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# FRAGMENTED BONES TELL STORIES: VIIMSI I EARLY IRON AGE *TARAND* GRAVE

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Cremation as a burial rite has been in use throughout prehistory. The graves as well as their fragmented content are the main informants reflecting the life and death of past communities in specific eras. So far, the studies of cremation graves in the eastern Baltic have mostly focused on reconstructing grave constructions and analysing artefacts. Far less attention has been paid to the skeletal material, especially to their value for reconstructing burial customs. In this paper we aim to outline how a detailed investigation of the skeletal material combined with statistical and spatial analysis can reveal burial customs and specific ritual practices, as well as the social status of the deceased. By applying these combined analyses, we were able to determine that both adults, incl. men and women, as well as children were buried at Viimsi I *tarand* cemetery in Estonia. Furthermore, we could establish specific burial practices centred around the skulls and different firing treatments of different body parts.

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## Introduction

The dead of prehistoric Estonia have been buried in several different ways. Early Iron Age (500 BC – AD 450) has stood out with very versatile burial constructions and various ways of disposing of the dead. The main grave type at that period was *tarand* cemetery resembling large stone rectangles, usually conjoined, generating longer rows. The size and the building order of the *tarand*s can be different, but one

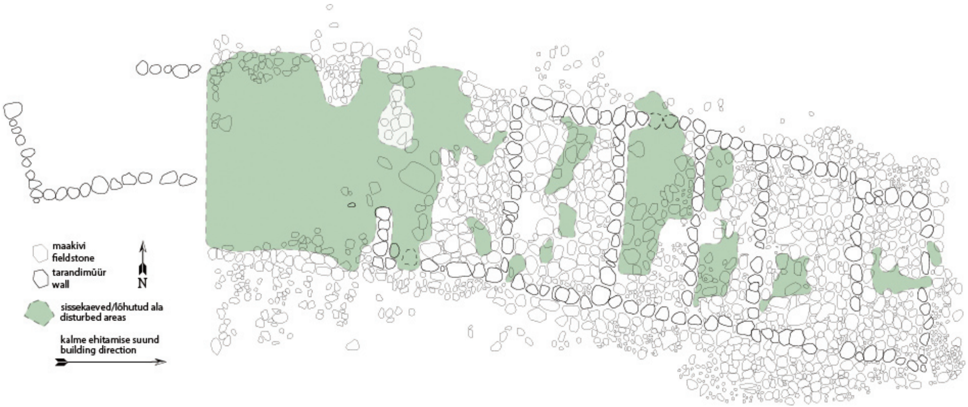



**Fig. 1.** Jaagupi *tarand* grave in southern Estonia, dated to 3rd–5th centuries. The conjoined *tarand*s and their building order are rather well detectable. After Laul 2001, fig. 12.

of the best examples of the built stone reconstructions is Jaagupi cemetery (Fig. 1). The dead have mostly been buried inside the stone structures, but it is not uncommon to find bones and artefacts from around the grave constructions. Burial rituals varied from inhumed bodies to scattered cremated bones. The reasons behind the changing burial customs have been interpreted through the changes in grave constructions and the artefacts, while the bones of the deceased have gained surprisingly little attention although numerous graves have been fully excavated (e.g. Vassar 1943; Shmidekhel′m 1955; Laul 1962; 1965; 2001; Moora 1967; Lang 1987). The aim of this paper is to exemplify how the analysis of skeletal material, both inhumed and cremated bones, can make a significant contribution to our understanding of the deceased and their burial practices, adding more nuanced insights into the funeral customs and social implications of past societies.

Relying on a case study of a partially destroyed Viimsi I *tarand* grave (ca AD 350–500), we show what information can be gained from visual analysis of the bones in combination with detailed mapping and further statistical analysis of the material. Furthermore, we aim to exemplify the high informative value of archive materials from earlier excavations when reconstructing past burial customs, but also show good quality of information is still retrievable even from partially destroyed burial sites. The presence and absence of bone elements as well as the thorough statistical and spatial analysis of skeletal material in the grave aid in understanding how the bones and the bodies were treated, and whether specific patterns emerge in these treatments allowing to suggest particular burial customs.

## *Tarand* cemeteries

*Tarand* cemeteries are collective burial places with rectangular above-ground stone wall constructions called *tarand*s (Lang 2006, 83) spread in the eastern Baltic.

*Tarand* cemeteries or similar structures have been noted in mid-eastern Sweden, but early examples are also known from south-western Finland, dated to Late Bronze or Early Pre-Roman Iron Age making them contemporary to the Estonian ones (*ibid*.). *Tarand* graves are also present in north-western Russia, northern and western Latvia, occurring there slightly later, at the end of Pre-Roman Iron Age (Lang 2007b, 112; Yushkova 2011; 2016; Yushkova & Kulešov 2011).

Even though more than 50 *tarand* cemeteries have been excavated in Estonia, most of them have been dated based on grave goods; only few bones have been radiocarbon dated and the earliest is known to be Kunda Hiiemäe *tarand* cemetery, dated to 730–410 cal. BC (Allmäe 2003, 138; Lang 2007a, 174; Laneman & Lang 2013; Oras et al. 2016; Saag et al. 2019).

The treatment of the corpse varied during the use of *tarand* cemeteries. The earliest graves in northern Estonia commonly contained inhumation burials – one rectangular grave was assigned for one or a few bodies (Lang 2007a, 179). In the 3rd century AD, cremation became prevalent and cremated bones were scattered in the grave area, but in 5th–6th centuries inhumation became more common (Lang 2007a, 179, 192 ff.).

*Tarand* cemeteries are supposedly elite burial places. This is indicated by the monumentality of grave constructions, their location at dominant places on the landscape and the items of value as grave goods (Lang & Ligi 1991, 25; Lang 1996, 469 ff.; Jonuks 2009, 217). The richness of finds from most of the *tarand* graves has resulted in many object-centred studies (e.g. Shmidekhel′m 1955; Vassar 1943; Lang 1996; 2000; Laul 2001; Rohtla 2003; Olli 2013; 2019).

Osteological analyses have been a common practice accompanying cemetery excavations for a while, but most of these have been conducted on inhumations. The pioneer study for cremated bones in Estonia was undertaken in 1993 when Ken Kalling, a medical doctor, analysed the bones of two *tarand* cemeteries from Viimsi (Lang 2007a, 170, 191; Allmäe 2013). The overall number of osteological analyses of *tarand* cemeteries is yet rather small being nowhere near the number of excavated graves (Kalman 2000a; 2000b; 2000c; Kivirüüt 2011; 2014; Allmäe 2013; Kivirüüt & Olli 2016).

## Material and methods

The Viimsi I *tarand* cemetery (Figs 2 and 3) was built on a limestone cliff in northern Estonia ca 350 AD based on the earliest finds (Lang 1993, 54). The cemetery was partially bulldozed while building an orchard in 1988. Large portions of the grave constructions incl. the majority of its central part (ca 30–50 cm from the upper layers) was destroyed and lifted on top of the north-eastern part of the cemetery (Lang 1993, 7, 13). Nevertheless, the bottom layers of the northern and southern area remained intact. This, as well as another *tarand* cemetery (Viimsi II) in the vicinity, was excavated in 1990 by Valter Lang (Lang 1993).

During the excavations the stone constructions of the cemetery and the accompanying finds were studied meticulously. The grave consisted of four conjoined *tarand*s


**Fig. 2.** The location of Viimsi *tarand* cemetery.

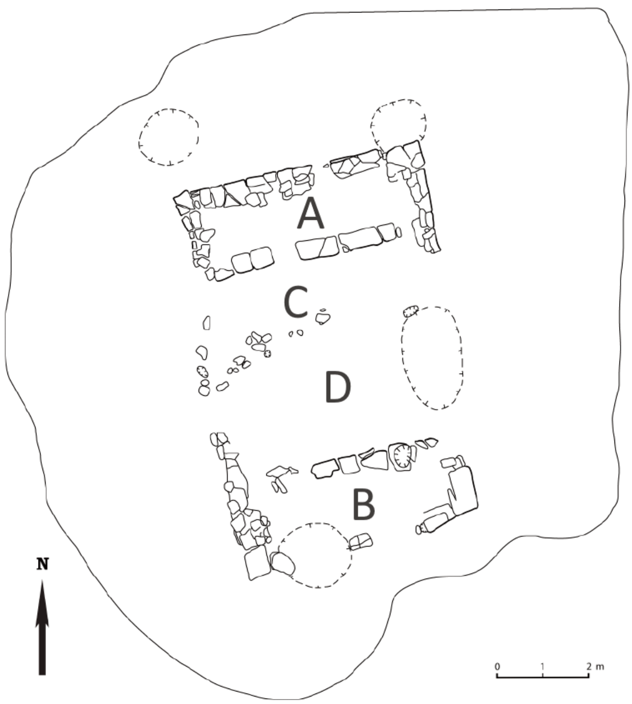



**Fig. 3.** Viimsi I *tarand* cemetery, where the *tarand*s (A–D) consist mainly of limestone slabs. Solid line – border of the excavation area that also marks the area of the limestone shingle, dotted line – an area of entirely destroyed occupation layer (pit of a fruit tree). After Lang 1993, figs 2 and 3, modified by Maarja Lillak and Anu Lillak.

surrounded by a limestone shingle (Lang 1993, 7 ff.). Despite the destruction of the grave the outline and construction of *tarand* A and B were rather well identifiable; the initial outline of *tarand* C and D located at the central part of the cemetery could not be documented (Lang 1993, 11). The finds were documented *in situ*, their location was marked on the excavation plan and their depth was recorded. The artefacts from Viimsi I have been studied by Lang (1993; 1996) in detail and their categorisation was revisited by Maarja Lillak (née Olli) in 2014, according to which the items can be divided into four groups: (1) personal adornments, (2) utensils, (3) weapons and (4) ceramics (Fig. 4, Olli & Kivirüüt 2017, Ill. 3). Ceramic shards were most numerous (n = 617) representing at least 32 vessels (Lang 1993, 50 f., 54 f.) that date to the usage period of the cemetery with a couple of examples from preceding and following periods (*ibid.*, 51 ff.). Personal adornments included bracelets, crossbow fibulae, neck rings, finger-rings, glass beads, stone beads, belt accessories and bronze spirals; everyday utensils and weapons were rare covering knives, scythe, awl, whetstone and razor, and a small spearhead (Olli & Kivirüüt 2017). Most bronze items were either affected by low temperatures or had not been in fire at all (*ibid.*). The metallographic analysis of the poorly preserved iron items indicate that some of these had been affected by fire (Peets 1993, 81 ff.). Further details of artefacts found at Viimsi I *tarand* grave can be found in Olli & Kivirüüt 2017.

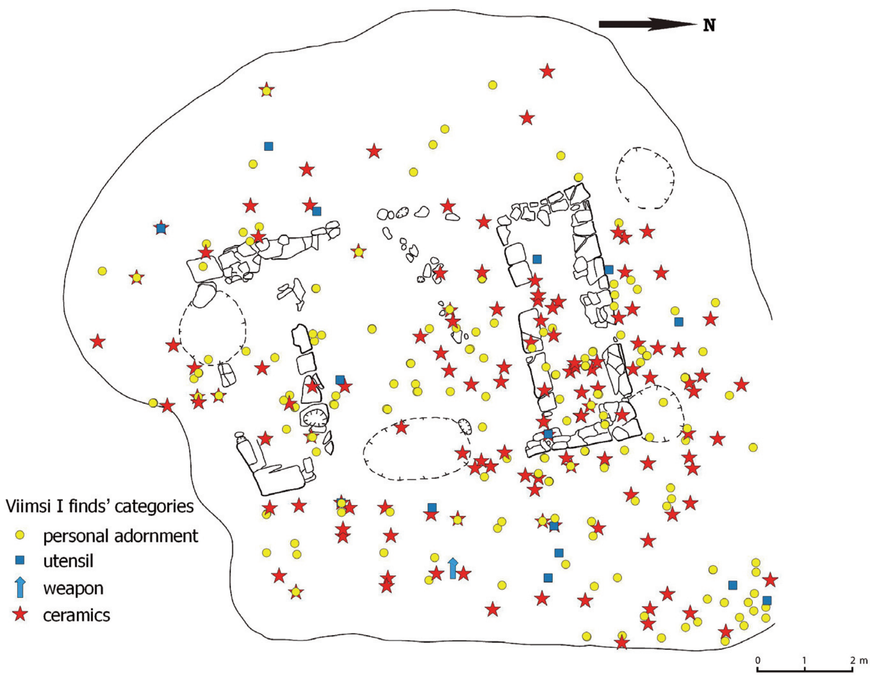



**Fig. 4.** The distribution of find groups of Viimsi I grave. Solid line – border of the excavation area, dotted line – an area of entirely destroyed occupation layer (pit of a fruit tree). Ill. 3 from Olli & Kivirüüt 2017, based on Lang 1993, figs 2 and 3.

The bones were also recorded by grids and their locations marked on the excavation plans. Their depth was not documented in the finds' list making it impossible to argue which bones were preserved in their initial location. The photos and descriptions, however, enable arguing that the bones at the bottom layers in *tarand* A and B (Fig. 2) were protected by the limestone walls and thus, stayed in place.

The cremated human remains from Viimsi I have been analysed several times: first by Kalling (1993) and reanalysed by A. Lillak (née Kivirüüt) in 2011, 2014 (Kivirüüt 2014) and 2015. The osteological assessment by A. Lillak is based on a combination of guidelines by McKinley and Roberts (1993), Buikstra and Ubelaker (1994), Brickley and McKinley (2004), Holck (2008) and Ubelaker (2009) to accommodate the fragmented and cremated nature of the material. To age the immature individuals, the combination of tooth growth charts by Ubelaker (1989), fusion charts of the epiphyses and sexing guidelines by Buikstra and Ubelaker (1994), juvenile bone development patterns by Scheuer and Black (2004) and Hoppa (1992) were used. The cremation efficiency was assessed visually based on the colour(s) of the fragments and the detailed overview of these results will be presented separately (A. Lillak unpublished data).

The poor preservation of the material prevented the usage of several standard methods. The bones showed signs of shrinking, warping as well as damage to diagnostic features. Many bones, esp. long bone fragments remained unidentifiable due to their small size and lack of characteristic traits. The majority of these bones were cremated, but some unidentifiable bone flakes originated from inhumations and were determined as long or cortical bone fragments. Due to severe fragmentation of the material adult individual age was not differentiated and the sex estimations should be taken as assumptions.

Altogether, 272 bone units or contexts were analysed. The units represent bones found in clusters of non-uniform size, marked on the excavation plans as dots with no associated geographical coordinate information. All the excavated and preserved bone fragments were assessed, recorded and described; the bone units were also weighed. The final minimum number of individuals (MNI) was decided upon the number of recurrent tooth and bone fragments considering the broad age and sex determination. The MNI based on recurrent bone fragments was higher than the one based on average weight (3233.2 g ± 581 g for males and 2238.3 g ± 482 g for females, Van Deest et al. 2011) of a cremated skeleton. This indicates that not all bones were either preserved or brought to the cemetery.

To test the significance of the spatial differences of inhumated and cremated body parts within and outside the cemetery walls statistically, the data was analysed in R Studio by chi-squared tests. Points depicting the location of bone units were manually transferred from the digitised excavation plans to a point shapefile layer in QGIS. Due to the lack of geographical coordinates on the excavation plans the shapefile was not georeferenced. The spatial analysis relies on the data from the excavation report. It must be noted that not all the bone units were depicted on the plan and the plan had a few extra points with no associated bone unit. The illustrations were made in QuantumGIS (QGIS, version 3.4).

## Results: Osteological analysis

Both cremated and inhumed bones were dispersed over the grave area and not all bone elements were equally recurrent in both cremated and inhumed bone material.

### *Minimum number of individuals*

Cremated individuals were identified by the recurrent fragments of petrous portion of the temporal bone (Table 1). All the petrous portions ($n_{right}$ = 26; $n_{left}$ = 21 and two fragments of the same bone of unknown body side; Kivirüüt 2014, 17) belonged to adults or adolescents based on their size and development. The remains of at least three children were present among the cremated bones making the MNI of cremated individuals at least 29.

The MNI of inhumations in Viimsi I *tarand* cemetery was determined by fifth metatarsals ($n_{right}$ = 6; $n_{left}$ = 10) with no evident signs of having been in fire. Seven of the bones belonged to adults and two to children, one was too damaged to be aged. As the material also contained at least one new-born not presented among the metatarsals and teeth of at least three different juvenile individuals, the MNI of inhumed individuals was 14.

As the bones were dispersed, the burial practices are not fully known and one body may have received differential burial treatment. It cannot be ruled out that the cremated petrous portions and inhumed 5th metatarsals belonged to the same individuals. Thus, the total MNI buried in Viimsi I *tarand* cemetery is 31, adding two inhumed immature individuals of distinct age to the group of cremated individuals (Table 1).

### *Age and sex composition of the burials*

The sex of the individuals was assessed by the robusticity of the cranial features. Large muscle attachments on the nuchal crest of the occipital bone (robusticity 5, Buikstra & Ubelaker 1994) indicated five possible cremated male individuals and the same bone element of minimal robusticity (grade 1, Buikstra & Ubelaker 1994) indicated the presence of three probable cremated females (Table 1, Fig. 5). The sex of the inhumed individuals was assessed by the robusticity of mandibular fragments (grades 1–5, Buikstra & Ubelaker 1994). As it was not possible to confidently assign several bones to one person, the sex assessment relies on one bone fragment per individual and it remains suggestive that the cemetery contained individuals of both sexes.

Based on the development of the cremated teeth, and cremated infant bones (fragment of ulna, rib and mastoid process of the temporal bone) there were at least three cremated juveniles: an infant, a child aged 6–10 years and an adolescent aged 14–17 years (Table 1). Long bone measurements, dental development and bone fusion stages indicate that there were at least six juvenile inhumations: a newborn, two children aged 0.5–5 and 4–12 years and two adolescents aged 11–18 and 16–20 years (Table 1).

**Table 1.** The individuals with determined age and/or sex in Viimsi I grave, based on Kivirüüt 2014, 19, 22

| Bone context No. | Age (years) | Sex estimation | Basis for determination | Treatment |
|---|---|---|---|---|
| 72 | 4–9 | Unknown | Dental development (age) | Cremated |
| 161 (cluster IV) | 6–10 | Unknown | Dental development (age) | Cremated |
| 72, 264 | 7–14 | Unknown | Epiphyseal growth (age) | Cremated |
| 30–32, 34, 35 | 14–17 | Unknown | Dental development (age) | Cremated |
| 167 | 8–18 | Unknown | Epiphyseal growth (age) | Cremated |
| 8 | Adult | Female | Nuchal crest robusticity 1 (sex) | Cremated |
| 28 | Adult | Female | Nuchal crest robusticity 1 (sex) | Cremated |
| 227 | Adult | Female | Nuchal crest robusticity 1 (sex) | Cremated |
| 95 | Adult | Male | Nuchal crest robusticity 5 (sex) | Cremated |
| 110 | Adult | Male | Nuchal crest robusticity 5 (sex) | Cremated |
| 137 | Adult | Male | Nuchal crest robusticity 5 (sex) | Cremated |
| 162 (cluster I) | Adult | Male | Nuchal crest robusticity 5 (sex) | Cremated |
| 203 | Adult | Male | Nuchal crest robusticity 5 (sex) | Cremated |
| 111, 114, 199 | 0 (new-born) | Unknown | Long bone measurements (age) | Inhumed |
| 118 | 0.5–5 | Unknown | Fusion of cranial bones (age) | Inhumed |
| 155, 239 | 1–3 | Unknown | Fusion of cranial bones; long bone measurements (age) | Inhumed |
| 207, 233, 236, 238 | 4–12 | Unknown | Dental development; fusion of cranial bones; fusion of vertebra (age) | Inhumed |
| 251, 172 | 11–18 | Unknown | Immature metatarsals (age) | Inhumed |
| 19, 160 | 16–20 | Unknown | Immature phalanges; dental development (age) | Inhumed |
| 81 | Adult | Female | Robusticity of the mandible 1 (sex) | Inhumed |
| 237 | Adult | Female | Robusticity of the mandible 2 (sex) | Inhumed |
| 222, 223, 225, 228 | Adult | Male | Robusticity of the mandible 5 (sex) | Inhumed |
| 237 | Adult | Male | Robusticity of the mandible 5 (sex) | Inhumed |
| 252 | Adult | Male | Robusticity of the mandible 4 (sex) | Inhumed |

### *Pathological conditions*

There were not many identifiable pathological conditions visible on the cremated bones. This might be due to the fact that the cremation process firstly affects and destructs the bones with pathologies as disease usually weakens the tissue allowing a complete disappearance of these bones (Holck 2008, 130 ff.). Inhumed bones also showed minimal health problems: teeth were in good condition with only a few cases of dental caries, dental calculus and linear enamel hypoplasia was mostly

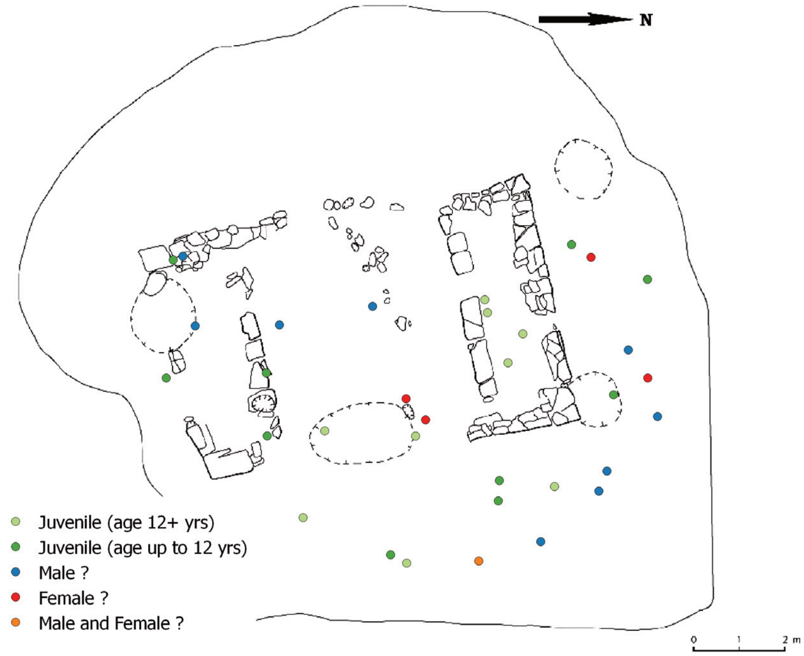



**Fig. 5.** Sex assessments and distribution in the grave. Blue – male, red – female, green – juvenile, solid line – border of the excavation area, dotted line – an area of entirely destroyed occupation layer (pit of a fruit tree). After Lang 1993, figs 2 and 3.

lacking. On the inhumed bones, there were signs of work-related trauma, stress, and degeneration as some individuals had visible Schmorls' nodes, spondylosis and ankylosis on thoracic and cervical vertebrae (Ortner & Putschar 1985, 357 ff.; Waldron 2009, 45, 51, 58). However, it must be noted that differential diagnosis is almost impossible for commingled bones because the skeleton should be nearly complete for accurate assessment.

## *Evidence of burial practices*

Osteological analysis reveals different burial practices. Warping, transverse and some longitudinal splitting as well as checking of the cremated bones are considered to be telling characteristics about the state of the corpse/bone being exposed to fire. Buikstra and Ubelaker (1994, 96) indicate that these traits occur when fresh or green defleshed bones are cremated. Some of the cremated long bones showed straight transverse breaks either with or without a protruding prominence. These were mostly fragments of humeri with little to moderate cremation (temp. up to 400 °C, Holck 2008, 98) based on the sooty appearance of the bones. The protruding prominence is believed to have resulted by transverse cracks that break due to quick cooling of the bones (Binford 1972, through Stewart 1979, 61 f.).

The endocranial surfaces often show stronger exposure to the fire than the outer surface, indicating that skulls were cracked prior or during the cremation. This could have been a deliberate ritual act conducted by the mourners prior to the cremation or might have happened due to the cremation process itself that forces the endocranial pressure to break the cranial vault (Gejvall 1981, 19). Due to commingling of the fragments it is not possible to reconstruct the breaking patterns of the crania. Thus, neither of the proposed versions – ritual act or accidental breaking – can be ruled out here. Several cremated cranial fragments had a glistening sooty appearance, esp. from the inside. This indicates that the bones had been cremated fresh (i.e. the organic matter present; Holck 2008, 96); moreover, since the glistening appearance had not faded to grey (*ibid.*), it can be suggested that their cremation process was rather short.

One fragment of parietal bone had a straight shallow mark on it. Closer inspection revealed scratch marks on the bone but as the surface had deteriorated, not all of them are visible. The largest of the scratches (Fig. 6: B) can be identified as a cut mark on the temporal bone. On inhumations there were three well distinguishable cut marks: (1) a 4 mm long diagonal cut mark (from the superior)

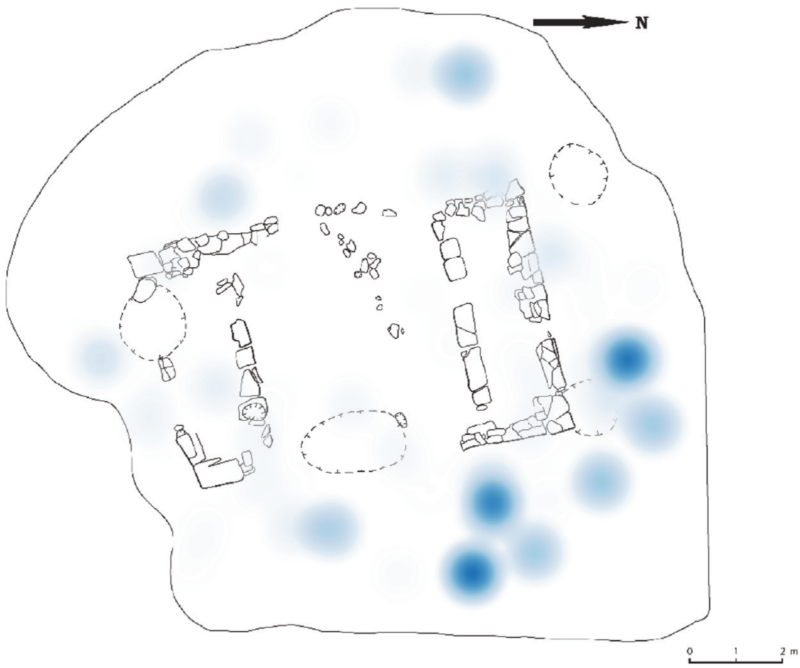

**Fig. 6.** Examples of cut marks from Viimsi I *tarand* grave. A – inhumed mandible with a cut mark on the posterior side of the ramus (context 238), B – cremated parietal bone fragment with cut marks on outer surface (context 167), C – inhumed fragment of a cervical vertebra with a centimetre-long cut mark on the posterior superior side (context uncertain due to further commingling in the storage), and D – a diagonal cut mark on the posterior side of a inhumed right radius (context 237).

on the posterior side of the ramus of a mandible (Fig. 6: A), referring either to decapitation (Roberts & Manchester 2005, 63), injuries accompanying decapitation (Tucker 2012, 236 ff.) or a perimortem trauma (Hatch 2017); (2) a fragment of a cervical vertebra with a centimetre-long cut mark on the posterior superior side (Fig. 6: C) that could also refer to collateral injury due to decapitation or other perimortem trauma (Tucker 2012, 236 ff.; Hatch 2017); and (3) a diagonal cut mark on the posterior side of a right radius, possibly a defence wound (Fig. 6: D; Brickley & McKinley 2004, 41). The bones with cut marks could have belonged to a single individual, however, this cannot be affirmed due to the commingling of the material. Therefore, the cut marks suggest perimortem trauma on one or several individuals, but the injuries on the skull also refer to the possibility of perimortem severing of the head from the body.

## Statistical analysis

There were some patterns found in the placement of bones in the cemetery. Firstly, the north-eastern corner of *tarand* A and the central area of *tarand* C displayed the most diverse bone material. *Tarand* A, in the northern part of the cemetery, was rather well preserved (Lang 1993, 7 ff.) and thus the variability could indicate initial placement of the deceased there. However, regarding the direction of the bulldozing on the grave area, the abundance of bone material in the north-eastern corner of *tarand* A could also be associated with the secondary disturbance of the cemetery. In contrast, *tarand* C was almost entirely destroyed, the finds and bones gathered from the very bottom of the *tarand* (*ibid.*, 11) could derive from an intact layer indicating the initial burial practices. Secondly, we could establish that cremated bones of smaller children were concentrated in the southern parts of the grave or in the heap that had been bulldozed off the grave area.

Finally, the majority of inhumed bones were found outside the *tarand* walls (i.e. limestone shingle, and area where the bulldozed soil was relocated), mostly north-east from the grave, while cremated bones were scattered all over the cemetery area (Fig. 7). The fragments of different body parts (teeth, arms, hands, thorax, vertebra, thighs, and feet) were rather equally presented in different grave areas. Nevertheless, the chi-squared test of the presence and absence of inhumed bones in different areas of the cemetery shows that the number and weight of inhumed bones outside the walls is notably higher for all the body parts (see Table 2, Fig. 8). The fact that the inhumed bones were more abundant (3823.83 g) than the cremated ones (1176.63 g) in the intact area of the eastern shingle (Lang 1993, 13) also supports the idea that inumations were deposited outside the *tarand* walls. However, since it is reported that some of the bones from the northern and eastern shingle must have initially derived from other parts of the cemetery and were bulldozed there (Lang 1993, 13), it is difficult to estimate whether more abundant inhumed bones had been intentionally buried outside the walls or bulldozed there from inside the *tarand*s. As the depth records of the bones are missing it is not possible to estimate which



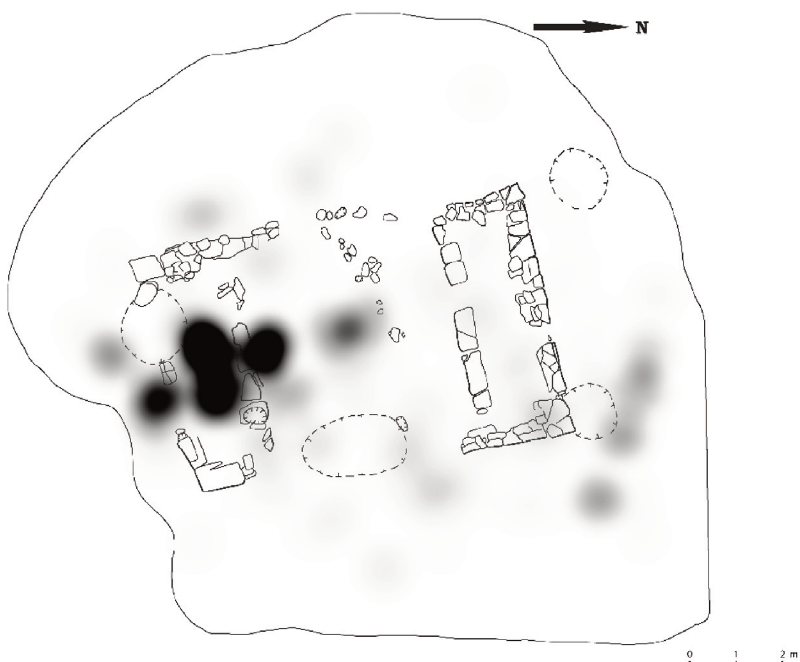




**Fig. 7.** The weight and location of the bone contexts. Blue – inhumed bones, black – cremated bones, solid line – border of the excavation area, dotted line – an area of entirely destroyed occupation layer (pit of a fruit tree). After Lang 1993, figs 2 and 3 and Olli & Kivirüüt 2017, fig. 1.

**Table 2.** Results of Chi square tests (Chi sq) assess the significance (Sig) of the distribution of inhumed and cremated bones inside and outside the *tarand* walls

| Body parts | Inhumed bones | | Cremated bones |
|---|---|---|---|
| | Chi sq | Sig | Chi sq |
| Cranium | 25.600 | 0.000 | 0.703 |
| Teeth | 16.030 | 0.000 | 1.671 |
| Arms and forearms | 13.564 | 0.000 | 2.325 |
| Hands | 22.563 | 0.000 | 2.701 |
| Thorax | 25.326 | 0.000 | 0.873 |
| Vertebra | 5.765 | 0.016 | 1.524 |
| Pelvis | 11.267 | 0.001 | 0.655 |
| Thighs and legs | 4.800 | 0.028 | 0.385 |
| Feet | 23.113 | 0.000 | 0.316 |
| All body parts | 26.042 | 0.000 | 2.774 |

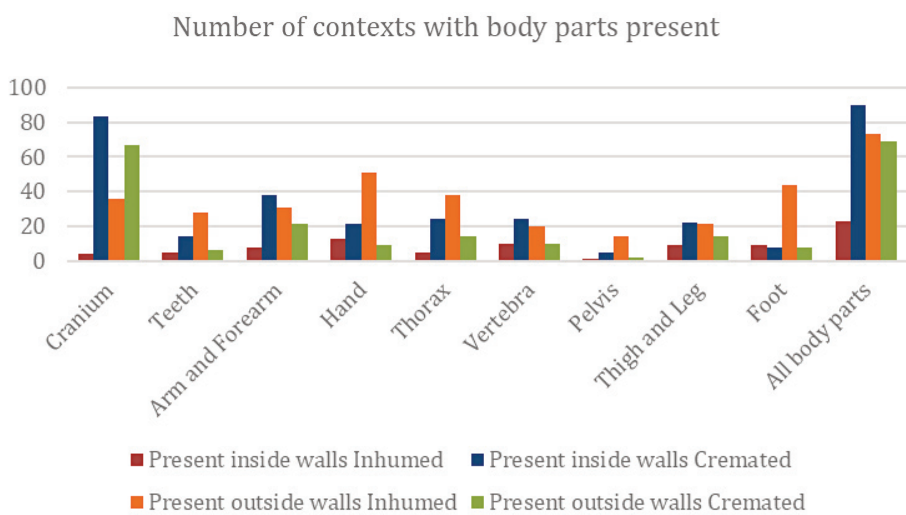



**Fig. 8.** Numbers of contexts containing bones from different body parts. Note that one context often contained bones from several parts of the body.

bones and finds were found *in situ* in the bottom layers and which had been shifted on top. Hence, due to the secondary disturbance of the cemetery's upper layers the spatial patterns should be taken with caution.

## Discussion

The material from Viimsi I *tarand* cemetery had been compromised by natural taphonomic processes and partial destruction. Further analytical biases relate to the initial collection and analysis of the material. The site was excavated in 1990, two years after the initial bulldozing, and was among the first ones subject to the analysis of cremated bones with a medical professional involved in the post-excavation process. Thus, it is possible that not all the bones were collected and smaller or less recognizable fragments might have been overlooked during the fieldwork. Due to these circumstances it is highly likely and understandable that the collection is a mere fraction of the actual material initially placed into the grave. Nevertheless, representation of bones and their position in the cemetery provides insight to several past socio-cultural aspects and burial practices.

The osteological data (MNI) and the use-life of the cemetery together with the grave goods have been employed to reconstruct population structure of *tarand* grave societies (Lang & Ligi 1991; Lang 1996; 2011). This has led to a conclusion that *tarand* graves (ca 500 in total known from Estonia) were used by less than 1/5 of the Roman Iron Age (50–450 AD) populations (Lang 2011, 115), whereas each grave was dedicated to a family of ca ten members (Lang 1990; 1996; Ligi 1995). The reanalysis of the human remains from Viimsi I *tarand* cemetery provides information about the community buried there across 150 years, and demonstrates the ambiguity of mortuary practices. For instance, one individual could have had both partial inhumation and cremation, which directly affects the estimation of MNI. This observation with no contemporary analogues together with the well-known osteological paradox stating that the data obtained from archaeological samples are biased to represent a once-living community (Wood et al. 1992; Chamberlain 2006, 179), indicates that such demographic estimations remain no more than estimated guesses. Thus, despite knowing the cemetery's use-time (350–500 AD) and the MNI, it is highly complicated to obtain more precise demographic calculations or the assertion of social exclusion and/or inclusion of the buried community.

The representation of the individuals within the cemetery, however, is still significant. It has been proposed that monumental *tarand* cemeteries were burial places for the elite families (Lang & Ligi 1991, 25; Ligi 1995, 222 f.; Lang 1996, 469 f.; 2011, 115; Olli & Kivirüüt 2017). The presence of different age groups and both sexes revealed in our study does imply that these identity categories were not limiting factors behind getting buried in the cemetery. This further suggests that the buried children did not have to earn their status during their lifetime (i.e. ascribed status) and men and women were equal enough to be considered worthy of a burial into a *tarand* cemetery. The group using the burial place was thus rather egalitarian.

Yet, it does not necessarily mean that everyone had the right to be buried into *tarand* grave, as it is well known that most of the prehistoric people are "missing" from the archaeological records (e.g., Weiss-Krejci 2011; Lang 2011; Tõrv 2019). Following this reasoning, the people of Viimsi I *tarand* grave already form a somehow remarkable minority. Whether this minority was a single family using a grave over a long time or an elite consisting of many families remains unanswered. Moreover, the egalitarian nature of the burial community cannot be widened to the whole society, while we are lacking any other contemporary cemeteries. Despite these interpretational limitations, our study highlights the wider contribution of detailed osteological analysis from commingled and cremated remains for the estimation of ancient population dynamics and burial practices.

Subadult (< 12 years) bones were mostly found from the southern part of the cemetery or from the soil shifted off the grave surface. It may mean that subadults were equal enough to be buried in the cemetery, but still treated slightly differently from adults, e.g. because they had not had enough time to contribute to society or for other reasons. The placement of the individuals into specific grave areas could have relied on the social status, age, sex or any other trait of the deceased that could have been important for the mourners. There is not yet much evidence for grouping the prehistoric dead with similar physiological traits elsewhere in Estonia, however, concentration of child burials has been observed in Võhma Tandemägi where the southern area of *tarand* 1 contained mainly child bones (Kalman 2000c, 425; Lang 2000, 132; Kivirüüt 2014, 41) or at Aakre Kivivare where one *tarand* contained the bones of at least three children aged 1–5 years and a foetus aged 16–24 weeks (Kivirüüt & Olli 2016). However, in Viimsi I, the differentiation was not as sharp. Also, it cannot be ruled out that the non-adult bones belong to later burials as *tarand* cemeteries were sometimes reused (Tvauri 2012, 254 ff.) and burying children into stone graves even during medieval times has been recorded (Laneman 2012, 106). Without the direct radiocarbon dates it is impossible to prove either of these hypotheses.

The continuous use and commingled nature of the cemetery has created a certain unity and collectiveness for the people buried in the *tarand*s. In addition to the slight clustering of subadult bones, more individual traits were observed in the cemetery (Olli & Kivirüüt 2017, 287). Based on the items and the bones, four clusters containing probably untouched finds and bones were defined (Lang 1993, 10 ff.). The bones and finds were juxtaposed on the excavation plans and items smaller than the standard size were indeed found close to subadult bones (Olli & Kivirüüt 2017, 285). These artefacts probably belonged to children and adolescents who may have had similar belongings as adults while the size of the items was adjusted for the owner (*ibid.*), showing that subadults were not only allowed into the cemetery but were accompanied with custom-made artefacts as well.

### *Patterns in burial customs*

The representation of cremated bones relies largely on actions undertaken by the mourners. They decided which bones were collected from the pyre and placed into the grave. In addition to the socio-cultural choices there are several other factors influencing the survival of the material, e.g. not all the bones survive the pyre (Holck 2008, 46 ff.). The pyre site relating to Viimsi I *tarand* grave has not been discovered, but according to the excavation report charcoal, soot and ashes are sparse in the grave (Lang 1990). Thus, the bodies were not cremated on the site and the bones had to be brought to the cemetery from elsewhere. There are only a few more definite pyre sites relating to graves excavated in Estonia: these include *tarand* cemeteries in Uusküla II (7th–11th c. AD; Lang 2000, 160), in Mõigu Peetri (3rd and 5th–7th c. AD; Lang 2007b, 131) and in Proosa (300–450 AD) (Deemant 1993, 25; Lang 2007b, 133) and an undated in Rakke (Moora 1970). Pyre sites as a phenomenon have not been closely studied; indeed, quite a few poor cremation patches may be pyre remains (Tvauri 2012, 274). Also, during or after active use of the burial place, the grave and the initial deposit area may have been used for building, quarrying or other purposes that destroy the grave constructions as had occurred in Viimsi I.

Viimsi I *tarand* cemetery did present a notable variation in the representation and different cremation patterns of body parts. One of them is the clear over-representation of cremated cranial bones. Differential treatment of body parts is known from several other archaeological assemblages and the fragmentation or breaking human body was a pattern that has been widely recognised during Iron Age but known already from the Mesolithic and Neolithic periods (Parker Pearson 2008, 51 f.; Redfern 2008; Armit 2012, 9; Tõrv 2019, 239 f., 284). Also, the phenomenon that not all the human remains were collected from the pyre after cremation and buried, has been widely noticed (McKinley 2002, 414; Parker Pearson 2008, 7; Joy 2011, 409). In addition to the preference of the mourners, the large portion of skull fragments may have resulted due to excavation bias – cranial vault fragments can be more easily recognised than other bone shards, especially to people with no osteological training. Excavation bias could have influenced the final percentage, but it cannot have been the sole cause of the relatively high prevalence of cremated cranial fragments, suggesting that skulls had a special meaning for the people burying the deceased.

The relatively small number of inhumed cranial fragments suggests that the head was treated differently from the body, also in the case of inhumations. The sparse evidence of possible disturbed inhumation burial outside the *tarand* walls implies that heads could have been cremated, but as there are no possibilities yet to match the cremated and inhumed fragments, this remains a hypothesis. It is also possible that the heads or the crania were transported elsewhere or left above the ground leaving no archaeological traces. Cremated cranial fragments might have been either preferred while picking bones from the pyre debris or collected during excavations or both.

The differential treatment of crania is a widely acknowledged phenomenon. In Anatolia, there is a place called the Skull Building which was used between 9400–6400 BC (Croucher 2011, 830). The skulls in the Skull Building were mostly accompanied by mandibles and sometimes even cervical vertebrae which suggest that the heads had been placed there while soft tissues were still intact (*ibid.*, 831).

On the contrary, the Mesolithic site in Kanaljorden exemplifies complex rituals where mandibles were removed before depositing the crania (Gummesson et al. 2018). Several examples are known from more recent Great Britain (Redfern 2008; Armit 2012). Decapitation has been a possible ritual prior to burial in Romano-British cemeteries (Egging Dinwiddy 2009, 41 f.). Special interest in cranial bones has also been noticed in Estonia: Stone Age Tamula XXII burial, Kunda *tarand* grave, Rebala stone-cist graves, Tõugu *tarand* grave, Tõnija *tarand* grave, and also in Võhma *tarand* graves (Kalman 2000b, 405; 2000c, 427; Jonuks & Konsa 2005; Lang 2007b, 180; Tõrv 2019, 214). In Kunda, the crania were placed in separate stone aligned pits and at least one of the separately placed skulls was accompanied by mandibular fragments (Jonuks & Konsa 2005).

The practices related to the cremation of corpses and/or bones remain ambiguous. Kalling (1993, 68) noted that some of the bones in Viimsi I may have been cremated after the dead had been buried for some time. Our results – large portions of cranial bones with more temperature-related changes on the inside or on the break surfaces rather than on the outside, and the occurrence of some longitudinal splitting and little warping on the surface of the long bones – seem to support this hypothesis, too. The exact timing of the cremation, however, cannot be estimated. These traits have both been demonstrated to occur when the bones are cremated green or fresh (Buikstra & Ubelaker 1994, 96), and also when the bone material had been buried, decomposed and dried (Buikstra & Swegle 1989; Ubelaker 2009). More recent studies have convincingly demonstrated that the determination of cremation time based on the occurrence of splitting and warping is ambiguous (Gonçalves et al. 2011). Thus, considering the precariousness of the method itself and rather scant presence of longitudinal splitting in Viimsi I material, it is more likely that most of the long bones in the *tarand* cemetery were cremated fleshed or at least not long after death. As some of the long bones had cooled down quickly as the temperature shock had caused long bones to break on a straight transverse line, the mourners may have poured water on the pyre site to be able to collect the bones faster. It is also possible that the cooling of the bones was incidental due to sudden weather changes (heavy rain, snowfall etc.).

The overall picture of Viimsi I *tarand* grave material reveals a rather intriguing set of burial practices. The burial customs seem to have revolved around the crania. Based on the cut marks and the representation of the bones, it is likely that the dead may have been first inhumed outside the *tarand* walls. After some time, but not long enough to let all the flesh decay and bones to dry, the crania may have been removed from the inhumations. In cases where the flesh had not decayed enough, some help was needed to remove the crania, hence the cut marks suggesting decapitation and marks on temporal bone, possibly on temporalis muscle. Some more bones may have been removed, cremated on the pyre, cooled the ashes and collected the bones to be buried inside the *tarand* walls while inhumed bones were left where they were – outside the *tarand* walls. The same mixed handling of burning and not burning can be seen in the artefact material which shows that not all items were impacted by heat, and several were burnt at lower temperatures.

## Conclusions

It is evident that even partially destroyed graves contain valuable archaeological information and reanalysis will add new information on past burial practices. Considering the commingled nature of *tarand* graves, the skeletons, articulated bones or even bone fragments can rarely be reassembled even in cases when the cemetery is preserved almost intact. The taphonomic processes as well as the movement of the bones and items directly prior to excavations can be reconstructed to some extent; the accuracy of the reconstructions and conclusions depend on the details documented during the fieldwork.

The bones from Viimsi I were severely commingled. Thus, even the combination of different visual methods did not allow an exhaustive overview of the people buried in the grave. Nevertheless, it gave insights about the number of the buried individuals as well as their age range. The representation of bones suggests that people of different age groups and both sexes were buried in the cemetery indicating a probable family burial place.

The burial practices at Viimsi I grave most likely had several stages: the dead may have been first inhumed and cremated only after some time had passed. The crania were treated differently from the rest of the body, including a deliberate removal from the inhumed burials, and cremation thereafter.

Every new analysis gives some more insight to prehistory as every researcher sees the data from a different angle. The already excavated collections may not have the perfect contextual data, especially considering commingled bone material, but there is always some more to be discovered while reanalysing the older collections and piecing the information together. The study of old excavation data clearly demonstrates that while excavating and creating new collections, it is of utmost importance to record different types of finds in units as small as possible. This allows a clearer context to the commingled fragments and generates additional metadata for future analyses – some of the commingling may turn out to be systematic and inform us more than expected.

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**Anu Lillak, Mari Tõrv ja Ester Oras**

## FRAGMENTAARSED LUUD JUTUSTAVAD LUGUSID: VIIMSI I VANEMA RAUAAJA TARANDKALME

*Resümee*

Surnute põletamisel matmiskombestiku osana on pikk ajalugu. Nii kalmed, säilinud (fragmentaarsed) esemed kui ka inimluud on oluliseks allikaks mitmete ajalooperioodide eluolu ja matmisviiside uurimisel. Seni on põletusmatustega kalmete uuringud Baltikumis keskendunud haua konstruktsioonide ja/või surnutele kaasa pandud esemete analüüsile. Oluliselt vähem on matusekombestiku rekonstrueerimisel tähelepanu pööratud inimluudele. Ehkki matuste osteoloogiline analüüs on Eesti arheoloogias tavapärane praktika, tehakse seda ennekõike terviklikult säilinud luustike, mitte fragmenteerunud luudega põletusmatuste puhul. Käesolev artikkel täidab kirjeldatud tühimikku: kombineerides luumaterjali detailset kirjeldust ja analüüsi statistiliste ja ruumianalüüsimeetoditega, on näidatud põlenud luude potentsiaali muistsete matmiskommete ning -rituaalide tuvastamisel. Lisaks võimaldab praktikate kirjeldus teha järeldusi maetute sotsiaalse staatuse kohta. Keskendudes 1990. aastal kaevatud Viimsi I tarandkalme analüüsile, on käesolevas artiklis rõhutatud arhiivimaterjalide väärtust uue teadmise loomisel.

Läänemere idakaldal levinud tarandkalmed on kollektiivsed matmispaigad, millele on iseloomulikud nelinurksed maapealsed kivikonstruktsioonid (jn 1). Kalmete asukoha, monumentaalsuse ja leiuainese tõttu on neid eliidi matmispaikadeks peetud. Viimsi I tarandkalme asub Jõelähtme kihelkonnas Põhja-Eesti rannikul (jn 2), see oli kasutusel umbes aastail 350–500 pKr. Pärast kalme osalist lõhkumist ehitustöödel toimusid seal 1990. aastal Valter Langi juhtimisel arheoloogilised kaevamised (jn 3); luumaterjali esmase analüüsi tegi Ken Kalling. Vaatamata sellele, et suur osa kalmest sai pinnase eemaldamisel kahjustada, on selle põhja- ja lõunaosa sügavamad kihid säilinud oma algsel kohal. Nii leiud kui ka luud markeeriti kaevamisplaanidele punktidena (luude puhul ei märgitud nende sügavust). Kalmest on leitud nii põletatud kui ka põletamata luid, mis olid kalme alale "laiali pillutatud". Hauapanuste analüüs (Lang ja Maarja Lillak, snd Olli) näitas, et surnutele pandi kaasa isiklikke esemeid, tööriistu, relvi ja keraamikat (jn 4). Viimast oli kalmes rohkelt ja leitud savinõutüübid kuuluvad valdavalt matustega samasse perioodi. Raudesemete analüüs näitas muuhulgas, et vähemalt osa esemeid on olnud kokkupuutes tulega.

Käesoleva artikli aluseks on Anu Lillaku osteoloogilised analüüsid. Kokku analüüsiti 272 konteksti, mis kajastavad luuplaanidele punktina märgitud ja geograafiliste koordinaatidega luukogumeid, mille suurus varieerub. Koljuluude esinemise alusel selgitati välja, et Viimsi I tarandkalmesse on maetud vähemalt 29 põletatud indiviidi säilmed; põlemata luud kuulusid korduvate 5-ndate metatarsaalluude järgi vähemalt 14 indiviidile. Kuna inimluude osteoloogilisel analüüsil ei saa välistada, et ühe indiviidi surnukeha koheldi matuserituaalide käigus erinevalt – osa kehast asetati tuleriidale, osa mitte –, siis tuleb kalmest leitud indiviidide minimaalseks arvuks pidada 31. Soo määramise aluseks oli kolju robustsus, mis lubas eristada viie naise ja kaheksa mehe luid (jn 5; tabel 1). Materjali fragmentaarsus ei võimaldanud eristada täiskasvanute vanusegruppe. Laste ja noorukite sugu polnud võimalik määrata (vanuses 0–20 aastat; tabel 1).

Osteoloogilise analüüsi käigus ei tuvastatud patoloogiaid. See teadmine ei pruugi kajastada mineviku tegelikkust, vaid võib olla põhjustatud põletuse käigus saadud luupinna kahjustusest, mis ei võimalda patoloogiaid eristada. Samas leiti ka põlemata luudelt vähe patoloogiaid: hambad olid heas korras, esines vaid mõningaid raske füüsilise koormusega seotud traumasid ja stressi ning vanusega kaasnevaid Schmorli sõlmi, spondüloosi ja anküloosi nii selja- kui ka nimmelülidel.

Osteoloogiline analüüs lubab ka matmiskombestiku kohta järeldusi teha. Näeme, et minimaalne maetute arv (MNI) erineb, kui kõrvutada korduvate luuelementide lugemise meetodil ja luude kaalumisel saadud tulemusi. Viimasega saadud tulemused näitavad, et mitte kõiki luustikuosi pole kalmesse pandud. Seda, kas tegemist on teadliku rituaali osaga või uurimistööst tuleneva kõrvalekaldega, on raske kindlalt väita. Samuti ilmnes, et kolju sisekülgedel on välisküljega võrreldes tugevamad põletusjäljed. See tähendab, et koljud olid põletuse käigus katki läinud, mis võib olla nii põlemisprotsessi tulem kui ka teadlik rituaali osa. Muuhulgas viitab koljude sisekülgedel olev läige sellele, et tuleriidale pandi värsked surnukehad. Samas näitab luude hallikas värvus, et põletusprotsess ise oli võrdlemisi lühike. Mitmel luul tuvastatud lõikejäljed (jn 6) võivad samuti matuserituaalidega seotud olla. Luumaterjali ruumiline ja statistiline analüüs paljastas, et A tarandi kirdeosas ning C tarandi keskosas oli kõige erinevama koostisega luumaterjal (tabel 2; jn 7 ja 8). Eri kehaosade katked olid võrdselt esindatud kõigis kalme osades. Enamik põletamata luid paiknes tarandi müüridest väljaspool (kalmest kirde pool), põlenud luid leiti aga kogu kalme ulatuses (tabel 2). Eraldi tähelepanu oli pööratud lastele, kelle põletatud luud paiknesid kalme lõunaosas või kalmelt eemaldatud pinnase kuhjatises.

Surnukehade põletamisega seotud praktikad jäävad osaliselt ebaselgeks. Viimsi I tarandkalmega seotud tuleriida asukohta ei ole seni leitud ja teame vaid, et surnukehi ei põletatud kohapeal. Eri kehaosad olid erineva põletusastmega. Näiteks on Viimsi I materjalis selgelt nähtav põlenud koljuluude rohkus. Uuringutega tuvastasime muuhulgas mõningase ajalise viivituse surmahetke ja põletamise vahel.

Viismi I tarandkalmega seotud matuserituaalid olid komplekssed ja mitmeetapilised. Koljuluude erinev kohtlemine ülejäänud kehast lubab oletada, et surnute peadele omistasid leinajad erilist tähendust. Nii luude välimus kui ka lõikejäljed tõendavad, et surnud asetati tuleriidale natuke aega pärast surma, et nende kehad poleks jõudnud lagunema hakata. Sealjuures olid mõned kehaosad (näiteks koljud) enne põletamist eemaldatud. Pärast põletust ja tuleriida jahtumist koguti kokku vaid osa luudest ning viidi taranditesse, samas kui põletamata surnukehad asetati müüridest väljapoole.

Kuna Viimsi I tarandkalme kasutusaeg katab poolteist sajandit, on demograafiliste analüüside tegemine keeruline. Samas näitab nii naiste, meeste kui ka laste matmine, et kalmistu oli soost ja vanusest hoolimata mõeldud "kõigile" kogukonnaliikmetele. Olemasoleva materjali põhjal ei ole aga paraku võimalik tuvastada, kas Viimsi I kalme oli 1) pikka aega kasutatud perekonnakalmistu või 2) eksklusiivne eliidi matmispaik. Kui oletame, et kirjanduses väljapakutud eliidikalmistu idee peab paika, siis on tähelepanuväärne, et Viimsi I kalmesse maeti ka lapsi. See tähendab, et lapsed ei pidanud ühiskonnas oma staatust n-ö välja teenima, vaid kuulusid sinna perekonna alusel. Samas koheldi laste luustikke täiskasvanute omadest natukene erinevalt: nende luud koondusid vaid kalme ühte ossa ja neile kaasa pandud esemed olid miniatuursed, st spetsiaalselt lastele valmistatud. Naiste ja meeste suhteliselt võrdne esinemine kalmes on tunnistuseks küllaltki egalitaarsest kogukonnast. Võime öelda, et kalme pikaajaline kasutus ja säilmete segatus lubavad kõnelda ühtsest kalme kasutajaskonnast.