE-GRENAL, FRANCE

The Combe-Grenal site is located in south-central France (see Figure 1) and has been excavated several times, the latest being in the 1960s. There are some 60 levels attributed to the Neanderthal occupation and the remains from Level 60 date to about 130 kya (MIS-5e). Most of the Neanderthal human remains were found in Level 25, dated between 65 and 75 kya.

In Level 25, the human remains consisted primarily of cranial and dental elements but included some post cranial materials, with the hand and foot bones being the only intact elements (Garralda et al. 2005:191). There was no evidence of deliberate burial and the human bone was found in the rear of the cave associated with discarded tools and faunal remainsof game animals (Garralda et al. 2005:191).

Five of the fragments exhibited cut marks (Garralda and Vandermeersch 2000; Gómez-Olivencia et al. 2013), some of which were identified ashaving been made by stone tools (Garralda et al. 2005:191). No clear consensus regarding the interpretation of the cut marks has been reached (Garralda and

Vandermeersch 2000; Garralda et al. 2005; Gómez-Olivencia et al. 2013) although Le Mort (1989) believed they reflected defleshing and dismemberment.

At least seven individuals (see Table 1) are represented in the human remains (Garralda and Vandermeersch 2000; Gómez-Olivencia et al. 2013; also see Trinkaus 1995: Table 1). These includeperhaps three adults (some younger than about 40 and some older),two adolescents (aged ≈ 12 and 14-15 years), and two children (aged ≈ 7 years). Not all of the individuals could be identified to age class and none were identified to sex. In spite of these limitations, the demographic profile is consistent with a family social unit.

LES PRADELLES (AKA MARILLAC-LE-FRANC), FRANCE

The Les Pradelles site is located along the Ligonne River in south-central France (see Figure 1). Excavations at the site began in the 1960s and continue to the present. The site has been interpreted as a small, perhaps specialized, reindeer hunting camp (Costamagno et al. 2006, 2018), dated to about60 kya(MIS-4/3) (Maureille et al. 2007:Table 5; also see Garralda et al. 2014, 2019; Frouin et al. 2017a; Maureille et al. 2017).Approximately 100 Neanderthal skeletal specimenshave been recovered, primarily in Levels 9 and 10 in the lower portion of the deposit and many of the fragments are cranial (Mussiniet al. 2011).

Observed anthropogenic alterationsinclude cut and scraping marks, percussion pits, and fragmentation. More than 35 percent of the cranial fragments (Mussini 2011; Maureille et al. 2017) and57 percent of the long bones showed alterations (Mussini 2011). Examination of some of the cut marks by SEM showed clear traces of having been made by stone tools (Garralada et al. 2005).

The human remains appear to have been discarded with the faunal remains of game animals (Garralda et al. 2014; Maureille et al. 2017) and one of the human bones was apparently used to retouch stone tools (Rougier et al. 2016). There may have also been some scavenger activity at the site as evinced by the presence of some partially digested human teeth (classified as such due to acidic erosion on the specimens; Maureille et al. 2017).

A total of seven individuals have been identified at the site (see Table 1): three adults, two juveniles, and two infants (Maureille et al. 2007; Garralda et al. 2014). This demographic profile is again consistent with a family social unit. The modified human remains from the site exhibit evidence of defleshing, disarticulation, and long bone fragmentation and appear to have been discarded with refuse. These patterns are commonly interpreted as reflecting cannibalism (Garralda et al. 2005, 2014; Maureille et al. 2007; Mussini; 2011;Yustos and de losTerreros 2015; Maureille et al. 2017).

LA QUINA, FRANCE

The La Quina rockshelter is located in southwest France (see Figure 1). Excavations at the site occurred between 1905 and 1998 and a significant Neanderthal occupation was documented (Verna et al. 2010; Verna and d'Errico 2011).

The complete (with no anthropogenic modifications) skeleton of an adult was found, as werean additional 53 fragmentary human specimens, all associated with Neanderthals (Frouin et al. 2017b). The site was dated to between 55 and 65 kya (Frouin et al. 2017b). Anthropogenic modifications were noted on three human cranial fragments. Two specimens exhibited cut marks, scraping marks, and

percussion pits, all suggestive of defleshing (Verna and d'Errico 2011). The third specimen exhibited modifications consistent with its use as a retouching tool (Rougier et al. 2016).The remains have been interpreted as possibly reflecting cannibalism (Verna and d'Errico 2011; Frouin et al. 2017b).

In addition to the complete adult skeleton, 53 other human specimens were found. These specimens represent at leastfour adult or subadult individuals plus one juvenile (see Table 1) (Trinkaus 1995:Table 1; Verna et al. 2010). The current data are not sufficient to define the nature of any social unit represented but are not inconsistent with a family unit.

EL SIDRÓN, SPAIN

The El Sidrón site is located near the coast in northern Spain (see Figure 1). More than 2,500 Neanderthal skeletal specimens have been recovered from the site (Rosas et al. 2017), dated to about 49 kya (Ríos et al. 2019; also see Wood et al. 2013a; de Torres et al. 2010).All portions of the skeleton have been recovered, including teeth, cranial, and post-cranial remains, as well as hand and foot bones (Rosas et al. 2012).

Approximately 30 percent of the recovered remains exhibit evidence of cut marks, percussion pits, and fragmentation. Some of the bone had also been flaked. Most of the alterations were found on the adult remains and most frequently on long bones. These alterations suggest that the individuals were defleshed, disarticulated, and fragmented (Rosas et al. 2006, 2012, 2013).

At least thirteen individuals have been identified (Rosas et al. 2013:Table 2; Rosas et al. 2017:1282),includingthree adult males (one mature and two young), four adult females (three mature and one young), three adolescent males (one aged ≈ 11/12years and two of undetermined age), two juvenile males (aged≈ 9/10 and ≈ 7/8 years), and one infant of undetermined sex (aged ≈ 2/3 years). The demographic suggested a family unit of some sort.

An analysis of the DNA from the individuals determined that the three adult males belong to the same mtDNA lineage while three adult females each had a different mtDNA lineage (Lalueza-Fox et al. 2005, 2011:50; Dean et al. 2013; Rosas et al. 2017: Ríos et al. 2019). This suggests that the adult males were all related and that the adult females had different familial origins, essentially an exogamous patrilocal "marriage" pattern. Further, the ≈ 7/8 year old juvenile male (individual J1) was "tentatively identified as the child of adult female 4 and the older sibling of infant 1"indicating that all of the individuals belonged "to a single Neanderthal group" (Rosas et al. 2017:1282) constituting "a closely related kin group" (Ríos et al. 2019:1). These relationships also suggest that the individuals "represent all or part of a contemporaneous social group of Neanderthals, who died at around the same time" (Lalueza-Fox et al. 2011:50).

The pattern of anthropogenic alterations suggested to Rosas et al. (2006; also see Wood et al. 2013a) that cannibalism was likely practiced. In any event, there is demographic and genetic evidence that this group of remains reflects a family of Neanderthals that were killed at the same time and whose bodies were then processed.

ZAFARRAYA, SPAIN

Zafarraya is located on the southern coast of Spain near Gibraltar (see Figure 1). The site was investigated beginning in 1981 (Barroso-Ruízand Hublin 1994; Hublin et al. 1995; Barroso-Ruíz

2003)and the Neanderthal materials there date to □46 kya (Wood et al. 2013b; Michel et al. 2013). A small number (N = 10) of Neanderthal skeletal remains were found in the lower levels, primarily in one location associated with a hearth (Hublin et al. 1995:934).

All of the human bone was fragmented, some had cut marks, and some of those were burned (Yustos and de losTerreros 2015:39). Several of the fragments were found within the hearth feature. There may have been some post depositional scavenger damage (Barroso-Ruíz and Hublin 1994). Yustos and de losTorreros (2015:43) argued that the cut mark type and location suggested skinning, disarticulation, defleshing, and evisceration, and further suggested they reflected cannibalism (Yustos and de losTerreros 2015:43). The Neanderthal remains recovered from the site represented nine individuals; seven adults and two infants of undetermined sex (Barroso-Ruíz and de Lumley 2006). This is broadly consistent with a family group.

VINDIJA CAVE, CROATIA

Vindija Cave is located in the northwestern part of Croatia (see Figure 1). The site was discovered in 1928 and excavated until 1986 (Malez and Ullrich 1982; Ahern 1998; Patou-Mathis 2018). About 70 fragments of Neanderthal bone, along with Mousterian artifacts, have been recovered from Layer G. The skeletal remains date earlier than about 44 kya (Devièsea et al. 2017; also see Hublin 2017).

Abundant faunal remains, almost exclusively cave bear (*Ursus spelaeus*) but including some ungulates, were found. Some of the bone had been trampled, eroded, and/or gnawed on by scavengers (Malez and Ullrich 1982). None of the cave bear remains had been modified by humans but a few of the ungulate bones showed signs of butchering (Patou-Mathis 2018).

Cut marks, percussion pits, and spiral fractures were noted on about 10 percent of the human bones (PatouMathis 2018). Some of the postcranial bones were broken in ways that Patou-Mathis (2018) thought were consistent with disarticulation and defleshing. None of the human bone was burned and most was found in the same deposits as the other materials.

The demographic profile of the human remains is enigmatic. Wolpoff et al. (1981) identified an MNI of at least seven, with five adults and two possible juveniles with two of the seven suggested to be female and one to be male. Ahern (1998) later recognized an MNI of six; two as adults (one young and one old), four of unknown age, and none identified to sex. Most recently, genetic studies revealed the presence of at least one female (Vi-33.19; Prüfer et al. 2017).

Studies conducted on the DNA of the remains fromVindija Cave. Gansauge and Meyer (2014; also see Green et al. 2008) reported that specimens Vi-33.19 (a female) and Vi-33.16 were related while Devièsea et al. (2017) reported that specimen Vi-207 was related to Vi-33.25 and that Vi-28 was related to Vi-33.17. Prüfer et al. (2017) found that Vi-33.16, Vi-33.25, and Vi-33.26 were closely(in time) related to Vi-33.19. Finally Hajdinjak et al. (2018) reported that the mtDNA from specimens Vi-33.16, Vi-33.17, Vi-33.19, Vi-33.25, and Vi-33.26share sufficient alleles to suggest they are broadly contemporaneous. In sum, the DNA data suggest close familial relationships between some of the individuals, possibly living at the same time.

The human remains Vindija Cave have been interpreted as reflecting cannibalism (White 2001; Patou-Mathis
2018). This conclusion was based on the presence of the cut marks and their similarity to the remains from Krapina (Patou-Mathis 2018).

GROTTES DE GOYET, BELGIUM

The Goyet site is a large cave system locatedabove the Samson River in central Belgium (see Figure 1). The site was investigated beginning in the late 1800s and contains Upper Paleolithic and later materials plus a Neanderthal occupation (Toussaint 2006)that dates between 41 and 45 kya (Rougier et al. 2016). A total of 96 specimens identified as Neanderthal (Rougier et al. 2016:2) has been reported. The remainsare highly fragmented and exhibit cut marks, percussive marks, green bone fractures, some possible scraping marks, and some evidence of burning (Rougier et al. 2016:3). The modificationsare primarily on femurs and tibias, presumably those with the highest nutritional values. The same pattern of defleshing was seen on the horse and reindeer remains from the site (Rougier et al. 2016:5).Some of the human bone was apparently used to retouch stone tools(Rougier et al. 2016).

Four adults/adolescents and one infant (the latter represented by a single tooth) could be identified from the highly fragmented remains (Rougier et al. 2016:2) (see Table 1) but data on specific ages or sex are lacking. As much of the Middle Paleolithic deposits at the site remains unexcavated, it is probable that additional individuals are present.DNA studies (Rougier et al. 2016) confirmed the Neanderthal lineage but comparisonsof the samples to determine whether there are any familial relationships is not yet complete (Hélène Rougier, personal communication 2021). Thus, no assessment of the nature of any social groups at the site is yet possible.

Rougier et al. (2016:6) concluded that the Goyet site contains “the first unambiguous evidence of Neandertal cannibalism” and that the individuals were “butchered” with “their exploitation as food sources [being] the most parsimonious explanation” (Rougier et al. 2016:6). It was further concluded that the perpetrators were probably other Neanderthals since AMH are not known in that area at that time (Rougier et al. 2016:6).

DISCUSSION

There are numerous sites that contain Neanderthal skeletal remains but only a few that contain highly fragmented remains with apparent anthropogenic modifications. In these few cases, it seems evident that the remains were modified by humans but the reasons for such modifications remain unclear. It is commonly suspected that cannibalism, either nutritional or ritual, may have occurred. Others consider the possibility of some sort of specialized mortuary treatment. Unfortunately, there is currently no direct evidence to support any specific reason(s) for these patterns of anthropogenic modifications.The comparative rarity of these body modifications suggest they were not the most commonly practiced mortuary treatment.

An examination of the demographic profiles at the sites in question (see Table 1) consistently shows the presence of adults, children, and infants, suggesting the possibility that the human remains at the sites in question reflect distinct social units, such as families. Analyses of DNA at two of the sites indicate close biological relationships between some of the individuals. At El Sidrón, the adult males were

related to each other while the adult females were not, suggestive of an exogamous system. In addition, one of the infants was identified as the child of one of the adult females. At Vindija Cave, close genetic relationships were noted between several of the individuals. It would further seem, given the available data on age, sex, and genetic relationships, thatthese families may have died at the same time. If the deaths of entire family units were synchronous, it seems most likely that violence was involved, although one cannot discount the possibility of some disease (Sullivan et al. 2017). But why would entire families be killed?

Mass killings would be consistent with nutritional cannibalism, as has been commonly proposed. It is also possible that cannibalism for food was not the goal but that people were killed for some other reason, with their bodies being processed as part of some mortuary treatment, perhaps even including ritual cannibalism.

If outsiders killed the families, they may have done so for some economic or military reason. In either case, they may have processed the "enemy" bodies in ways to denigrate them and exert power over them in the afterlife (Duncan 2005:211-212). Such treatment may have also included some level of cannibalism.If members of their own general society killed them, it may have been due to an effort to exert social control over the larger group (other families) through intimidation. The mortuary treatment afforded the dead may have been designed to terrify and demoralize others.

Similar patterns of anthropogenic modified bodies are known in the American Southwest, often interpreted as cannibalism (White 1992; Turner and Turner 1999). However, Martin (2015; also see Martin 2016;Osterholtz2012, 2016;Osterholtz and Martin 2017) suggested that the patterns of anthropogenic modified human remains were the result of acts of extreme violence, performances designed to "erase" the victims from the landscape, cement alliances with other groups, or to gain status. While the prehistoric societies of the American Southwest and Western Europe are very different, similar motivations may have existed.

This model requires that we ask how one group of Neanderthals would have regarded other Neanderthal groups. It is typical that groups in conflict "dehumanize" each other so as to justify their killing so it would not be unreasonable to believe that the same was true between distinct Neanderthal groups, perhaps with each seeing the other as not "human" (e.g., Hortolà and Martínez-Navarro 2013). A similar argument has been made in respect to cannibalism in the prehistoric American Southwest (e.g., Palkovich 2012:114–115).

CONCLUSION

It is recognized that this model is speculative, secured by few data, and contains a number of "if, then" propositions. As such, it is very much like all of the other ideas that address the issue of the modified Neanderthal remains. Of course, further excavations at these sites could reveal additional individuals that may alter the demographic patterns noted herein and additional DNA data would be informative. In sum, the purpose of this paper is not to evaluate the merit of cannibalism, mortuary patterns, natural processes, and the like, but to call attention to the possibility that discrete social units, families, may have been the victims of violence. Such an insight may better inform future research into this fascinating phenomenon.

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Acknowledgements:

I appreciate the encouragement, assistance, and suggestions of Amaya Ardilla, Eric Bartelink, Steven E. Churchill,and Gary D. Richards on a draft of this paper. They have all insisted they take no credit for the ideas expressed.

Table 1. European Sites with Reported Anthropogenically Modified Neanderthal Remains.

Site	Age (ka[1])	Demographic Profile					DNA data
		MNI[2]	Adult (ca. ≥21 yrs)	Adolescent (ca. 11 to 21 yrs)	Juvenile (ca. 2 to 10 yrs)	Infant (ca. 0-2 yrs)	
Krapina, Croatia	130	~23	7	10	4	2	
Moula-Guercy, France	120	6	2	2	2	--	--
Combe-Grenal, France	65-75	≥7	≥3	2	2	--	--
Les Pradelles, France	~60	7	3	--	2	2	--
La Quina, France	55-65	53	4		1	--	--
El Sidrón, Spain	43-48	13	7	3	2	1	adult males related

Zafarraya, Spain	46	9	7	--	--	2	--
Vindija Cave, Croatia	≥44	≥ 6	2-5	--	2 (?)	--	some related individuals
Grottes de Goyet, Belgium	41-45	5	4		--	1	analysis in process

[1] thousands of years old, based on geomorphological, faunal, radiocarbon, and luminescence data [2] minimum number of individuals

[3] not including a complete adult skeleton

Figure Caption: Figure 1. Location of sites discussed in the text: (1) Krapina, (2) Moula-Guercy, (3) Combe-Grenal, (4) Les Pradelles, (5) La Quina, (6) El Sidrón, (7) Zafarraya, (8) Vindija Cave, (9) Grottes de Goyet.