

TOOTH BEADS IN TWO HUNTER-FISHER-GATHERER SOCIETIES OF NORTHERN EUROPE

Lars Larsson

Beads made from animal teeth were an important form of decoration among hunter-gatherer societies in Northern Europe. The analyses presented in this paper are based on questions regarding the design of the beads, the choice of animal teeth, their placement on the costume, and the exchange of beads. For these analyses, two sites with partly different conditions have been selected, one located in northern Latvia (Zvejnieki), and the other in southernmost Sweden (Skateholm). The former covers a long period of use with a large number of graves, while the latter has a smaller number of graves, but these have been studied using new methods of analysis.

INTRODUCTION

In most societies where hunting makes the most important economic contribution, beads made of animal teeth are common as decorative objects (Rigaud 2011). Tooth beads can be perceived to have various meanings. A number of studies of tooth pendants have considered social factors (d'Errico and Vanhaeren 2002; Cristian and Borić 2017; Macâne et al. 2019; Mannermaa et al. 2017; Rigaud et al. 2015; Vanhaeren and d'Errico 2002) as well as other factors, such as the ritual perspective (Laporte and Dupont 2019). They can be a purely decorative element of the costume, but they can also be a kind of abstraction of the wild environment (Larsson 2012).

The animal teeth, in being extracted and reshaped, are transferred to the human sphere of hunter-fisher-gatherers (Larsson 2006). Here, carnivorous and herbivorous animals, and animals from marine and terrestrial environments, are mixed together in an artificial world completely ruled by humans. However, they remain part of the wild and their special qualities might be transferred to the wearer. The use of teeth from particular animals may generally be taken to reflect norms and values accepted by individuals living in a shared physical and social environment. For example, members of a society can be related to a particular animal through heredity or special characteristics, or a large number

of tooth beads on a woman's costume can mark her status and relationship to that of a skilled hunter.

One aim of the current study was to obtain an understanding of how the teeth were modified by identifying the techniques of bead manufacture. A further goal was to identify and classify whether and in what ways the beads might have been affected through use by conducting a use-wear analysis. This analysis should give an indication of how the pendants were fastened, as well as how different sets of garments were handled, and whether beads differing in use-wear were combined.

Throughout life, a person's dress, adornments and gear would change, being replaced and supplemented. The number and combination of beads might change due to transitions in age and gender roles. Other reasons for a change in the embellishment of dress might be developments in competences and special social relationships. For example, a person who left their previous place of residence may change their dress and ornament in order to be accepted into a new society. These transitions ought to shape the number of items, species composition, and wear patterns in the assemblage of pendants associated with an individual. In the archaeology of hunter-gatherer societies, such features might be reconstructed based on the study of tooth beads and pendants of other materials associated with burials. Further insight would be obtained, if these combinations could be followed diachronically, shedding light on the survival of tradition and acceptance of innovations. Changes in the climate and composition of local game can also have consequences for the choice of tooth beads.

To illustrate different aspects of these phenomena, two different sites have been selected. A site permitting both synchronic and diachronic analysis is the cemetery at Zvejnieki, northern Latvia (Zagorska 2006a; Zagorskis 2004). At the time of its prehistoric occupation, lasting from about 7500 to 2600 cal BCE, it was an island in the middle of the lake, which was three times larger than at

present (Eberhards 2006). The other site included in the study, Skateholm, is located on the opposite shore of the Baltic, on the southern coast of Scania, the southernmost part of Sweden (Figure 1). The Skateholm excavation project revealed two cemeteries with associated settlements on former islands in a now completely dry bay, dated to the Late Mesolithic, around 5000 cal BCE (Larsson 2006, 2012, 2020). The two burial sites, Skateholm I with 22 and Skateholm II with 65 graves, appear to be chronologically sequential, which relates to a rise in sea level.

How beads were shaped and used

At least three major modes of shaping the teeth into beads have been identified (Larsson 2006). The first mode is drilling in order to obtain a round perforation. In most cases the perforation has been made from both sides (Figure 2). A second mode involved perforation achieved by carving on opposite sides of the root using a tool with a sharp edge, until a perforation or crater was obtained. The third mode

was by cutting a groove in order to facilitate the fixing of the tooth to a thread.

It is possible to evaluate how long a tooth bead was used by studying use-wear on the perforation. Use-wear consists of wear on the edge of the hole so that it becomes more or less rounded. In cases with extremely heavy use wear, it can include the smoothness of the entire tooth root. On most tooth beads, traces of wear are limited, which may indicate that they were securely fixed to the clothing. In some cases, distinct wear can be traced (Figure 2e-f). One such example is a red deer tooth where the original suspension hole was broken and a new one added (Figure 2a). The traces of wear are found around the perforation, but are mainly visible in the area in the direction of the root of the tooth. Experiments have further shown that wear on the perforation will be limited, even if the tooth was allowed to hang free. For example, wearing a bracelet of teeth daily for just over six months resulted in limited traces of use.

Traces of use-wear suggest that beads were individually sewn to some surface or combined into



Figure 1. Northern Europe with the find sites of Zvejnieki, northern Latvia, and Skateholm, southern Sweden. (Drawing by the author, 2005).

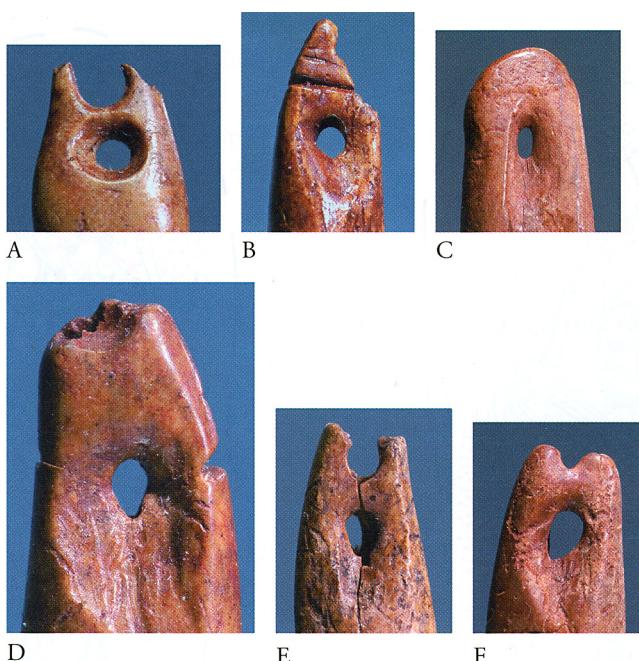


Figure 2. Tooth beads displaying different techniques for altering the root and use-wear. A. Root drilled twice, with heavy use-wear, B. Combined grooves and drilled perforation, C. Carved perforation with heavy use-wear, D. Carving of the perforation, and E-F. Twice cut perforations with light and heavy use-wear. (Photo Bengt Almgren, 2004).

smaller or larger sets. There is no obvious evidence of wear from secondary fastening, such as a second string or multiple loops of leather. Observation of the beads' positions on the burials suggests that both modes of use – sewing to a surface and stringing beads together – were common. The fairly common occurrence of use-wear indicates some movement of the beads along the string or fastening loop. Beads firmly tied to a surface would not be so mobile and would not display as much use-wear. My own experimental study shows that a considerable time of use is needed before physical traces of the kind observed in this study can develop on the beads. The use-wear might appear earlier, if they were worn during energetic activities, such as dancing.

In several instances, tooth sets include beads with wear varying from light to heavy, as well as teeth without any use-wear at all. Although teeth in the same group could have become differentially worn according to their position on the substratum (hide, etc.), it is likely that in at least some cases, sets were arranged by recycling old beads and adding new ones. A small number of beads have no traces of wear at all and appear to be in mint condition. They seem to have been made shortly before or after the individual's death, possibly added to the gear or clothing at the time of interment.

BEADS FROM A LARGE CEMETERY

A site permitting both synchronic and diachronic analysis is the cemetery at Zvejnieki, northern Latvia (Zagorska 2006a; Zagorskis 2004). In Latvia, the Middle Mesolithic period dates to 8300–5400 cal BCE, Early Neolithic to 5400–4100 cal BCE, Middle Neolithic 4100–2900 cal BCE and Late Neolithic to 2900–1800 cal BCE. Altogether, 330 registered structures have been excavated including single, double and group burials, which are divided into two clusters (Zagorska 2006b; Larsson et al. 2017; Meadows et al. 2018). Several graves contain grave goods other than tooth beads, while many burials are lacking personal ornaments.

The long period of use, from the Early Mesolithic to the Late Neolithic (lasting approx. 7500 to 2600 cal BCE) provides possibilities for studying the design and selection of tooth beads. The study included all 46 graves containing tooth beads from different periods, examining all the available tooth beads, more than 2000, at 10x magnification. The tooth beads are very well preserved, which provides the opportunity to study them in detail.

The range of species used for the beads seems to be smaller during the early stage of the cemetery, with moose (*Alces alces*), wild boar (*Sus scrofa*), red deer (*Cervus elaphus*), and aurochs (*Bos primigenius*) as the most common (Lougas 2006). A much wider spectrum is present during the later stage. In addition to those species present in the Middle Mesolithic, the following species were used: brown bear (*Ursus arctos*), wolf (*Canis lupus*), dog (*Canis lupus familiaris*), badger (*Meles meles*), otter (*Lutra lutra*), marten (*Martes martes*), fox (*Vulpes vulpes*), ringed seal (*Phoca hispida*), beaver (*Castor fiber*), wild horse (*Equus caballus*), and human. Most of the tooth beads are incisors from herbivores and omnivores in contrast to canines from carnivores.

No burial was found containing beads from just one species; most included three or more species. The dating of the graves shows a clear change from beads made by drilling holes to beads with holes produced by carving already took place at the end of the Middle Mesolithic (Larsson 2006, Fig. 21). To give an insight into how tooth beads were used, a small selection of the graves with tooth beads from the Zvejnieki site are presented.

The application of tooth beads

Grave 170 (a young adult male from the Middle Mesolithic) is one of the oldest burials in the cemetery,

dating to 8150 ± 80 BP (7380–7021 cal BCE, Ox-5969) (Figure 3a). All of the beads were perforated using the drilling technique. There is a marked spatial distribution of beads within the burial according to species. The largest number are incisors from wild boar, and these are associated with the chest area, forming vertical as well as horizontal lines. Tooth beads form a regular cluster in two vertical rows in the pelvic region and on the extremities (Figure 3b). The remaining pendants occur as smaller clusters, including a group of red deer beads at the lower right side of the chest and a mixed group of wild boar and moose tooth pendants at the right upper chest. There was a necklace consisting mainly of beads from moose, with a bead from aurochs placed in the middle. Beads from moose, wild boar, and red deer were found close to the feet.

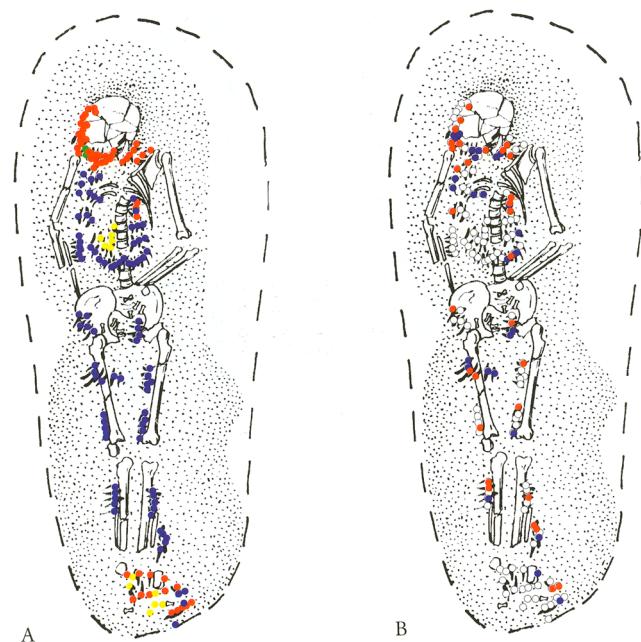


Figure 3. Grave 170, Zvejnieki. A. The distribution of beads according to species: red – moose, blue – wild boar, yellow – red deer, green – aurochs. B. Pendants with light use-wear (blue) and heavy use-wear (red). (Drawing by the author, 2005)

Most of the beads with identified use-wear are associated with the neck region of the buried individual (Figure 3b). Among the sets of beads from wild boar, the wear varies from clusters showing no use-wear to those in which all beads display use-related polish. Because teeth within clusters of beads tend to show similar amounts of wear or lack of wear, the different groups of beads may be interpreted as having been obtained at different stages during the individual's lifetime. One third of the beads from moose teeth, the two beads from aurochs, and just one of the beads from red deer show use-wear.

A different group of burials are dated to the Late Mesolithic in accordance with the Latvian chronology. Among these is grave 57, an elderly adult female dated to 6825 ± 60 BP (5839–5628 cal BCE, Ua-3636) (Figure 4). The burial includes some 52 beads, none of which have traces of use-wear. Of the eleven beads with perforations, only one shows signs of drilling. The remaining beads were made by carving. Just one set of beads from moose is directly associated with the interred individual, occurring in the lower pelvic region. The other beads were found close to the body or a small distance away. Six deer teeth without traces of alteration were found close to a stone axe behind the head of the interred. Four separate sets of beads were found on the left side of the individual. Because of their positions, they cannot have been part of the clothing in which the person might have been dressed when interred. They may have been part of a shroud of, for example, an animal skin that surrounded the body. Only three teeth showed use-wear. The teeth next to the body, including the set in association with the stone axe, indicate that the beads were used not just for bodily adornment or application to clothing.



Figure 4. Grave 57, Zvejnieki. For legend see Figure 3. (Drawing by the author, 2005).

Grave 122–123 is a double grave from the Early Neolithic, consisting of a young adult male with a child arranged on top. The male has been dated to 6395 ± 75

BP (5481–5214 cal BCE, OxA-5967). More than three hundred pendants were found, representing twelve species altogether (Figure 5a). This grave also holds the most tooth beads from aurochs, elk, wild boar, red deer, brown bear, dog, badger, otter, marten, ringed seal, beaver and wild horse (Macāne 2022).

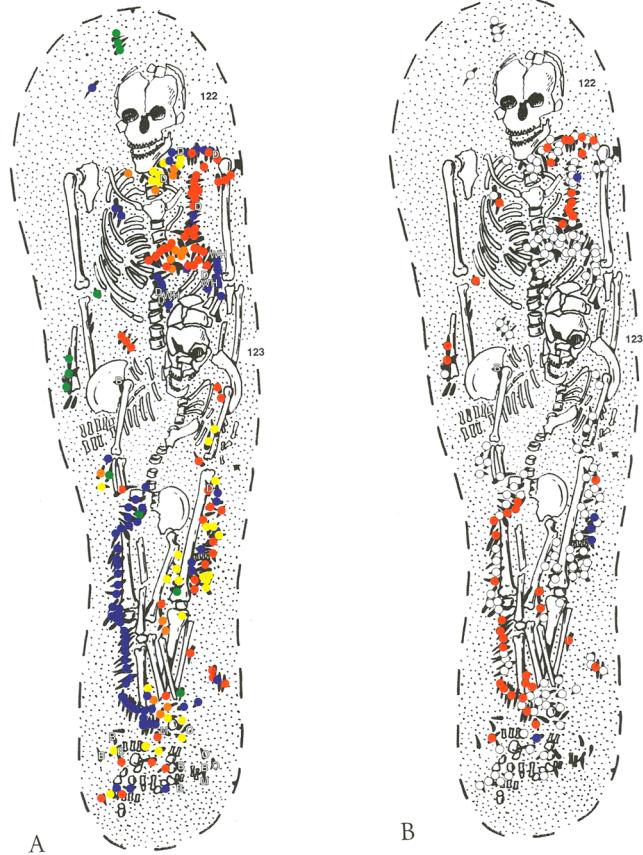


Figure 5. Graves 122–123, Zvejnieki. **A.** The distribution of beads according to species: red – moose, blue – wild boar, yellow – red deer, green – aurochs, orange – brown bear, B – badger, D – dog, M – marten, O – otter, WH – wild horse. **B.** Pendants with light use-wear (blue) and heavy use-wear (red). (Drawing by the author, 2005).

It is problematic to associate many of the teeth specifically with the adult male or the child. Two small sets of teeth were found behind the skull and to the left of the legs of the adult (Figure 5a). Rows of teeth at the neck, the left shoulder and along the upper chest of the male can be assigned to this individual. A fan-shaped arrangement behind the child can be associated with it, along with some pendants at the left margin of the chest. The sets of pendants along the extremities belong to the adult, including teeth close to the feet. A clear difference is seen in terms of wear and type of alteration of the tooth. The tooth beads embellishing the man's dress exhibit various forms of use-

wear, whereas the tooth beads that belong to the child do not show any use-wear (Figure 5b).

Tooth beads for children

As noted above, a person's dress, adornments, and gear would change, being replaced and supplemented, throughout their life. Also of special interest is the question of how and when a new member of society received their outfit and gear. Two contrasting scenarios are expected. One is that the dress outfit and adornments were specially made for a child entering the society. Alternatively, the child inherited the outfit – or parts of it – from relatives or other members of the society. In the former situation, the beads would be newly made, with little or no use-wear. In the latter scenario, one would expect to find use-wear among the beads for the child. Moreover, because it is unlikely that children's beads could have developed substantial use-wear, worn beads in juvenile burials likely represent gifts including used beads.

Grave 27, that of a child, was part of a collective burial of five individuals from the Late Mesolithic period. However, the child's skeleton was found at a certain distance from the other interred individuals and was not disturbed when these were buried (Figure 6a). Beads were found all over the child's body. A drilled perforation was observed on just one bead, an incisor from aurochs with heavy wear. Moderate wear was identified on beads from moose, wild boar, and red deer (Figure 6b).

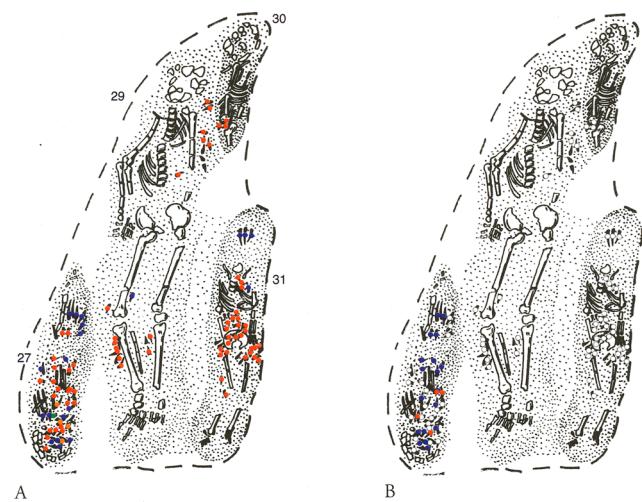


Figure 6. Graves 27–31, Zvejnieki. For legend see Figure 3 (Drawing by the author, 2005).

Burial 31, another child in the same mass burial, had three beads from wild boar around the head, plus a small number at the neck, along with a number of beads from the

same species at the right leg and foot (Figure 6a). In the pelvic region, a subgroup within the concentration appeared to have been arranged in a fan shape. No use-wear was identified on the beads.

Both of the above-described patterns are represented in child graves at Zvejnieki. In the case of burial 27, a young child, a considerable number of the beads exhibit use-wear (Figure 6b). Grave 31 had no beads exhibiting use-wear (Figure 6b). In the case of grave 122–123, there is a spatial distinction between beads associated with the adult individual and those associated with the child (Figure 6a). The adult bead assemblage includes worn teeth, whereas the child's assemblage includes no specimens with use-wear (Figure 6b).

One might expect that the social roles of children changed rapidly with age. If a child died at a very young age, he or she would not yet have been fully initiated as a true member of the society and would not have received their personal dress, including adornments. As in the case of burial 27, such a child would have been wearing parts of their dress from adult relatives. However, as a child grew older, he or she would have been presented with a new dress or gear, as a full member of society. It seems difficult to determine at what age this initiation took place. The child burial 31 seems to have a new dress, as the beads show no use-wear. Full acceptance may have occurred at about the age of two. Child grave 190 could exemplify this change, where the interred individual was buried in a new dress, while the old one, having been given after birth, was deposited to the left of the body (Larsson *et al.* 2017).

Most adult burials include beads with wear. Yet, in a small number of cases, such as grave 57, beads associated with the interred person show no wear. One does not need to be a child in order to enter society. Women and men might have been given, or expected to furnish for themselves, a new dress with newly-made ornaments when they were integrated into new families or obtained a new status among their own relatives. At death, a completely new dress might even have been made for use as a covering for the dead, while the old dress or parts of it could have been deposited in the grave beside the body.

Of particular interest is a couple of individuals who had decoration on their heads consisting of a combination of beads from dogs and seals (Figure 7). The seal originates from the coast, reached by following a watercourse about 60 km downstream. Analysis of the dog teeth has shown that they ate marine food (Ericsson and Zagorska 2000). It is likely that special decorated headgear was made at the coast and brought inland as an example of trade.

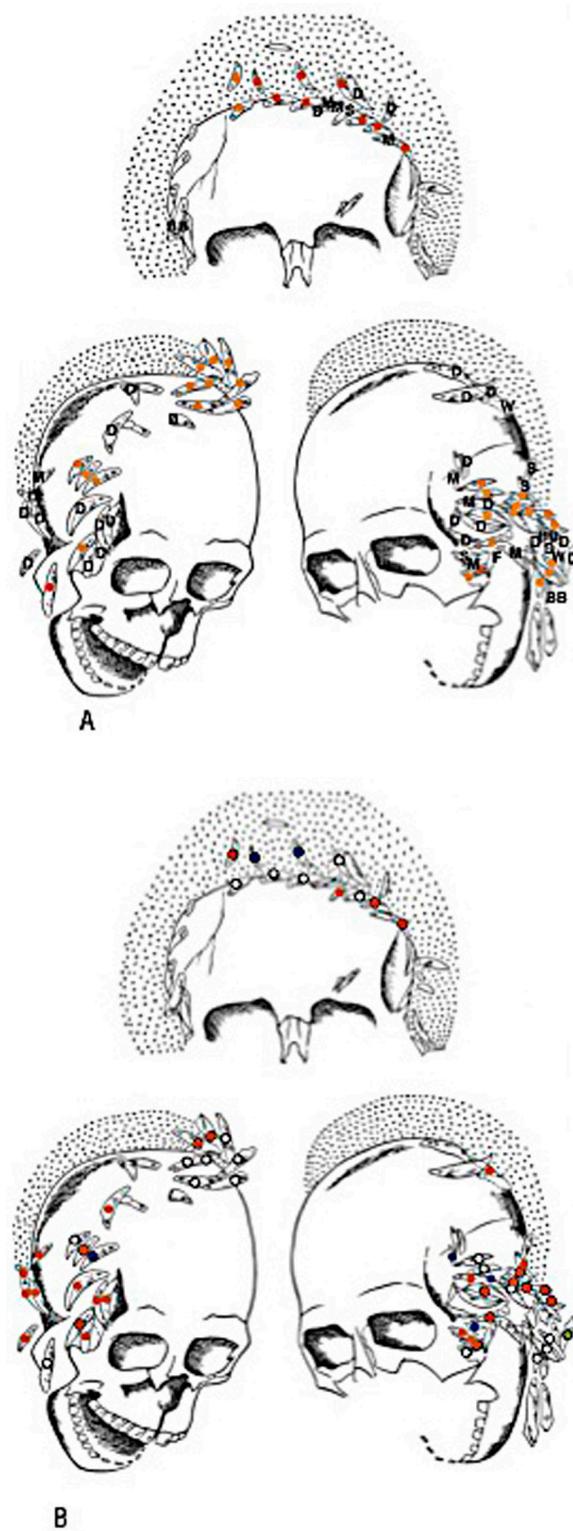


Figure 7. The skull of the individual in grave 153. For legend see Figure 3. Additionally: D – dog, S – seal, BB – brown bear, M – marten, W – wolf. (Drawing by the author, 2005).

The distribution of beads on the embellished clothing

One important aspect of the study of the Zvejnieki beads is to obtain an understanding of how the teeth were combined and distributed in relation to the body of the buried person. In order to study the variability in the position of beads on the interred individual with respect to chronological period, age, and sex, the bead distribution is projected onto a schematic representation of the body. Despite the unequal sample sizes, it is obvious that in the case of the Mesolithic burials, beads are distributed mostly around the central part of the body (Larsson 2006). For the Neolithic sample, beads are related to the extremities and head. In both periods, a number of beads were found outside the interred body. In several burials, beads occur in association with the feet (Figure 3a). Most commonly in such cases, a range of different animals are represented. From around 4000 cal BCE, tooth beads were replaced with beads, rings, and pendants in amber as exchange objects from a region further south (Larson 2020).

TOOTH BEADS FROM TWO MINOR CEMETERIES

The other site included in the study, Skateholm, consisted of two cemeteries 200 meters from one another, and is located on the opposite shore of the Baltic, on the southern coast of Scania, the southernmost part of Sweden. Thirteen of the human graves contained objects that may have embellished clothing. Due to the relatively poor state of preservation, it was not possible to determine in detail the use-wear for all the teeth from the burial grounds, but here it was possible to use a completely new method of analysis, namely strontium isotopes analysis.

Teeth from red deer predominate; while less frequent, teeth from wild boar are also present. A few beads were made from the teeth of moose and aurochs. There are also beads from porpoise (*Phocoena phocoena*), bear, and wolf. By contrast, there are no beads from roe deer (*Capreolus capreolus*) or grey seal (*Halichoerus grypus*), even though these are well represented among the bones found at the settlement sites (Jonsson 1988). However, deer hooves have been used as ornaments on the costume, while the grey seal fur or skin was perhaps represented in parts of the costume for its special texture.

Likewise, teeth from smaller fur-bearing animals, such as fox, marten, and badger, common as beads at Zvejnieki, were not used either. These animals provided soft, colorful furs for clothing, and their exclusion from embellishments of this kind was probably not because it was difficult to pierce the small teeth, but instead probably due to norms within the society.

Most of the teeth were perforated from both sides of the root by drilling; but not all teeth were perforated to serve as ornaments. They could also be cut out from the jaw in such a way that the gums were preserved around the roots, and some of the teeth from graves at Skateholm were held together in this way. In a few instances, parts of the jaw adjacent to the teeth were cut loose, and both the bone and the dried gums served to hold the tooth.

Tooth beads in male and female graves

There seems to be a certain gender distribution regarding where the tooth beads were located in the grave in relation to the clothing. In women's graves, Grave XXII in Skateholm II, the tooth beads occur in one or more rows around the upper part of the pelvic area. It has been suggested that they were attached to a belt placed immediately above the hip. In one grave, Grave VII at Skateholm II, this decoration comprised a total of 121 beads from about 30 red deer (Figure 8). Only front teeth were used, and only teeth from the left part of the jaw were mounted on the left side of the band, while teeth from the right half of the jaw were placed on the right-hand side, matching the position in the animal's jaw. This distinct distribution is also found in other tooth sets, not just from red deer but also from wild boar. On the other hand, there are no restrictive patterns concerning the sex or age of the animal. Both sexes are represented, and the teeth come from young animals as well as older individuals (Jonsson 1988). No major variation can be discerned in terms of wear on the perforation, which suggests that the entire set of teeth was processed at the same time. Where several red deer teeth have been combined, one or two teeth from some other animal appear.



Figure 8. Around a woman's hip in Grave VIII, Skateholm II, more than a hundred tooth beads were found, deriving from about 30 deer. (Photo by the author, 1983).

One woman, Grave 6 at Skateholm I, like several others, had been placed in a sitting position, had on her

hip about 20 tooth beads from wild boar and one from moose, arranged in several rows (Figure 9). On top of these teeth, the skeleton of a new-born child was found. Most likely, the woman died in childbirth, and the baby was placed on her hip. Although the tooth beads are in the hip region, it is not certain that they belonged to her clothing. Ethnographic parallels show that teeth and other objects might be attached to a pouch for carrying an infant, sometimes referred to as a papoose (Vang Petersen 2016). It may be a richly decorated pouch like this that the baby lay on. The teeth on the pouch could also have made a rattling sound, perhaps to lull the baby to sleep, or may have served as amulets to protect the baby (Rainio and Tamboer 2018).



Figure 9. Grave 6, Skateholm I, a woman in a sitting position. Several tooth beads of wild boar were found on her hip. On top of these was the skeleton of a new-born child or an almost full-term fetus. The baby may have lain in a richly decorated pouch. (Photo by the author, 1982).

As for the men, tooth beads were used in a less systematic way. One buried man, Grave XV at Skateholm II, had red deer teeth placed across his head, perhaps attached to some kind of headdress or fastened to the man's hair (Figure 10). The same man also had some wild boar tooth beads at his left thigh.

As stated above, a band of tooth beads placed at the hip is interpreted as a typical female clothing item in other graves from Southern Scandinavia (Brinch Petersen 2016). However, in two cases, such an ornament also appears in graves identified as containing males. One young man in Grave 53 at Skateholm I, had tooth beads placed at the elbow and next to his hands and feet, as well as around the hip, (Figure 11). This is the only person with decoration at the arms and feet. These beads were probably attached to the sleeves of the clothing and to the footwear. When the man moved, perhaps in dance, the teeth may have given a rattling sound (Larsson 2006; Rainio and Mannermaa 2014; Rainio et al. 2021).

In this situation, it is interesting to consider the finds in terms of gender rather than sex (Deaux 1985), and the possibility that some items could have been worn by both



Figure 10. Grave XV, Skateholm II, a man in a sitting position with red deer tooth beads across the skull. (Photo by Lovisa Dal, 2022).



Figure 11. An accumulation of tooth beads from red deer and wild boar and an unperforated porpoise tooth lay next to the left hand of a man in Grave 53, Skateholm I. (Photo by the author, 1983).

genders. As for children, the Skateholm graves provide little evidence of embellished clothing for individuals under the age of 20. A double grave, Grave 41 at Skateholm I, with an adult male and a four-year-old child contained two canine teeth of brown bear and pendants of amber (Figure 12a-b). In other graves, a small number of amber pendants were found in combination with tooth beads. Amber has been found on the beach in the vicinity of the site.

Tooth beads from near and far

Identifying the ratio of strontium isotopes $^{87}\text{Sr}/^{86}\text{Sr}$ in the tooth enamel has proven to be an appropriate method for determining where an individual spent the first years of life. The isotopic ratio varies depending on soil composition (Price *et al.* 2002). This value is transmitted through the diet into the enamel during dental development. By comparing the strontium value of tooth enamel and the value at different sample points in the landscape, it is possible to establish where an individual grew up.

Extensive analyses have been performed on teeth from the humans buried in Skateholm and on teeth from other animal species, both tooth beads and teeth found in occupation layers (Price *et al.* 2021; Larsson and Price 2022). Results show that the humans buried at Skateholm were born in this area and spent their first years of life there (Boethius *et al.* 2022). Not one person born in other parts of southernmost Sweden settled in Skateholm later in life.

Most of the animals whose teeth have ended up in the occupation layer or were used for bead production were likewise born in the surrounding area. However, in contrast to the human teeth, there are tooth beads that exhibit slightly or markedly anomalous values. This applies to teeth from red deer, wild boar, moose, and bear. That the values for moose, wolf, and bear differ slightly from the local signature is not so strange. These are species that inhabit large territories and move great distances. Some tooth beads from red deer, wild boar, and moose, on the other hand, show values that are more comparable to the ratios in northern Scania and even further north, at least 100 km away. This is an indication of contact with tribal areas in northern Scania or possibly even further away, with the teeth of red deer and wild boar constituting a major item of exchange. (Boethius *et al.* 2022). These animal species did occur in the immediate area, so the reason why they were traded over considerable distances was probably to maintain contact routes. Notably, the tooth beads forming part of the papoose found with the woman and child in Grave 6 (Figure 9) were exchange items. It is likely that the entire papoose was an object brought from the north.



Figure 12. A-B. Grave 41, containing an adult male and a four-year-old child with two canine teeth of brown bear and pendants of amber. (Photo by the author, 1983).

A small number of beads were made from aurochs with a strontium isotope content showing that these individuals were born and lived in the Skateholm area. There are, on the other hand, no skeletal remains of aurochs in the occupation layers (Jonsson 1988). This seems to be contradictory, but the extremely heavy wear around the perforation and on the entire tooth root shows that the tooth beads had been worn for a very long time before finally ending up in graves. They were made several generations earlier, at a time when aurochs were still hunted in the area. Hence, these tooth beads may have been perceived as valuable heirlooms that were only applied to special persons.

CONCLUSION

When comparing the sites in northern Latvia and southern Sweden, there are significant differences in how beads and pendants were worked, but similarities in the types of beads chosen for use. For both sites, the teeth used as beads come from the most important hunted animals. At Zvejnieki, the teeth deemed appropriate for adorning the costume were mainly from moose, while at Skateholm it was the red deer that contributed to the decoration. This is mainly due to ecological differences. When it comes to other animal teeth, the variety of tooth beads is significantly greater at Zvejnieki than at Skateholm. This may in some cases be due to ecological factors, but is also related to norms and rules within the communities.

When it comes to how these tooth beads were worn on the clothing, there are significant differences. Some of the differences between the sites may have chronological significance, as the overall time span of the burials at Zvejnieki when tooth beads were used as decoration is much longer than in the case of Skateholm, but there was also a significant difference in traditions and associated norms. At Zvejnieki, tooth beads were used as neck and chest decoration as well as along the extremities, but less commonly in connection with the pelvic area. Arranging teeth in rows of various lengths was also common. Tooth beads also adorned the footwear and were attached to grave gifts. However, wearing of decorated headgear by some richly furnished individuals is similar at both Zvejnieki and Skateholm. At Skateholm, tooth beads were attached to some form of girdle in the pelvic area, an item common to women and men. There is one example of a necklace, and the same is true of foot decoration.

At Zvejnieki it seems that people were given tooth beads at different times in their lives. Young children were buried with an adult's embellished dress. At about two years of age, they were given newly made tooth beads to wear on a costume of their own, probably a mark of their

acceptance as real members of society. For the rest of a person's life, the jewelry on the costume was augmented with new tooth beads, which may be due to membership of different groups within society combined with the person's own special efforts. Certain tooth beads, for example from aurochs, were heirlooms that after several generations of transmission finally ended up as grave gifts. Tooth beads were also bartered. In some cases, these came from special animals that did not occur in the settlement area, but in several cases beads from familiar animals hunted in the area seem to have been exchanged over significant distances. Here, the explanation may be offered that the bead trade was one of several ways to maintain contact between different tribes. Ornaments on individual outfits reflected not only the community's environment and subsistence strategies, but also personal information: male and female, infant, juvenile, prime and old age and different status.

ACKNOWLEDGEMENTS

The author wishes to express his thanks to Alan Crozier for the proofreading and to two reviewers for their important comments.

REFERENCES CITED

Boethius, Adam, Torbjörn Ahlström, Melanie T. Kielman-Schmitt, Mathilda Kjällquist, and Lars Larsson
2022 Diachronic Forager Mobility: Untangling the Stone Age Movement Patterns at the Sites Norje Sunnansund, Skateholm and Västerbjers Through Strontium Isotope Ratio Analysis by Laser Ablation. *Archaeological and Anthropological Sciences* 14, 176 <https://doi.org/10.1007/s12520-022-01640-0>

Brinch Petersen, Erik
2015 Diversity of Mesolithic Vedbæk. *Acta Archaeologica* 86 (1):7-225.

Cristiani, Emanuela and Dušan Borić
2017 Personal Adornment and Personhood Among the Last Mesolithic Forager of the Danube Gorges in the Central Balkans and Beyond. In *Not Just for Show. The Archaeology of Beads, Beadwork, & Personal Ornaments*, edited by Daniella E. Bar-Yosef, Clive Bonsall, and Alice M. Choyke, pp. 39-68. Oxbow Books. Oxford

D'Errico, Francesco and Marian Vanhaeren
2002 Criteria for Identifying Red Deer (*Cervus elaphus*) Age and Sex from Their Canines. Application to the Study of Upper Palaeolithic and Mesolithic Ornaments. *Journal of Archaeological Sciences* 29:211-232.

Deaux, Key

1985 Sex and Gender, *Annual Review of Psychology* 36:49-81.

Eberhards, Guntis

2006 Geology and the Development of the Paleolake Zagorska, In *Back to the Origin: New Research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*, edited by Lars Larsson and Ilga Zagorska, pp. 25-51. *Acta Archaeologica Lundensia*, Series in 8o, No. 52. Almqvist & Wiksell International, Lund.

Eriksson, Gunilla and Ilga Zagorska

2000 Do Dogs Eat Like Humans? Marine Stable Isotope Signals in Dog Teeth from Inland Zvejnieki. In *Mesolithic on the Move. Papers presented at the Sixth International Conference on the Mesolithic in Europe, Stockholm 2000*, edited by Lars Larsson, Hans Kindgren, Kjel Knutsson, David Loeffler and Agneta Åkerlund, pp. 160-168. Oxbow, Oxford.

Jonsson, Leif

1988 The Vertebrate Faunal Remains from the Late Atlantic Settlement Skateholm in Scania, South Sweden. In *The Skateholm Project 1. Man and Environment*, edited by Lars Larsson, pp. 56-88. *Regiae Societatis Humaniorum Litterarum Lundensis LXXIX*. Almqvist & Wiksell, Stockholm.

Laporte, Luc and Catherine Dupont

2019 Personal Adornments and Objects of Ornamentation: Two Case Studies from Hunter-Gatherer Burials in France (La Vergne) and Argentina (Arroyo Seco II). *PaleoAnthropology* 2019:156-176.

Larsson, Lars

2006 A Tooth for a Tooth. Tooth Ornaments from the Burials at the Cemeteries of Zvejnieki. In *Back to the Origin. New Research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*, edited by Lars Larsson and Ilga Zagorska, pp. 253-287. *Acta Archaeologica Lundensia*, Series in 8o, No. 52. Almqvist & Wiksell International, Stockholm.

2012 The Embellished Dress in Hunter-gatherer Societies. Tooth Ornaments from the Graves at the Cemeteries of Zvejnieki, Northern Latvia. *Archaeological Textiles Review* 054:44-51.

2020 Beads and Pendants in a Long-Term Perspective. Tooth Beads and Amber in the Burials at Zvejnieki, Northern Latvia, Through the Millennia. In *Beauty and the Eye of the Beholder. Personal Adornments Across the Millennia*, edited by Monica Margarit and Adina Boroneant, pp 353-369. Târgoviște, Cetatea de Scaun.

Larsson, Lars, Liv Nilsson Stutz, Ilga Zagorska, Valdis Bērziņš, and Aija Cēriņa

2017 New aspects of the Mesolithic-Neolithic Cemeteries and Settlement at Zvejnieki, Northern Latvia. *Acta Archaeologica* 88:57-93.

Larsson, Lars and T. Douglas Price

2022 Animal Teeth and Mesolithic Society. *Open Archaeology* 8:55-61.

Lougas, Lembi

2006 Animals as Subsistence and Bones as Raw Material for Settlers of Prehistoric Zvejnieki. In *Back to the Origin. New Research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*, edited by Lars Larsson and Ilga Zagorska, pp. 75-89. *Acta Archaeologica Lundensia*, Series in 8o, No. 52. Almqvist & Wiksell International, Lund.

Macāne, Aija

2022. *Stone Age Companions. Humans and Animals in Hunter-Gatherer Burials in North-eastern Europe*. GOTHARC, Series B archaeological thesis 81. University of Gothenburg, Gothenburg.

Macāne, Aija, Kerkko Nordqvist and Elena Kostyleva

2019 Marmot Incisors and Bear Tooth Pendants in Volosovo Hunter-Gatherer Burials. New Radiocarbon and Stable Isotope Data from the Sakhtesh Complex, Upper-Volga Region. *Journal of Archaeological Science: Reports* 26:10198 DOI:10.1016/j.jasrep.2019.101908.

Mannerma, Kristiina, Dimiytri Gerasimov, Evgeny Giryja, and Mikhail V. Sablin

2017 Wild Boar (*Sus scrofa*) Teeth from a Female Burial in Yuzhniy Oleniy Ostrov, Northwestern Russia (c. 6200 cal BC) – Local Rarities or Transported Goods? *Journal of Environmental Archaeology* 28(1):79-90.

Meadows, John, Valdis Bērziņš, Dardega Legzdiņa, Harald Lübke, Ulrich Schmölcke, Ilga Zagorska, and Gunīta Zariņa

2018 Stone-age Subsistence Strategies at Lake Burtnieks, Latvia. *Journal of Archaeological Science: Reports* 17:992-1006.

Price, Douglas T., James Burton, and Richard Bentley

2002 Characterization of Biologically Available Strontium Isotope Ratios for the Study of Prehistoric Migration. *Archaeometry* 44:117-135.

Price, Douglas T., Lars Larsson, Ola Magnell, and Borić Dušan

2021 Sedentary Hunters, Mobile Farmers. The Spread of Agriculture into Prehistoric Europe. In *Foraging*

Assemblages, Borić Dušan, Dragana Antonović and Bojana Mihailović, editors, pp. 579-586. Serbian Archaeological Society. The Italian Academy for Advanced Studies in America. Columbia University, New York.

Rainio, Riita, Dmitry V. Gerasimov, Evgeny Yu Giryja, and Kristiina Mannermaa

2021 Prehistoric Pendants as Instigators of Sound and Body Movements. A Traceological Case Study from Northeast Europe, c. 8200 cal. BP. *Cambridge Archaeological Journal* 31(4):639-660.

Rainio, Riita and Kristiina Mannermaa

2014 Tracing the Rattle of Animal Tooth Pendants from the Middle Neolithic Graves of Ajvide, Gotland, Sweden. *World Archaeology* 46(3):332-348.

Rainio, Riita and Annemiek Tamboer

2018 Animal Teeth in a Late Mesolithic Woman's Grave, Reconstructed as a Rattling Ornament on a Baby Pouch. *Experimental Archaeology* 2018:1-21.

Rigaud, Solange

2011 La parure: traceur de la géographie culturelle et des dynamiques de peuplement au passage Mésolithique-Néolithique en Europe. PhD dissertation. Archéologie et Préhistoire. Université Sciences et Technologies - Bordeaux I,

Rigaud, Solange, Francesco d'Errico and Marian Verhaeren

2015 Ornaments Reveal Resistance of North European Cultures to the Spread of Farming. *PLOS ONE* 10(4):e0121166. <https://doi.org/10.1371/journal.pone.0121166>

Vang Petersen, Peter

2016 Papooses in the Mesolithic? A Reinterpretation of Tooth and Snail Shell Ornaments Found in Grave 8 at Bøgebakken and Other Mesolithic Burials. In *Mesolithic Burials – Rites, Symbols and Social Organisation of Early Postglacial Communities*, edited by Judith M. Grünberg, Berhard Gramsch, Lars Larsson, Jörg Orschiedt and Harald

Mellers, pp. 109-124. International Conference Halle (Saale), Germany, 18th–21st September 2013. Tagungen des Landesmuseums für Vorgeschichte Halle Band 13/II, Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Halle.

Vanhaeren, Marian and Francesco d'Errico

2002 The Body Ornaments Associated with the Burial. In *Portrait of the Artist as a Child. The Burialtian Human Skeleton from the Abrigo do Lagar Velho and its Archaeological Context*, edited by Joao Zilhão and Erik Trinkaus, pp. 154-186. Trabalhos de Arqueologia 22, Lisboa.

Zagorska, Ilga

2006a Radiocarbon Chronology of the Zvejnieki burials. In *Back to the Origin. New research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*, edited by Lars Larsson and Ilga Zagorska, pp. 91-113. Acta Archaeologica Lundensia, Series in 8o, No. 52. Almqvist & Wiksell International, Lund.

2006b The History of Research on the Zvejnieki Site. In *Back to the Origin. New research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*, edited by Lars Larsson and Ilga Zagorska, pp. 5-24. Acta Archaeologica Lundensia, Series in 8o, No. 52. Almqvist & Wiksell International, Lund.

Zagorskis, Francis

2004 *Zvejnieki (Northern Latvia) Stone Age Cemetery*. Translated by Valdis Bērziņš. British Archaeological Reports International Series 1292, Oxford.

Lars Larsson,
Professor emeritus
Department of Archaeology and Ancient History
Lund University
LUX, Box 192, SE-221 00
Lund, Sweden
Lars.Larsson@ark.lu.se