



Archaeological fieldwork at Pikk Street and St Michael's churchyard, Rakvere

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INTRODUCTION

In spring of 2019, Pikk street, the historic main street of Rakvere was reconstructed. New paving was laid on the entire street, the whole street section was provided with modern lighting, and a new central heating pipe was placed between Pikk St. 19 and Posti St. 4 (Fig. 1). During the resulting archaeological fieldwork in an area of ca. 615 m², an array of old street levels, buildings, and different artefacts were unearthed, including a surprising find of a possible Iron Age pit house. A part of the St Michael's churchyard was also excavated.

Authors have contributed to the article as follows: M. Malve and L. Vilumets – excavation, burials, and human remains, J. Viljat – excavation and analysis of finds and broader context, E. Rannamäe and F. Ehrlich – analysis of faunal remains.

HISTORICAL BACKGROUND AND RESEARCH AT PIKK STREET

The site of Rakvere has been inhabited at least since the Early Iron Age. Some of the oldest finds originate from Teatrimägi (Eng. Theatre Hill) on the northern side of the castle, including a fire pit possibly from the beginning of the 1st millennium AD (Aus 1993, 9) and striated pottery, which is known to have been in use until the end of the Early Iron Age (Aus 1993; Lissitsina *et al.* 2016). The first evidence of an Iron Age settlement in Rakvere comes from Pikk street, where the layers of charred wood have suggested that this area has been inhabited from the beginning of the 11th and 12th centuries¹ and has seen at least four major fires (Aus 1985, 6–9). During this time, the settlement stretched as far as Teatrimägi, where signs of Late Iron Age dwellings have been found alongside pottery mostly from the end of the Late Iron Age. There, at least one of the houses had been used from the end of the Late Iron Age to the beginning of the Medieval Period, showing the continuation of permanent settlement in this part of Rakvere (Aus 1993, 9–11).

¹ Radiocarbon dating of the charred wood (Tln 761, 941±30 BP) gave the result 1028–1170 calAD with 95.4% certainty after calibration (Bronk Ramsey 2020).

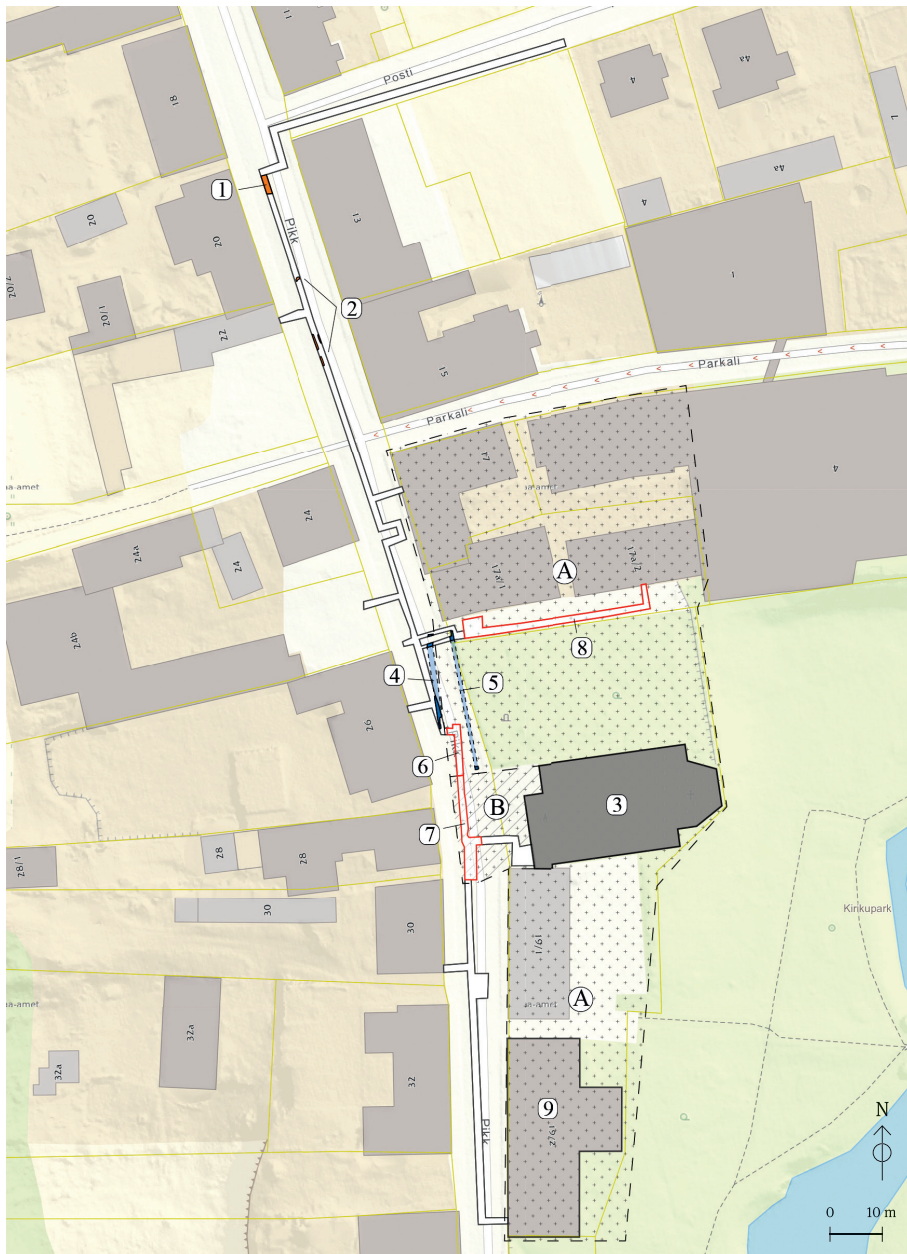


Fig. 1. The location of the opened trench in Pikk street in Rakvere during fieldwork carried out in 2019. 1 – pit house, 2 – depressions containing the Late Iron Age cultural layer, 3 – the Church of the Holy Trinity, 4 – churchyard wall, 5 – new churchyard wall, 6 – area of burials, 7 – area of slight burial density, 8 – area of commingled human bones and grave goods, 9 – location of in situ burials found in the cellar of Pikk St. 19/2, A – churchyard, B – area of burials found in a single layer.

Jn 1. 2019. aastal Rakveres Pikal tänaval uuritud trass. 1 – majaase, 2 – hilisrauaaegse kultuurkihiga lohud, 3 – Rakvere Kolmainu kirik, 4 – kirikaia piirdemüür, 5 – kirikaia uus piirdemüür, 6 – matustega ala, 7 – väikse matmistihedusega ala, 8 – segatud inimluudega ja hauapanustega ala, 9 – Pikk tn 19/2 keldrist leitud matuste asukoht, A – kirikuaed, B – ühes kihis leitud matused.

Drawing / Joonis: Raido Roog

The first written records of an Iron Age fort of Tarvanpää or what we assume is Rakvere comes from the chronicles of Henry of Livonia in 1226 (T(h)arwanpe; HCL XXIX, 7). In the 13th century, the Danes built a stone castle on the site of the earlier Iron Age fort (Markus *et al.* 2012, 336) and a small urban settlement of merchants and craftsmen began to form next to the castle (Alttoa 2019, 125). In the 15th century the St Michael's church was built² next to the main road of the settlement, the Pikk street (Raam 1997). The town carried heavy losses during the Livonian and the Great Northern Wars in the 16th and early 18th centuries (Kirss 2003, 43–44; Piirimäe 2003, 35) and Pikk street kept its role as the main street of the town.

Archaeological research at Pikk Street

There have been many archaeological investigations carried out at and around Pikk street and the St Michael's church, currently known as the Church of the Holy Trinity. Besides the above-mentioned studies at Pikk St. 3, Aus carried out minor investigations at Pikk St. 22 and 24 (Aus 1985). The largest earthwork was carried out in 2000, when a new 1.8-kilometre-long water and sewage pipe was put in place (Jaanits 2000); during this monitoring several cross-sections of the street levels were made. Small-scale archaeological fieldwork at the churchyard were carried out in the following years (Jonuks 2003; 2006). Thus, during 2019 campaign street layers undocumented during the previous fieldwork were studied under the Pikk street and an Iron Age cultural layer was found. The extent of the St Michael's churchyard was also determined based on the burials and mixed human bones present in the opened trenches.

THE LATE IRON AGE SETTLEMENT

Under the Medieval street level³ between Parkali and Posti streets in the natural reddish sand, four pits were found (Fig. 1: 2), which were filled with dark grey sandy soil. They contained a small amount of animal bones (see Faunal remains, Unit 1) and a few pieces of pottery, specks of rusted metal, and charcoal. The diameter of the pits varied from about 1.25 to 3.3 m. These pits could be explained by extensive earthworks, where the upper strata were removed, and the original cultural layer remained only in the natural depressions.

One of the pits found in front of Pikk St. 13 turned out to be the base of a larger house dug into natural soil (Fig. 1: 1; Fig. 2). While the edges of other pits were rounded, this pit had clear straight cut edges. It was 4 m long and 0.5 m deep. In the bottom of the pit was a dark black layer about 7 to 8 cm thick, and soil above this layer was sooty and dark, while below it was light and sandy. This is interpreted as the floor of the house.



Fig. 2. A keris stove found in the pit house. The keris, laid of large granite stones, can be observed on the left, with the cooking area or lee situated on its right side. The small fire pit can be seen further right of the keris stove.

Jn 2. Maasse süvendatud hoone seinä äärest leitud kerisahi. Vasakul on näha kividest laotud keris ja selle paremal küljel leease. Kerisahjust kaugemal paremal asetseb väike tulease.

Photo / Foto: Janika Viljat

² This is the opinion of art historian V. Raam, although art historian K. Alttoa has proposed that the church might have been erected as early as in the 13th century (Alttoa 2003, 49).

³ The street level was found at the depth of 76.8–77.2 m a.s.l. in front of the Pikk St. 15 and 13 buildings.

Near the northern wall of the house, there was a small *keris* stove (a stove covered with a heap of boulders, see Tõnisson 1981). It was laid in the north-south direction with the *keris* near the wall and a rectangular *lee* (e.g. cooking area) on the southern side (Fig. 2). The *keris* of large granite stones with a few limestone slabs seemed to be more rectangular in shape, but this could be due to the limitations set by the trench itself – length 1.9 m and width 0.95 m. In front of the oven, a small separate fire pit was laid of flat granite slabs. The stones had been subjected to a lot of heat and the soil around them contained a lot of stone rubble, pieces of charcoal, and burnt or unburnt faunal remains⁴, but also fragments of fine- and coarsewares dating approximately from the Late Iron Age. The stones were laid almost on top of the virgin soil with only a thin darker sandy layer separating the two, indicating that the pit house and the stove were built simultaneously.

Similar pit houses have only been found from Iru hill fort and Aakre settlement site (Tvauri 2014, 57–58). It is possible that the pit house found in Rakvere had a similar construction to the one found in Iru – a house with an earthen floor and a *keris* stove⁵ situated in the corner of the house. No stone or wooden walls were found, but the limestone slabs around the oven suggest a possible wooden above-ground structure, as the slabs would have offered some insulation from the heat of the granite stones. Although we found no signs of burnt or charred wood, the house may have been destroyed by a similar fire as the houses found on Pikk St. 3 lot (Aus 1985). It is also possible that wooden or above-ground stone constructions or deposits were removed during the extensive earthworks, associated with the development of the main street in the Medieval Period.

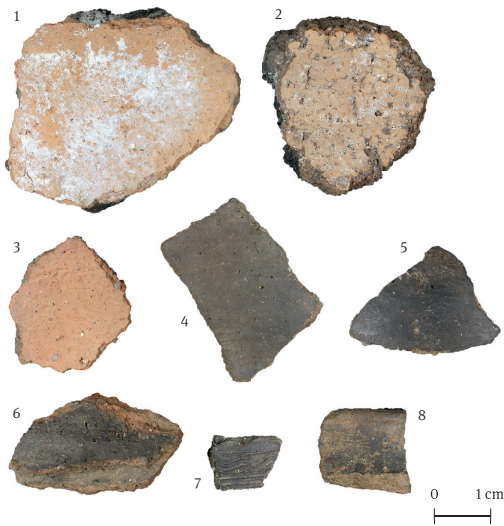


Fig. 3. Example of pottery sherds found from the Late Iron Age cultural layer.

Jn 3. Näited rauaaegsest kultuurkihist leitud keraamika katketest.

(RM A 180: 728, 729, 738, 734, 731, 741, 724, 720.)

Photo / Foto: Raido Roog

A small number of finds were retrieved from the pits with preserved cultural layer and the pit house, those being mostly sherds of hand-made and wheel-thrown pottery. Typologically (see Lang 1996, 78–81; Tvauri 2005, 31–59), the sherds can be dated to the Late Iron Age (Fig. 3). Beside the few natural depressions and the pit house, no cultural layer dating from the Iron Age was found anywhere else in the trench. Nevertheless, a remarkable artefact – a striated pottery sherd – was found in the mixed soil of one of the burials. Pottery with this kind of surface treatment was typically used from the Late Bronze Age up to the 5th or 6th century AD (Laul 2001, 173–174). A few similar vessel fragments with striated surfaces have also been found from Vallimägi, at the site of the Iron Age fort, and from Teatrimägi (Aus 1993; Lissitsina *et al.* 2016).

In addition, a pendant made of a white-tailed sea-eagle's (*Haliaeetus albicilla*) or

⁴ Three bone samples gathered from around the *keris* stove (cattle scapula AZ-14: 2, cattle tibia AZ-13: 3, and sheep/goat tibia AZ-14: 1) have been sent for radiocarbon dating.

⁵ In the pit house found in Iru only a stove-like construction was found, alongside pottery dated to the 9th century (Lang 1996, 72).

golden eagle's (*Aquila chrysaetos*) talon was obtained from mixed soil from the Pikk St. 17a plot north of the church. Similar pendants have been found, for example, in Pada cemetery and Linnaaluste III and Rebala settlement sites, all from the Late Iron Age context (Luik & Maldre 2005, 269, fig. 19: 4; Jonuks & Rannamäe 2018, table 2.1). An ornamented copper bead coated in tin bronze and decorated with a circular pattern was also collected. Similar beads have been found from Pühaste hoard, which is dated to the Late Iron Age (Tvauri 2014, 133, fig. 111: 8; 201).⁶

Solely based on the finds – the striated pottery sherd, the copper bead, and the talon pendant – we can estimate the extent of the Iron Age settlement. Until now it was thought that the core of the settlement had formed over at Teatrimägi and at the base of Pikk street and gradually moved down towards St Michael's church as it grew during the Medieval Period (Alltoa 2019, 121). With the finds gathered, we can now hypothesize that the Iron Age settlement stretched far beyond what we had previously imagined and at least during the Late Iron Age, some form of habitation was situated along the current Pikk street, which has been suggested as the main trade route already back then (*ibid.*, 120).

STREET LAYERS

Many different strata were visible under the Pikk street. Between the street pavements and their sand beddings were three dark brown, almost black organic rich layers that contained household waste. In addition, a very dense black layer only a few centimetres thick could be observed above the natural depressions containing the Iron Age cultural layer. This was only found in the northern part of the trench in front of Pikk St. 15 and 13. A handful of finds were collected from its surface – a few unburnt animal bones and unidentifiable pieces of metal. Since it was located under the 17th century street layer and above the natural sandy soil, it is probable that this was the surface of the Medieval street.

Above that layer and under the earliest limestone pavement was the first dark layer, which was the thickest of the three organic rich strata, measuring around 50 cm (see Fig. 4: 4). This



Fig. 4. Profile of the trench with remains of the Late Iron Age pit house found in the trench after removing the keris stove. 1 – present day asphalt, 2 – 19th or 20th century cobblestone pavement, 3 – sand bedding, 4 – 1st dark layer, 5 – possible Medieval Period street level, 6 – Late Iron Age pit house, 7 – floor of the house, 8 – layer under the floor level, 9 – sandy virgin soil.

Jn 4. Trassi profiil hilisrauaaegse maasse süvendatud hoone kohal pärast kerisahju eemaldamist. 1 – tänapäevane asfalt, 2 – 19. või 20. sajandil laotud munakivisillutis, 3 – liivapadi, 4 – 1. must kiht, 5 – võimalik keskaegne tee, 6 – maasse süvendatud noorema rauaaja hoone, 7 – hoone põrand, 8 – hoone põranda alune kiht, 9 – looduslik liiv.

Photo and additions / Foto ja täiendused: Janika Viljat

⁶ Artefact first dated by Andres Tvauri (TÜ).

layer contained a copious amount of artefacts, animal bones (see Faunal remains, Unit 2), and pieces of limestone and bricks. Based on pottery and coin finds, the stratum could be dated to the 17th and the beginning of 18th century, although it also contained some artefacts from the end of the 16th century.⁷ In this stratum, a horizontal layer of limestone was observed, used at some point as a form of early pavement or street level.

Two pavements made of smaller limestone pieces were observed throughout the trench. A sandy bedding was visible under every pavement, which in some places was also used to correct the slant of the street. Although the pavements or the layers between them did not contain a lot of finds, we can date the limestone pavements to the 18th and 19th centuries mostly based on coin finds and a few fragments of redware or porcelain vessels. The second and third dark layers were only about 10–15 cm thick and mostly contained pieces of limestone and red bricks, with few artefacts and faunal remains (see Faunal remains, Unit 3). Since these strata were located between the 18th and 19th century limestone pavements and their sand beddings, we can date the layers to the same period. The last time the road was paved was probably at the beginning of the 20th century, when a layer of cobblestones was placed on the main street and surrounding smaller roads, including some courtyards.

Though there is still some debate about the nature of the second and third dark layer, it is almost certain that the first dark layer cannot be seen as completely formed as a result of activities in the street area. Its nature and thickness suggest that waste and debris from the surrounding properties has been piled on the streets to improve their condition. From the 19th century, it is known that the streets were used to drive cattle to nearby pastures, causing the streets to become muddy, trampled, filthy, and often impenetrable, especially during the spring and autumn months (Kirss 2003, 76). Interestingly, many finds show signs of weathering⁸, which seems to support this claim.

No first, second, or third dark layer nor the surface of the Medieval street were observed under the current street south of the St Michael's churchyard, where only later, 19th and 20th century pavements and layers were found (Fig. 1). This may be due to the churchyard acting as a sort of boundary to the Medieval and Early Modern settlement. Art historian Kaur Altoa has stated that the settlement did not stretch far south of the church during the beginning of the 16th century (Altoa 2019, 121). Considering the location and stratigraphical situation of the two churchyard walls⁹ (Fig. 1: 4–5) and the foundations of houses found during fieldwork, which extend under the present asphalted road, the Pikk street could be displaced in this part and could have previously been situated closer to Vallimägi than today.

817 numbers of finds were gathered during fieldwork from different street layers, constructions, and the churchyard. A large number of the recovered artefacts were pottery sherds, but also a few white clay pipe stem pieces, bone artefacts or worked animal bones, stove tile or red brick fragments, and many metal finds such as mostly 17th–19th century coins, horseshoes, and a bundle of keys. Most of the finds were collected from different street layers. A large number of pottery were pieces of Modern Period redware vessels, mainly glazed and some decorated with mostly floral patterns. Plates, platters, and tripod pots were all represented. A few pieces of stoneware and greyware were also found. Most of the finds were collected from the first dark layer discussed above and were dated to the 17th and 18th centuries. Many

⁷ The finds were dated with the help of Erki Russow (TLÜ AT).

⁸ This was pointed out by E. Russow, when examining the artefacts.

⁹ The first churchyard wall (Fig. 1: 4) is situated under the 17th and 18th century street layers, and the earlier burials of the St Michael's churchyard were found about 2 m east of this wall. The second churchyard wall was more related to the greenery we now see next to the church of the Holy Trinity, suggesting the wall was built when the street had already moved closer to the church.

of the pottery fragments show signs of weathering. For Late Iron Age finds see discussion in subchapter 'The Late Iron Age settlement site'.

Quite a few bone artefacts were found, most of which were gaming pieces made of cattle phalanges, including one filled with lead (for examples, see Luik 2004, fig. 16). Besides these, a spinner made out of a cattle talus was found, examples of which have been dated to the period from the Late Iron Age to Modern Period (Heinloo *et al.* 2011, fig. 34). Some other worked bone and antler pieces were also present, including a Late Iron Age talon pendant (see above).

A number of finds were recovered from a small trench in front of Pikk St. 17a. As this was the site of the marketplace during the Modern Period (Kirss 2003, 96), the soil contained a lot of faunal remains and pieces of redware vessels associated with the butchering of animals and selling goods during the 18th and 19th century. Here, the churchyard and burials were disturbed by later earthworks, so a lot of mixed grave goods such as coins, beads, textiles, and pottery fragments were found alongside disarticulated human remains.

ST MICHAEL'S CHURCHYARD

Burials

During the excavations, 57 burials related to St Michael's churchyard were discovered, the majority of which can be dated to the Early Modern Period. The results of osteological analysis provide insight into the lives of inhabitants of Rakvere from the 13th to the late 18th centuries.

The burial area surrounding the church can be divided between that in front of the church (burials nos 1–18, 22, and 23), where burials were situated scarcely in one layer and no later burials occurred (Fig. 1: 7), and the burial area north and south of the church. A layer of limestone and mortar debris, possibly from the 17th century when the church was renovated, covered the burials in the first area. Five graves were in a straight row next to each other and all buried at the same time (nos 16, 17, 18, 22, and 23). Unlike other burials, these graves were found under the current street, west of the church. No finds were discovered from these graves. It is highly possible that these five burials date from the Livonian War period (1558–1583), or the following uneasy times when the town was in ruins.

The burials north of the church (Fig. 1: 6; skeletons nos 19–20, 24–28, 30–57) showed remarkably high burial density (Fig. 5) and several earlier burials had been partly destroyed by later ones. The north side of the churchyard probably extends to the plot at Pikk St. 17a and also to the courtyards. During the fieldwork in 2019, a large amount of commingled human remains and grave goods were collected from the part of the trench in front of Pikk St. 17a (Fig. 1: 8). The discovered material was probably the result of building the two houses at Pikk St. 17a, during which the graves were destroyed and the soil was spread in the area between the buildings and the church. No *in situ* burials were discovered from this area in 2019,



Fig. 5. Burials cleaned from the soil at the St Michael's churchyard in Rakvere.

Jn 5. Väljapuhastatud matused Rakvere Püha Mihkli kirikaiaas.

Photo / Foto: Janika Viljat

since the trench did not reach the burial layer. In 2003 *in situ* burials were found in front of Pikk St. 17a at a depth of only about 1 m from the present day ground level (Jonuks 2003).

A few years ago, human remains, including *in situ* burials, coins, and coffin nails were discovered from the basement of a building at Pikk St. 19/2 south of the church¹⁰ (Fig. 1: 9). Thus the southern boundary of the burial area might have reached significantly further.

During the fieldwork, 57 *in situ* burials were documented (Table 1), of which 56 were un-earthed. Most of the dead were buried in single graves; however, there were four double burials (nos 1–2, 8–9, 10–11, and 16–17) and one possible triple burial (nos 19, 20, and 24).

Table 1. Osteological age, sex and pathologies of the recorded skeletons from Rakvere St Michael's churchyard.

Tabel 1. Rakvere Püha Mihkli kirikuaast leitud luustike osteoloogiline vanus, sugu ja patoloogiad.

DEH = dental enamel hypoplasia / hammaste hüpoplaasia; OA = osteoarthritis / osteoartroos; SpA = spondyloarthritis / spondüloartroos, OC – osteochondrosis / osteokondroos.

Compiled by / Koostanud: Martin Malve

No / nr	Sex / Sugu	Age / Vanus	Pathologies / Patoloogiad	Stature / Kehakasv
1	♂	18–20 y / a	Periostitis on the diaphysis of the tibiae and fibulae, trauma on the distal 1/3 end of the right humerus, healed fracture on the right 11th rib, Schmorl's nodules on thoracic vertebrae, spondylosis on thoracic and lumbar vertebrae.	165.9 ± 3.27 cm
2	♀	40+ y / a	OA of the elbows, wrists, hips, knees and ankles, periostitis on the proximal end of the left fibula, osteomyelitis on the distal posterior side of the right femur, spondylosis of lumbar vertebrae and 1st sacrum vertebra.	156.6 ± 3.72 cm
3	♂	18–20 y / a	Teeth: slight dental calculus, DEH. Sharp force trauma on the inferior part of the body and arch of the 5th cervical vertebra, healed fracture on the neck of the 7th and 8th rib, healed fracture on the distal 1/3 of the right tibia, Schmorl's nodules on thoracic and lumbar vertebrae.	170.4 ± 3.27 cm
4	?	2 y / a ± 8 m / k	-	-
5	♂	44–83 y / a	Dislocation of the right shoulder, OA of the shoulders, elbows, wrists, hips, knees and ankles, OC on cervical vertebrae, SpA on thoracic and lumbar vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, Schmorl's node on the 11th thoracic vertebra.	-
6	?	0–2 m / k	-	-
7	?	0–6 m / k	-	-
8	?	2–4 y / k	-	-
9	♂	44–66 y / a	Teeth: slight dental calculus, remarkable alveolar reduction, caries, periapical lesions, DEH. OA of the shoulders, elbows, wrists, hips, knees and ankles, SpA on cervical vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, Schmorl's nodes on thoracic vertebrae.	171.4 ± 3.27 cm
10	♀	50+ y / a	Teeth: slight dental calculus, slight alveolar reduction, DEH. Parturition scars on the pubic bones, compression of the 11th thoracic vertebra, OC on cervical vertebrae, SpA on thoracic vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, Schmorl's nodes on thoracic vertebrae.	148.9 ± 3.72 cm
11	♀?	40–44 y / a	Teeth: slight dental calculus, medium alveolar reduction, caries, periapical lesions. Os trigonum, trauma on the right proximal part of 4th metacarpal bone, trauma on the left distal part of the 5th metacarpal bone, OC on cervical vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, Schmorl's nodes on the 12th thoracic vertebra.	157.1 ± 3.72 cm
12	♀	Adult / täiskasvanu	-	-
13	♀	17–25 y / a	Teeth: medium dental calculus, caries. Metopism, button osteoma on the right parietal bone.	-
14	♀	18–19 y / a	-	154.9 ± 3.72 cm

¹⁰ Tauno Toompuu, the minister of the Church of the Holy Trinity, informed us of bones found during fieldwork carried out in 2019. The site was surveyed by M. Malve, J. Viljat and freelance metal detectorist Andrei Roosild.

No / nr	Sex / Sugu	Age / Vanus	Pathologies / Patoloogiaid	Stature / Kehakasv
15	?	3–9 m / k	-	-
16	♀	18–25 y / a	Teeth: slight dental calculus, caries, periapical lesion, DEH. Metopism.	-
17	♀?	19–21 y / a	Teeth: medium dental calculus, caries, DEH.	-
18	♂	35–45 y / a	Teeth: slight dental calculus, medium alveolar reduction, periapical lesions, DEH. Cyst inside of the superior part of the thoracic.	-
19	?	7–8 y / a	Teeth: slight dental calculus, DEH.	-
20	?	7–11 y / a	Teeth: slight dental calculus, DEH. <i>Cribra orbitalia</i> .	-
21	♂	44–66 y / a	Teeth: medium dental calculus, slight alveolar reduction, caries, DEH. Healed sharp force trauma on the frontal bone, healed fractures on the anterior part of the nasal bones, button osteoma on the right side of the frontal bone, OA of the shoulders, elbows, wrists and hips, sternal foramen, trauma on the heads of the left 6th and 7th ribs, compression of the 11th thoracic and 1st lumbar vertebra, spondylosis on thoracic and lumbar vertebrae.	-
22	?	2–3 y / a	Teeth: caries.	-
23	♀	25–40 y / a	Teeth: slight dental calculus, slight alveolar reduction, caries, periapical lesions, <i>ante mortem</i> lost teeth, DEH, left maxillary second premolar has not been formed. Healed fracture on the lateral part of the right clavicle, <i>cribra orbitalia</i> on the left orbit, posterior part of the 1st cervical vertebra has not been fused, foramen on the spinous process of the 7th cervical vertebra, spondylosis on the thoracic vertebrae.	-
24	♂	25–35 y / a	Teeth: slight dental calculus, DEH. Metopism.	-
25	♀	40+ y / a	Teeth: slight dental calculus, medium alveolar reduction, caries, periapical lesions, <i>ante mortem</i> tooth loss. OA of shoulders, elbows, and wrists, spondylosis on thoracic and lumbar vertebrae, Schmorl's nodes on lumbar vertebrae.	-
26	♀	18–20 y / a	Teeth: slight dental calculus, caries. Depressed fracture on the right side of the frontal bone, Schmorl's nodes on the 7th thoracic vertebra.	160 ± 3.72 cm
27	♂	39–57 y / a	Teeth: slight dental calculus, remarkable alveolar reduction, DEH. Spondylolysis of the 3rd lumbar vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, healed depressed trauma on the posterior part of the left parietal bone.	170.9 ± 3.27 cm
28	♀	25–40 y / a	Teeth: slight dental calculus, caries, DEH. Metopism, spondylosis on thoracic vertebrae.	-
29			Left unexcavated	
30	♂	25–40 y / a	Teeth: slight dental calculus, medium alveolar reduction, caries, periapical lesions. Healed depressed trauma on the right supraorbital ridge of the frontal bone, <i>os acromiale</i> on both scapulae, one additional rib on the left side, healed fracture on the spinous process of the 4th thoracic vertebra, spondylosis on thoracic and lumbar vertebrae, trauma between the left 3rd, 4th and 5th proximal and medial hand phalanges.	-
31	♀	25–40 y / a	Teeth: slight dental calculus, slight alveolar reduction, caries, periapical lesions, <i>ante mortem</i> tooth loss, DEH. Button osteoma on the right parietal bone, OA of the elbows, SpA of cervical vertebrae.	-
32	♂	40+ y / a	Teeth: remarkable dental calculus, medium alveolar reduction. OA of the shoulders and elbows, SpA on the cervical vertebrae, four button osteomas on the frontal bone, one on the left side of the coronal suture, three on the parietal bones.	-
33	♂	40–57 y / a	Teeth: slight dental calculus, remarkable alveolar reduction, caries, periapical lesions, <i>ante mortem</i> tooth loss, DEH. OA of the shoulders, elbows, wrists and hips, two foramina on the right scapula, button osteoma on the left parietal bone, healed depressed trauma on the right side of the frontal bone, healed traumas on the shafts of the left 9th and 10th, compressions on thoracic and 1st lumbar vertebrae, OC on cervical vertebrae, spondylosis on thoracic and lumbar vertebrae, Schmorl's nodes on the thoracic vertebrae.	-
34	♀	40–70 y / a	Teeth: medium dental calculus, medium alveolar reduction, caries, periapical lesions. OA of the hips and knees, spondylosis on thoracic and lumbar vertebrae.	161.3 ± 3.72 cm
35	♂	18–21 y / a	Teeth: slight dental calculus, caries, periapical lesions, DEH. Compressions on the 10th and 11th thoracic vertebrae, spondylosis on thoracic vertebrae, Schmorl's nodes on thoracic vertebrae.	-
36	?	12 y / a ± 30 m / k	Teeth: slight dental calculus, maxillary left second premolar has been erupted wrongly.	-

No / nr	Sex / Sugu	Age / Vanus	Pathologies / Patoloogiad	Stature / Kehakasv
37	♀	40+ y / a	Teeth: medium dental calculus, remarkable alveolar reduction, caries, periapical lesions, <i>ante mortem</i> tooth loss, maxillary right canine has not been formed. OA of the shoulders, elbows and wrists, healed fracture of the mid shaft of the left clavicle, metopism, button osteomas on the right side of the frontal bone and the left parietal bone, SpA on cervical and thoracic vertebrae, OC on cervical vertebrae, ankylosis of cervical and thoracic vertebrae, spondylosis on thoracic vertebrae.	-
38	♀	25–35 y / a	Teeth: slight dental calculus, caries, periapical lesions, <i>ante mortem</i> tooth loss. Button osteomas on the right side of the frontal bone and on the right parietal bone, OA of the right shoulder.	-
39	♀	40+ y / a	Teeth: slight dental calculus, remarkable alveolar reduction, caries, periapical lesions, <i>ante mortem</i> tooth loss, DEH, right maxillary first premolar has not been erupted – instead the first roots of deciduous molar are present. Healed trauma on the mid shaft of the right 5th rib, healed fracture of the mid shaft of the 3rd rib, possible periostitis on the posterior side of the left 7th and 8th rib, OA of the shoulders, elbows and wrists, healed traumas on the left clavicle and scapula, compression of the 12th thoracic vertebra, SpA and OC on cervical vertebrae, spondylosis on thoracic and lumbar vertebrae, Schmorl's nodes on thoracic and 1st lumbar vertebrae.	-
40	♀	Adult / täiskasvanu	-	155 ± 3.72 cm
41	♀	25–40 y / a	Teeth: slight dental calculus, caries, periapical lesions, <i>ante mortem</i> tooth loss. Periostitis on the left anterior side of the mandible, healed depressed trauma on the right side of the frontal bone, <i>os acromiale</i> on the right scapula, three button osteomas on the right side of the frontal bone, Schmorl's nodes on thoracic vertebrae.	-
42	♀	Adult / täiskasvanu	-	-
43	?	6–9 y / a	Teeth: slight dental calculus, caries, periapical lesion.	-
44	♀	44–66 y / a	Teeth: medium dental calculus, caries, periapical lesions, <i>ante mortem</i> tooth loss, DEH. OA of the shoulders and hips, metopism, periostitis on the tibiae, fibulae and calcanei, SpA on the cervical and thoracic vertebrae, OC on cervical vertebrae, spondylosis on thoracic, lumbar and 1st sacrum vertebrae, Schmorl's nodes on the thoracic and lumbar vertebrae.	153.6 ± 3.72 cm
45	?	6–12 m / k	Endocranial lesions on occipital bone.	-
46	?	2–4 y / a	-	-
47	♂	40+ y / a	Teeth: slight dental caries. OA of the elbows, wrists and hips, seven unhealed sharp force traumas on 1st, 2nd, 3rd, 4th and 5th cervical vertebrae, unhealed sharp force traumas: on the mandible, on the left temporal bone, on the left parietal bone, on the right clavicle and on the 9th rib. Healed sharp force trauma on the left parietal bone, compression of the 1st lumbar vertebra, OC on cervical vertebrae, spondylosis of thoracic and lumbar vertebrae.	180.2 ± 3.27 cm
48	♀	18–25 y / a	<i>Os acromiale</i> on the left scapula.	-
49	♂	15–18 y / a	Metopism, Schmorl's nodes on lumbar vertebrae.	-
50	♂	30–46 y / a	Teeth: severe dental calculus, caries, <i>ante mortem</i> tooth loss. <i>Os acromiale</i> on both scapulae, spondylosis of thoracic, 4th lumbar and 1st sacrum vertebrae, Schmorl's nodes on thoracic vertebrae.	171.4 ± 3.27 cm
51	?	15–16 y / a	-	-
52	?	6–12 m / k	-	-
53	?	3–4 y / a	-	-
54	♂	27–34 y / a	Schmorl's node on the 11th thoracic vertebra.	176.1 ± 3.27 cm
55	♀	45+ y / a	Teeth: slight dental calculus, caries, periapical lesions, <i>ante mortem</i> tooth loss. Metopism, spondylosis on thoracic vertebrae.	-
56	?	1 y / a ± 4 m / k	-	-
57	♀	25–30 y / a	Teeth: slight dental calculus, medium alveolar reduction, DEH, maxillary left canine has not been erupted.	154.6 ± 3.72 cm

Almost all burials for which the position of the skeleton could be determined, were in a supine-extended position, with just two exceptions of children who were buried in a prone position (nos 2 and 7). All the deceased were east-west aligned, with their heads towards the west, which is typical for Christian burials. Wood from the coffin had been preserved in six burials (nos 3, 25, 28, 42, 45, and 46), but not a single coffin nail was found. Some of the burials were very poorly or only partially preserved, hence the presence of a coffin remains unclear. The position of hands¹¹ could be observed in 19 cases: they were mostly placed on the body and appeared in several different positions. Two equally common positions were noted: one hand straight next to the body and the other either diagonally across the chest, abdomen, or pelvis (four burials); 2) one hand at a right angle across the abdomen and the other diagonally across the chest (four burials). Other positions were also noted: 3) both hands diagonally across the chest (three burials); 4) both hands at a right angle across the abdomen (two burials); 5) one hand at an angle across the abdomen and the other diagonally across the pelvis (two burials). Other four hand positions appeared in only single cases.

Characteristically to its time period, the burials had a small number of finds. Only six graves in total contained artefacts. Necklaces of beads were found in two cases (nos 28 and 31; Fig. 6: 2–4), one of which (no 28) also had coin pendants among the beads (Fig. 6: 2–3). Unfortunately, coin pendants were almost completely corroded and therefore impossible to date. One brooch was unearthed from a child's grave (no 46; Fig. 6: 6) and another child had a bracelet, dating from the Medieval Period (no 56; Fig. 6: 7). Among the finds also a single pendant was found (no 24; Fig. 6: 1). Numerous disturbed grave goods were found in the churchyard culture layer, the earliest finds date from the Medieval Period and latest from the 18th century (e. g Russian *dengas* and Orthodox pendants; Fig. 7).



Fig. 6. Finds from the St Michael's churchyard: 1 – pendant (no 24), 2–3 – necklaces of beads with fragments of coin pendants (no 28), 4 – necklaces of beads, 5 – copper alloy chain with fragments of textile (no 31), 6 – round brooch (no 46), 7 – bracelet (no 56).

Jn 6. Leiud Püha Mihkli kirikaiaist: 1 – ripats (nr 24), 2–3 – helmekee koos ripatsmüntide fragmentidega (nr 28), 4 – helmekee, 5 – vasesulamist kett koos tekstiiliga (nr 31), 6 – rõngassõlg (nr 46), 7 – käevõru (nr 56).

(RM A 180: 8, 10, 14, 16, 21.)

Photo / Foto: Janika Viljat

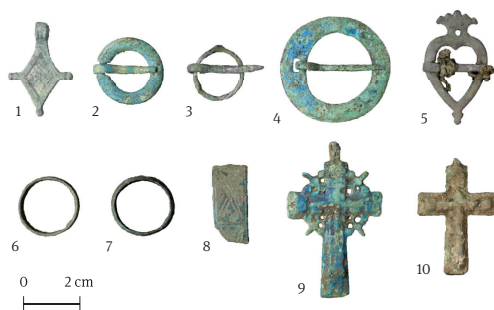


Fig. 7. Stray finds from Rakvere St Michael's churchyard: 1 – cross pendant, 2–4 – round brooches, 5 – heart-shaped brooch with crown, 6–7 – rings, 8 – bracelet with ornament, 9–10 – Orthodox pendants.

Jn 7. Juhuleiud Rakvere Püha Mihkli kirikaiaist: 1 – rist-ripats, 2–4 – rõngassõled, 5 – krooniga südasõlg, 6–7 – sõrmused, 8 – ornamendiga käevõru, 9–10 – õigeusu kaelaristid.

(RM A 180: 36, 39, 42, 43, 45, 50, 53, 56, 74, 96.)

Photo / Foto: Janika Viljat

¹¹ Determining the position of hands is based on schematics by Valk 2001, 69, fig. 53.

Human remains

All 56 skeletons were osteologically analysed¹² (Table 1; Malve & Vilumets, in prep). Statistics also include skeletons that were highly fragmented and/or whose sex and age could not be determined. Most of the skeletons were not fully excavated; they were either damaged by later burials and/or during earthwork or remained partially out of the excavation area. Overall, the bones were in a good condition, with just slight erosion on their surface.

The analysed skeletons included 39 adults (69.6%) and 17 subadults (30.4%). Fifteen (38.5%) of the adults were males and 24 (61.5%) females (including two possible females). In addition, one subadult was determined to be a male (Table 1: 49). The ratio of male-to-female burials is characteristic of cemeteries of the Medieval and Early Modern Period. In addition, both skeletal and dental diseases were studied.

Dental diseases

Of all 56 unearthened burials, teeth and/or dental sockets could be examined on 39 cases: 30 adults and nine subadults. It was possible to analyse 981 erupted and preserved teeth, of which 883 were permanent and 98 were deciduous. Four out of all subadults had some or all permanent teeth erupted. In addition, 35 teeth lost *ante mortem* and 58 teeth lost *post mortem* were recorded.

34 burials (87.2%)¹³ had at least one dental pathology, while four had some kind of congenital dental abnormality. There were two cases where one of the teeth had never been formed (Table 1: 23, 37). In two cases, unerupted teeth were situated in an erroneous location (Table 1: 39, 57).

Calculus (tartar), being the most common dental disease, was found in all analysed adults and four subadults, making it the total of 34 (87.2 %) cases, males and females were equally affected. One of the children (Table 1: 19) had tartar on deciduous teeth while an older child (Table 1: 36) had it on permanent teeth. Two children (Table 1: 20 and 43) had calculus on both permanent and deciduous teeth. Left maxillary canine (82.4%) and both mandibular first incisors (85.7% and 87.9%) were most affected by the disease. The five burials that did not have signs of calculus were all children aged 1 to 4 years and had only their deciduous teeth erupted.

Caries occurred in 23 (58.9%) cases, of which one was a 6–9-year-old child (Table 1: 43) who only had signs of the disease on deciduous teeth. 15 females and seven males were affected. The highest frequencies occurred in the cheek-teeth, with caries most common of all on the left second molars (27%). None of the teeth up to the second premolar were affected by the disease. Usually, caries had affected one or two teeth per skeleton, but the most severe case was a 25–40 years old female (Table 1: 28), who had lesions on six teeth out of 27. Caries was mostly found on the mesial surface of the tooth, being the most susceptible to a disease in general.

Dental enamel hypoplasia was found on 19 (48.7%) skeletons, on 60 permanent teeth and one deciduous tooth. The majority of the registered hypoplasia was seen as horizontal lines on the teeth, but in two cases plane-type hypoplasia also occurred. Of the two affected

¹² The sex of the burials was determined according to the morphological traits on the pelvis and cranium (Buikstra & Ubelaker 1994, 16–20), maximum length of the long bones (Garmus & Jankauskas 1993, 6–8), and tarsal bones (Garmus 1996, 2). The age at death was determined according to tooth wear (Brothwell 1981, 72), pubic symphyseal face (Todd 1920; 1921; Brooks & Suchey 1990), and age caused changes on the limb joints (Ubelaker 1989, 84–87). The age of subadults was determined by examining the development and eruption of the teeth (Ubelaker 1989, 63) and epiphyseal fusion (Schaefer *et al.* 2009). Pathological conditions were identified based on Ortner & Putschar (1985) and Roberts & Manchester (2012). Stature was calculated according to the formula of Trotter and Gleser (Trotter 1970), using measurements of the right femora.

¹³ Percentages here and below given of the total number of skeletons with teeth preserved.

subadults, one was aged 7–8 years (Table 1: 19) and the other was 7–11 years old (Table 1: 20). The left mandibular canine and right maxillary first incisor were most commonly affected by the pathology, which was expected, because anterior teeth, especially canines, are known to be more susceptible to hypoplasia. Defect distribution was quite even for males (eight) and females (nine).

Periapical lesions were observed on 18 (46.2%) skeletons. In the majority of cases, the lesion was associated with a carious cavity in the adjacent tooth. Within the study sample, 52 (4.6%) of adult teeth were found to have calculus deposits, it occurred on eleven females and six males. There was also one subadult with periapical lesions (Table 1: 43).

In total, 33 teeth had been lost *ante mortem*. Eleven (28.2%) of the buried had suffered an *ante mortem* tooth loss as a result of previously noted periapical lesions, these included nine females and two males. Maxillary first and third molars were most commonly lost ante-mortem.

It is worth mentioning that an adult female (Table 1: 41) who in addition to suffering periapical lesion and *ante mortem* tooth loss, had periostitis on the same side of her mandible, showing a clear link between these diseases.

Periodontal disease was recorded 16 times (41%), the regression mostly being minor to medium. Eight males and eight females, mostly aged around 40 years, had the disease.

Overall comparison to other cemeteries shows that the individuals buried at the St Michael's churchyard had dental diseases typical for Early Modern Period, such as is seen at St Jacob's cemetery in Tartu (Liblik 2017, 27), Vastseliina borough cemetery (Malve *et al.* 2018, 125), and possible parish churchyard in Kodavere (Valk *et al.* 2019, 123). All the named cemeteries have a high prevalence of dental calculus, followed by caries and hypoplasia. St Michael's churchyard stands out with its rather low percentage of periapical lesions compared to Vastseliina and St Jacob's; however, the number is quite identical to that in Kodavere (19.2%). Regarding alveolar reduction (38.3% at Vastseliina, 33.9% at St Jacob's) and *ante mortem* tooth loss (31.2% at Vastseliina and 31.5% at St Jacobs), however, the percentages are similar to the mentioned sites.

Skeletal pathologies

As is common for Early Modern Period cemeteries, one of the most frequently encountered expressions of pathologies is the spondylosis of the spine, which in Rakvere was found on the vertebrae of 20 adults: nine males and 11 females. Most of the individuals were over 40 years old, with some exceptions of younger adults. Schmorl's nodes were also quite common among the deceased, as 16 individuals were affected by them: nine males and seven females, in various age categories from 15–18 years to 40+ years. Osteoarthritis of limb joints and spine had left its mark on 14 skeletons, the distribution being equal for males and females.

The cemetery stands out with its high number of recorded traumas among the deceased. Most of the recorded injuries were bone fractures, among which the frequency increased with age and males were more affected. Six healed depressed cranial fractures were registered. Three females (Table 1: 26, 37, and 41) had fractures on their frontal bone, the size of the fracture ranging from 4.9 mm to 18.5 mm. The depressed traumas recorded on males (Table 1: 27, 30, and 33) were larger, up to 32 mm. Additionally, one adult male (Table 1: 21) had a healed cut wound on his frontal bone.

Two males aged 18–20 years (Table 1: 1, 3) and an older male (Table 1: 39) had healed rib fractures, while two females had a fractured clavicle (Table 1: 23 and 37).

An interesting case of fusiform swelling was seen in the distal right femur of a 40+ years female (Table 1: 2; Fig. 8). On the posterior aspect of the affected area there was a circular sinus with smooth margins. The bone surrounding the sinus was pitted and in the process of remodelling into lamellar bone. There was no evidence of joint involvement and severe bone changes suggest that the chronic infection affected the individual for several months or even years. These bone changes are characteristic to osteomyelitis, a non-specific infection of the bone marrow. The disease usually occurs when pyogenic bacteria has access into the bone (Ortner 2003, 181).

One male (Table 1: 30) had a clay shoveler's fracture in the spinous process on the IV thoracic vertebra. Fractures like that are usually a result of avulsion by the supraspinous ligament due to hyperflexion in this area of spine, but they can also be caused by direct blows (Resnick 2002, 2975).



Fig. 8. Fusiform swelling and a circular sinus (osteomyelitis) on the posterior side in the distal right femur of burial no 2.

Jn 8. Luustik nr 2 parema reieluu distaalne $\frac{1}{3}$ oli ümardunud ja selgmisel küljel oli mädaauris.

Photo / Foto: Janika Viljat



Fig. 9. Perimortem sharp force trauma in the upper and lower jaws of burial no 47.

Jn 9. Surmaaegsed terariista löikejäljed luustik nr 47 üla- ja alalõualuul.

Photo / Foto: Janika Viljat

Two individuals displayed evidence of sharp force traumas on the skeleton. Sharp force injuries have been found among males and are commonly associated with interpersonal violence. The first individual, one of the 40+ years old males (Table 1: 47), had six sword or sabre cuts on his skull, cervical vertebrae, ribs, and right clavicle. All these marks show that the man had died a very violent death, probably on the battlefield. Injuries had straight lines and relatively smooth surfaces and a V-shaped profile. The cranium had suffered a sharp superficial force trauma.

The man had received a strong cut to the cranium which had sliced upper and lower jaws downwards transversely (Fig. 9), with such violence from left to right that the weapon had also sliced the first cervical vertebra, left mastoid process, and cut into the second cervical vertebra. As a result, most of the left alveolar process of the maxilla was cut off. The blade had split the roots of the maxillary teeth from the right canine to the third molar. The left ascending ramus of the mandible had also been sliced. In addition, the tip of the blade had cut superficially into the medial surface of the right side of the mandible and a right mastoid process was missing its tip. Cut surfaces were visible on the atlas, axis (Fig. 10) and the third vertebra had been sliced from left to right and transversely downwards, the cut had split the body and the left transverse process.

Another cut was made between the fourth and fifth cervical vertebra and was an oblique slice from right to left. The transverse split through the right inferior articular facet and spinous process of the fourth cervical vertebra resulted in left superior articular facet, a small fragment from the left side of the superior part of the body and the right part of the neural arch being cut off. Fifth cervical vertebra also had a superficial cut mark on the superior part of the left side of the neural arch.

In addition to cervical injuries, there were cut marks on the inferior side of the right clavicle and left IX rib. The clavicle was injured superficially on the midshaft region, and the rib's head and neck had been sliced.

Besides perimortem injuries, the male also had a healed trauma on the cranium. The left parietal bone had a 54.3 mm long cut close to the coronal suture (Fig. 11). This kind of lesion is characteristic of a healed sharp force trauma, which is caused by an edged implement or weapon. Considering the injuries, their location and nature, it is highly possible that the man with six unhealed wounds died in a battle. Skeletons with similar injuries have been found from other rural and urban churchyards. Usually these are single cases. Those killed in the battle have possibly been unearthed from St Mary's churchyard in Tartu (Malve *et al.* 2012, 145), St Laurence's churchyard in Nõo (Malve 2016, 202), St Nicholas' churchyard in Kose (Malve *et al.* 2014, 126–127), and Haapsalu cathedral (Malve 2017, 23–30). Mass graves from Veibri (Lõhmus *et al.* 2011, 97–98) and Vastseliina (Malve *et al.* 2018, 123–124) have analogical skeletal traumas as well.

The second individual, an 18–20 year old male (Table 1: 3), had a single cut on the fifth cervical vertebra, probably from getting hit by a sword or sabre. The cut had made a horizontal split through the vertebral body and neural arch. The nature of the injury indicates that the vertebrae had been sliced from left to right. The blow had split both inferior articular facets. As a result of the blow, the man had not been completely decapitated, since his head was in its normal alignment. This male had also suffered rib and leg fractures, all of which were healed by the time of death. The single injury found on his neck area indicates that he was probably executed. Alike traumas were present on skeletons which were found from a possible execution site 200 m south of the St Michael's churchyard (Malve & Vilumets, this volume).



Fig. 10. Transverse cut on the second cervical vertebra of burial no 47.

Jn 10. Diagonaalne lõige luustik nr 47 teisel kaelalülil.
Photo / Foto: Janika Viljat



Fig. 11. The male (burial no 47) had a healed trauma on the left parietal bone.

Jn 11. Paranenud trauma mehe kolju (luustik nr 47) vasakul kiiruluul.
Photo / Foto: Janika Viljat

FAUNAL REMAINS

In total, 7812 animal remains were excavated in Rakvere, including mostly mammals and to a lesser extent birds, fish, amphibians, and bivalves (Table 2).¹⁴ Most of the material (94%) was fragmented and due to the collection method by hand consisted mostly of larger fragments and not so much of smaller mammals, birds, or fish. On the other hand, the material had also very small fragments in it, produced during and after the excavations. These small unidentifiable fragments were mostly recorded as ‘mammals’ or ‘vertebrates’ and appeared as a large part in the taxonomic distribution, but in reality contributed only little to the overall faunal composition of the site. For the analysis, the material was divided into five analytical units in accordance with the find contexts (Table 3). Detailed identifications and analyses are given in the zooarchaeological report (Rannamäe & Ehrlich, in prep.).

Table 2. *Taxa identified among the faunal remains from Rakvere.*

Tabel 2. *Rakvere loomaluude liigiline jaotus.*

Compiled by / Koostanud: Eve Rannamäe

Group / Rühm	Taxon / Takson		Finds / Leide	%
Mammals	<i>Bos taurus</i>	Cattle	2727	34.9
	<i>Ovis aries/Capra hircus</i>	Sheep/Goat	581	7.4
	<i>Ovis aries</i>	Sheep	58	0.7
	<i>Capra hircus</i>	Goat	60	0.8
	<i>Sus domesticus</i>	Pig	416	5.3
	<i>Sus sp.</i>	Swine	3	0.04
	<i>Equus caballus</i>	Horse	26	0.3
	Artiodactyla	Even-toed animals	368	4.7
	Ungulata	Hoofed animals	5	0.1
	<i>Canis familiaris</i>	Dog	10	0.1
	<i>Felis catus</i>	Cat	11	0.1
	<i>Lepus sp.</i>	Hare	9	0.1
	<i>Erinaceus europaeus</i>	Hedgehog	1	0.01
	Mammalia	Mammals	3387	43.4
Birds	<i>Anser sp.</i>	Goose	6	0.1
	Anatinae	Ducks	1	0.01
	<i>Gallus gallus domesticus</i>	Domestic chicken	11	0.1
	Galliformes	Galliforms	7	0.1
	<i>Corvus monedula</i>	Eurasian jackdaw	1	0.01
	Aves	Birds	12	0.2
Fish	<i>Esox lucius</i>	Pike	5	0.1
	Cyprinidae	Cyprinids	1	0.01
Vertebrates	Vertebrata	Vertebrates	5	0.1
Bivalves	Bivalvia	Bivalves	2	0.03
Amphibians	Amphibia	Amphibians	99	1.3
			Total: 7812	100

¹⁴ The faunal remains were identified using the anatomical reference collection at the Department of Archaeology, University of Tartu, and osteology handbooks (Ernits 2000; Ernits & Nahkur 2013; Tomek & Bochenki 2000). The age of mammals was determined after epiphyseal fusion (Chaix & Méniel 2001; Reichstein 1991) or tooth eruption (Schmid 1972) and measurements were taken after acknowledged standards (von den Driesch 1976). Withers height was calculated after the greatest length of the long bones for cattle (Matolcsi 1970), sheep (Teichert 1975), goat (Schramm 1967), and pig (Teichert 1990). The specimens were recorded in the ARHIS database following the guidelines by Lõugas (2018). Open access data will be available online in the ARHEST database (<https://andmekogud.arheoloogia.ee/#/leiud/arheozooloogia>). The osteological material is stored at TLÜ AT (collection AI 8183).

Table 3. Analytical units for the faunal remains from Rakvere.**Tabel 3.** Rakvere loomaluude analüüsiüksused.

Compiled by / Koostanud: Eve Rannamäe, Janika Viljat

Unit / Üksus	AZ no in ARHIS database / AZ number andmebaasis ARHIS	Archaeological context / Leiu kontekst	Time period / Dateering	Finds / Leide
1	13–15, 36	Late Iron Age settlement	Late Iron Age	77
2	8–12, 39–44, 46	Street layer	17th c. (end of the 16th – 1st half of the 18th c.)	6394
3	1, 5–7, 16–18, 29–33, 37–38, 45, 47–48	Street layer	18th – 19th c.	1085
4	19	Street layer	20th c.	34
5	2–4, 20–28, 34–35, 49–64	St Michael's churchyard (grave fills)	Medieval/Modern Period	222
				Total: 7812

Unit 1 – Late Iron Age settlement seemed to present a common household waste and consisted mostly of domestic livestock: cattle, sheep/goat, pig, and unidentifiable artiodactyls, who were most probably sheep, goat, or pig as well. More than half of the material was quite fragmented and was identified only as mammals.

The core of the animal bone material came from the 16th to 19th century street layers (Units 2 and 3; Fig. 12). **Unit 2 – 16th to 18th century street layer** was the largest analysed assemblage, consisting mostly of the remains from the first dark layer (see Street layers, Fig. 4: 4).

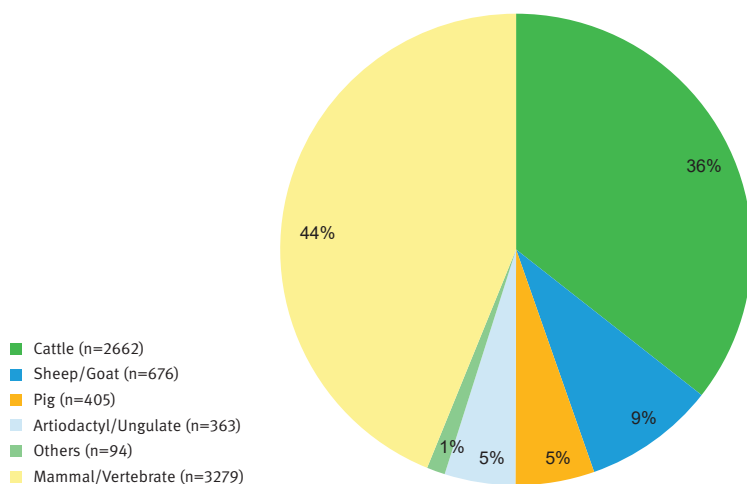


Fig. 12. Taxonomic distribution of faunal remains from the 16th to 19th century street layers in Rakvere (Units 2 and 3; n=7479). 'Sheep/Goat' includes sheep (n=56), goat (n=60), and sheep/goat (n=560). 'Pig' includes domestic pig (n=402) and a few larger canines that might be of a domestic pig or wild boar (n=3). 'Artiodactyl/Ungulate' includes artiodactyls (sheep/goat/pig/cattle; n=358) and ungulates (cattle/horse; n=5). 'Others' include horse (n=25), dog (n=10), cat (n=11), hare (n=9), hedgehog (n=1), birds (n=32), fish (n=4), and bivalves (n=2). 'Mammal/Vertebrate' includes unidentified mammals (n=3277) and vertebrates (n=2).

Jn 12. Rakvere 16.–19. sajandi tänavakihtidest leitud loomaluude taksonoomiline jaotus (üksused 2 ja 3; n=7479). 'Lamba/kitse' hulgas on lammas (n=56), kits (n=60) ja lammas/kits (n=560). 'Sea' hulgas on kodusiga (n=402) ja suuremad kihvhambad, mis võivad kuuluda nii kodu- kui ka metsseale (n=3). 'Sõralise/ungulaadi' hulgas on sõralised (lammas/kits/siga/veis; n=358) ja ungulaadid (veis/hobune; n=5). 'Teiste' hulgas on hobune (n=25), koer (n=10), kass (n=11), jänes (n=9), siil (n=1), linnud (n=32), kala (n=4) ja karbid (n=2). 'Imetaja/selgroogse' hulgas on määramata imetajad (n=3277) ja selgroogsed (n=2).

Chart / Diagramm: Eve Rannamäe & Freydis Ehrlich

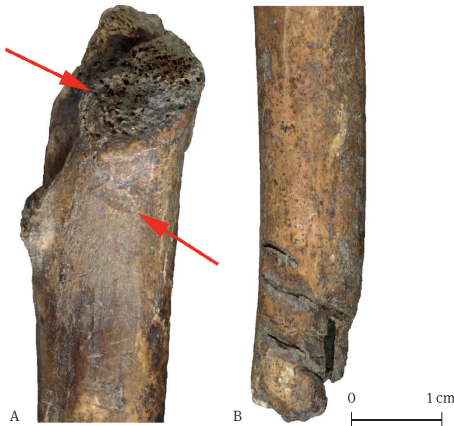


Fig. 13. Cut marks on dog bones. A – head of the femur (AZ-44: 1069) has been partially cut off and another cut mark is just under the femoral head. B – tibia (AZ-44: 1070) has its distal end cut off with several parallel cut marks still visible.

Jn 13. Lõikejäljed koeraluudel. A – reieluupea (AZ-44: 1069) on läbi lõigatud, lõikejalg on ka reieluupea all. B – sääreluul (AZ-44: 1070) on distaalne ots ära lõigatud, näha on mitmed paralleelsed lõikejäljed.

Photo / Foto: Janika Viljat

Cattle, sheep and goat, pig, and artiodactyls/ungulates were the main domestic species identified. The size of livestock seemed to be similar to the Medieval and Early Modern Period, so rather small (for comparison, see Rannamäe & Lõugas 2019, 70–72). The withers height for cattle was between 102–113 cm, sheep 56–57 cm, goat around 61 cm, and pig 67–81 cm. Additionally, few horse, dog, and cat specimens were found. Among horse bones, some seemed to be from smaller individual(s) with the withers height between 120–136 cm, while one bone belonged to a larger individual of 144–152 cm. It is interesting to note that two dog bones – a femur and a tibia (possibly from a single individual) – had cut marks on them (Fig. 13). The characteristics of these cut marks indicated dismemberment and/or meat removal, which has usually been related to times of famine and warfare (Murphy 2001, 21, table 6), feeding the meat to other dogs, or using the marrow fat for cosmetic and medical purposes

(Albarella 1999, 873; Thomas 2005, 97). However, in early modern Rakvere, there seems to have been no intensive dog utilisation and the few analysed dog specimens represented just occasional activities (for similar cases, see Lõugas *et al.* 2019; Rannamäe & Lõugas 2019). Of wild mammals, only hare was represented – clearly utilised by the Rakvere inhabitants, as one of the bones carried cut marks. Birds included domestic chicken, galliforms, geese (wild or domestic), duck, and Eurasian jackdaw, of which the latter would probably not be associated with human activity. Some bird bones remained unidentified due to their fragmentation. Fish bones were very few and only from cyprinids and pike. A fragment of a bivalve indicated consumption of local molluscs. Due to extensive (recent) fragmentation, almost half of the material remained unidentified.

Unit 3 – 18th to 19th century street layer was also abundant and very similar to the material in Unit 2. Most of the assemblage consisted of cattle, among whose remains a proportionally higher number of mandibles, teeth, hyoid bones, and other parts of cranium was noticeable, indicating systematic processing of the crania.¹⁵ Based on long bones, the withers height of the cattle was between 102–115 cm. Less remains were from sheep and goat, pig, artiodactyls/ungulates, and horse. Several remains of a cat represented possibly a single juvenile individual. The only wild mammal was a hedgehog – most probably of natural origin. Bird remains included domestic chicken, galliforms, and unidentified fragments. There was also another bivalve. Almost half of the material remained unidentified.

In Units 2 and 3, the material seemed to be common butchering and kitchen waste with both skeletal extremities and meatier parts represented (Fig. 14). Mostly adult livestock had been butchered.

¹⁵ Part of these remains (AZ-47) can be associated with the marketplace situated next to the church during the 18th and 19th century (Kirss 2003, 96).

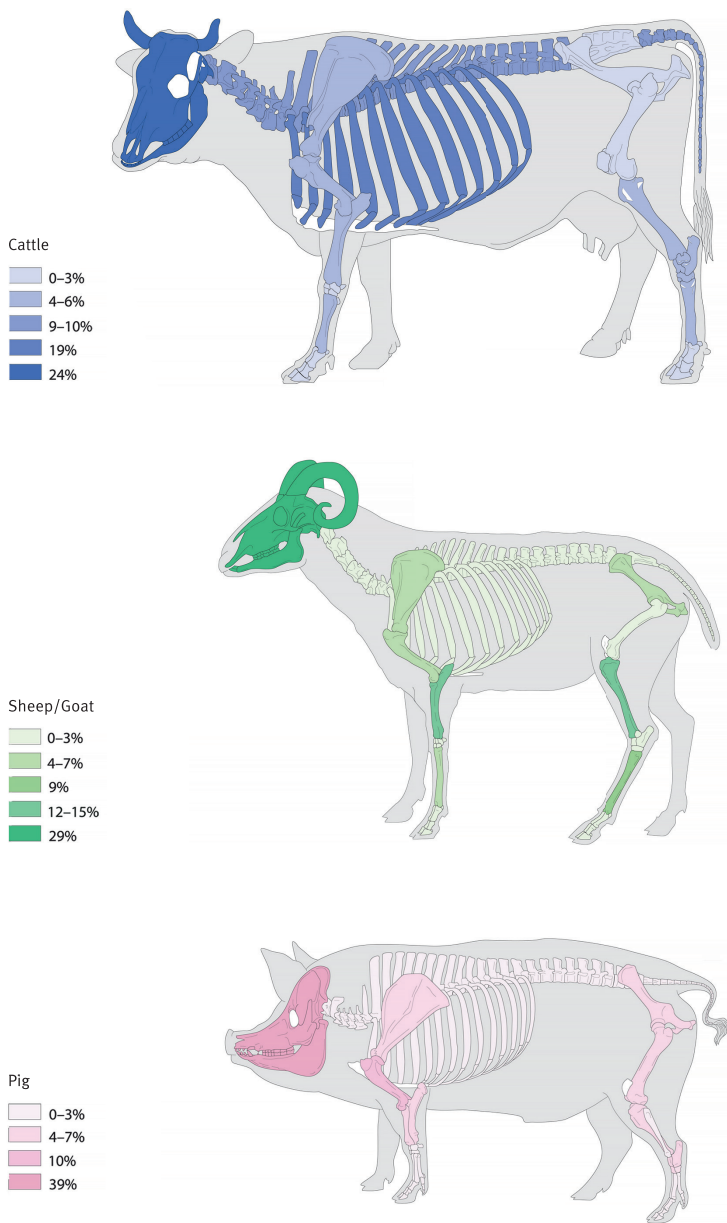


Fig. 14. Distribution of skeletal elements in body parts that are meatier (kitchen and food waste) and poor in meat (butchering waste) for cattle, sheep/goat, and pig in Units 2 and 3. Meatier body parts include vertebrae, costae, humeri, ulnae and radii, scapulae, coxae and sacrum, femora and patellas, tibiae and fibulae; poor in meat include cranium, metapodials, carpals, tarsals, and phalanges (following the division by Wigh 2001, 58–59).

Jn 14. Veise, lamba/kitse ja sea liharikaste (toidujäätmed) ja lihavaeste (tapajäätmed) skeletiosade jaotus üksustes 2 ja 3. Liharikastesse kehaosadesse kuuluvad selgroolülid, roided, õlavarreluud, küünar- ja kodarluud, puusaluud, ristluu, reieluud ja põlvekeder, sääre- ja pindluud. Lihavaestesse kehaosadesse kuuluvad kolju, kämbla- ja põialuud, randme ja kanna luud ning varvaste luud (lähtuvalt Wigh 2001, 58–59 jaotusest).

Figure / Alusjoonis: after Michel Coutureau (Inrap), Vianney Forest (Inrap) – 1996 (©ArcheoZoo.org)

Chart / Diagramm: Freydis Ehrlich & Eve Rannamäe

Unit 4 – 20th century street layer consisted only of a small number of cattle, sheep/goat, pig, artiodactyl, and galliform specimens that represented common food waste. A quarter of the bones remained unidentified.

Unit 5 – St Michael's churchyard included faunal remains from the grave fills, dated to the Medieval and Modern Period. From most of the grave fills, only a few bone fragments were found. In general, the specimens were of cattle, sheep and sheep/goat, pig, and artiodactyls. Here, the withers height for one cattle was 109 cm. Horse, pike, goose, and chicken were also found. Most of the counted specimens belonged to amphibians (frogs) not associated with human activity. The rest of the small fragments remained unidentified. Although the material came from the cultural layer of the churchyard, it still seemed like common food and kitchen waste, most probably from habitation layers mixed with the grave fills.

CONCLUSIONS

The data collected during the fieldwork in Pikk street in Rakvere has offered a fascinating look into the small town in Northern Estonia. Although most finds collected from various pavements and street layers dated mostly from the Modern Period, a Medieval street and possibly a Late Iron Age pit house were also discovered. In addition, St Michael's churchyard was partly excavated.

Under the Medieval street, a cultural layer had been preserved in three natural depressions, together with a possible pit house and a *keris* stove all dated by accompanying finds to the Late Iron Age. Although a few similar examples of pit houses have been found in Estonia, the one recorded in Rakvere is unique due to the *keris* stove found inside the dwelling. Elsewhere in the trench, there was no Iron Age cultural layer detected, but there were a few mixed finds from that period. These artefacts help us to hypothesize the extent of the Iron Age settlement at the base of the fort, which seems to be much more widespread than previously thought.

The Pikk street has been actively used since at least the Medieval Period, but extensive earthworks took place mostly during the 17th and 18th centuries, when the inhabitants tried to better the road conditions. These street layers, unearthed foundations (including the churchyard wall), and burials show how Pikk street itself partially moved further from Vallimägi and the castle during centuries of use. During the excavations at St Michael's churchyard, 57 burials dating mostly from the Early Modern Period were documented, an area west of the church could be used for burials only during the Livonian War and the consequent turbulent period. Besides single graves there were four double burials and one possible triple burial. Out of the 56 analysed skeletons, 39 were adults and 17 subadults; 15 were male and 24 female. While most of the pathologies discovered on the osteological material were characteristic of the era, the cemetery also stands out with a high number of injuries on the skeletons. Especially remarkable was a male burial with seven unhealed cut wounds, indicating death in a battle, and another showing signs of beheading. These kinds of cases are quite unique because skeletons with sharp force traumas are rarely ever found from the churchyards. It was also established that the burial area extends significantly south and also north from the church.

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REFERENCES

- Albarella, U. 1999.** 'The mystery of husbandry': medieval animals and the problem of integrating historical and archaeological evidence. – *Antiquity*, 73, 867–875.
- Altoa, K. 2003.** Virumaa keskaegsest sakraalarhitektuurist. – Jõhvi kindluskirik – legendist tegelikkuseks. Jõhvi Muuseumi Seltsi toimetised, 1. Jõhvi, 44–57.
- Altoa, K. 2019.** Rakvere. – Eesti linnaehituse ajalugu. Keskajast tsaariaja lõpuni. Ed. by L. Hansar. Tallinn, 120–125.
- ArchéoZoo.org**, <https://www.archeozoo.org/archeo-zootheque/> (last accessed 7 August 2020.)
- Aus, T. 1985.** Rakvere, Pikk tn. 3 ja 22. Ehitusarheoloogilise järelevalve aruanne. Tallinn. (*Manuscript in MA.*)
- Aus, T. 1993.** Rakvere Teatrimäe vanem asustus. – *Stilus*, 4, 5–17.
- Bronk Ramsey, C. 2020.** OxCal 4.4 manual. <https://c14.arch.ox.ac.uk/oxcal/OxCal.html>. (Accessed 19 August 2020.)
- Brooks, S. & Suchey, J. M. 1990.** Skeletal age determination based on the os pubis: A comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods. – *Human Evolution*, 5, 227–238.
- Brothwell, D. R. 1981.** *Digging up Bones*. New York.
- Buikstra, J. E. & Ubelaker, D. H. (eds) 1994.** Standards for Data Collection from Human Skeletal Remains. Arkansas Archeological Survey Research Series, no. 44. Arkansas.
- Chaix, L. & Méniel, P. 2001.** Archéozoologie. Les animaux et l'archéologie. Paris.
- von den Driesch, A. 1976.** Das Vermessen von Tierknochen aus vor- und frühgeschichtlichen Siedlungen. München.
- Ernits, E. 2000.** Hambad. Tartu.
- Ernits, E. & Nahkur, E. 2013.** Koduloomade anatoomia. Kõrgkoolide õpik. Tartu.
- Garmus, A. 1996.** Lithuanian Forensic Osteology. Vilnius.
- Garmus, A. & Jankauskas, R. 1993.** Methods of person's identification from the skeleton in Lithuania. – *Medicina Legalis Baltica*, 3–4, 5–23.
- HCL = Chronicon Henrici Livoniae.** Henriku Liivimaa kroonika. 1982. Trans. by R. Kleis. Ed. & comm. by E. Tarvel. Tallinn.
- Heinloo, E., Jürjo, I. & Russow, E. 2011.** Kõrts keskaegses linnas: näituse „Poriveski kõrts” kataloog / Inn in a Medieval Town: Catalogue of the exhibition „Poriveski kõrts” / Трактир в средневековом городе: Каталог выставки „Поривески Кыртс”. Tartu.
- Jaanits, K. 2000.** Aruanne arheoloogilisest järelevalvest Rakvere linnas, Pika, Parkali, Sauna, Kooli ja Tõusu tn. vee- ja kanalisatsioonitrasside rajamisel. Tallinn. (*Manuscript in MA.*)
- Jonuks, T. 2003.** Aruanne arheoloogilisest järelevalvest Rakvere Kolmainu kiriku aias 15.07.2003. Rakvere. (*Manuscript in MA.*)
- Jonuks, T. 2006.** Aruanne arheoloogilisest järelevalvest Rakvere linna valgustuspargi ajamisel mai–juuli 2006. Rakvere-Tartu. (*Manuscript in MA.*)
- Jonuks, T. & Rannamäe, E. 2018.** Animals and world-views: a diachronic approach to tooth and bone pendants from the Mesolithic to the Medieval period in Estonia. – *Bioarchaeology of Ritual and Religion*. Ed. by A. Livarda. Oxford; Haverton, 162–178.
- Kirss, O. 2003.** Rakvere ajalugu kõige vanemast ajast kuni 1944. aastani. Tallinn.
- Lang, V. 1996.** Muistne Rävåla. Muistised, kronoloogia ja maaviiljelusliku asustuse kujunemine Loode-Eestis, eriti Pirita jõe alamjooksu piirkonnas, I–II. *MT*, 4. Tallinn.
- Laul, S. 2001.** Rauaaja kultuuri kujunemine Eesti kaguosas. *MT*, 9. *ÕES Kirjad*, 7. Tallinn.
- Liblik, M.-A. 2017.** Hambapatoloogiad Tartu Püha Jakobi kalmistu kasutajaskonnal. MA thesis. Tartu. (*Manuscript in TÜAK.*)
- Lissitsina, J., Varul, L., Malve, M., Kadakas, V. & Kriiska, A. 2016.** Rakvere Teatrimägi – an overview of the site and new results from the archaeological excavations in 2015. – *AVE*, 2015, 159–169.
- Lõhmus, M., Malve, M., Plado, J. & Tšugai, A. 2011.** Archaeological research at Veibri: A Late Mesolithic cemetery and a mass grave from the 13th century AD. – *AVE*, 2010, 89–102.
- Lõugas, L. 2018.** Praktiline juhend arheoloogiliste loomsete jäänuste kogumiseks ja säilitamiseks. Tallinn.
- Lõugas, L., Rannamäe, E., Ehrlich, F. & Tvauri, A. 2019.** Duty on fish: Zooarchaeological evidence from Kastre Castle and customs station site between Russia and Estonia. – *International Journal of Osteoarchaeology*, 29, 432–442.

- Luik, H. 2004.** Luuesemed hilisrauaaja linnamägedel Lõhavere, Soontagana, Varbola ja Valjala leidude põhjal. – Linnusest ja linnast. Uurimusi Vilma Trummali auks. Ed. by A. Haak, E. Russov & A. Tvauri. *MT, 14*. Tallinn-Tartu, 157–188.
- Luik, H. & Maldre, L. 2005.** Bone and antler artefacts from Pada settlement site and cemetery in North Estonia. – From Hooves to Horns, from Mollusc to Mammoth. Manufacture and Use of Bone Artifacts from Prehistoric Times to the Present. Proceedings of the 4th Meeting of the ICAZ Worked Bone Research Group at Tallinn 26th–31th of August 2003. Ed. by H. Luik, A. M. Choyke, C. E. Batey & L. Lõugas. *MT, 15*. Tallinn, 263–276.
- Malve, M. 2016.** Archaeological fieldwork at the Medieval and Early Modern churchyards in Nõo, Pilstvere and Põltsamaa. – *AVE*, 2015, 199–210.
- Malve, M. 2017.** Surmaaegsete vigastustega kolju Haapsalu toomkirikust. – Läänemaa Muuseumi toimetised, XX. Haapsalu, 23–30.
- Malve, M., Tvauri, A. & Roog, R. 2012.** Preliminary results of the rescue excavation in St Mary's churchyard and its surroundings in Tartu 2010–2011. – *AVE*, 2011, 137–150.
- Malve, M., Kadakas, V., Kiudsoo, M. & Tiidu, E. 2014.** Archaeological studies in the church and churchyard of Kose. – *AVE*, 2013, 119–134.
- Malve, M., Liblik, M.-A. & Juus, T. 2018.** Rescue excavations at the Vastseliina borough cemetery and the 16th–17th-century war-related mass grave. – *AVE*, 2017, 117–132.
- Malve, M. & Vilumets, L. in prep.** Rakvere Püha Mihkli kirikaiaist leitud inimluude osteoloogiline analüüs. (*Archaeological report in prep.*)
- Markus, K., Valk, H., Mänd, A. & Põltsam-Jürjo, I. 2012.** Linnused. – Eesti ajalugu, II. Eesti keskaeg. Comp. & ed. by A. Selart. Tartu, 333–339.
- Matolcsi, J. 1970.** Historische Erforschung der Körpergrösse des Rindes auf Grund von ungarischem Knochenmaterial. – *Zeitschrift für Tierzüchtung und Züchtungsbiologie*, 87, 89–137.
- Murphy, E. M. 2001.** Medieval and Post-Medieval butchered dogs from Carrickfergus, Co. Antrim, Northern Ireland. – *Environmental Archaeology*, 6: 1, 13–22.
- Ortner, D. J. 2003.** Identification of Pathological Conditions in Human Skeletal Remains. Second edition. London.
- Ortner, D. J. & Putschar, W. G. 1985.** Identification of Pathological Conditions in Human Skeletal Remains. Washington.
- Piirimäe, H. 2003.** Põhjasõda. – Eesti ajalugu, IV. Põhjasõjast pärisorjuse kaotamiseni. Comp. & ed. by M. Laur, T. Tannberg & H. Piirimäe, Tartu, 18–44.
- Raam, V. 1997.** Kolmainu (algselt Mihkli) kirik Pikk t. 19. – Eesti arhitektuur, 3. Harjumaa. Järvamaa. Raplamaa. Lääne-Virumaa. Ida-Virumaa. Ed. by V. Raam. Tallinn, 123–124.
- Rannamäe, E. & Lõugas, L. 2019.** Animal exploitation in Karksi and Viljandi (Estonia) in the Late Iron Age and Medieval Period. – The Ecology of Crusading, Colonisation and Religious Conversion in the Medieval Eastern Baltic: Terra Sacra II. Ed. by A. G. Pluskowski. Turnhout.
- Rannamäe, E. & Ehrlich, F. in prep.** Pika tänavarekonstrueerimisega seoses toimunud arheoloogilised päästekaevamised Rakvere Pikal tänaval ja Püha Mihkli kirikaia. Zooarheoloogiline analüüs. Tartu. (*Archaeological report in prep.*)
- Reichstein, H. 1991.** Die Fauna des germanischen Dorfes Feddersen Wierde, Teil 1: Text. Stuttgart.
- Resnick, D. M. 2002.** Diagnosis of Bone and Joint Disorders. 4th edition. Philadelphia.
- Schaefer, M., Black, S. & Scheuer, L. 2009.** Juvenile Osteology. A Laboratory and Field Manual. Amsterdam.
- Schmid, E. 1972.** Atlas of Animal Bones. Amsterdam, London, New York.
- Schramm, Z. 1967.** Kości długie a wysokość w kłębie u kozy. – *Roczniki Wyższej Szkoły Rolniczej w Poznaniu*, 36, 89–105.
- Teichert, M. 1975.** Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen. – *Archaeozoological Studies*. Ed. by A. T. Clason. Amsterdam-New York, 51–69.
- Teichert, M. 1990.** Withers' height calculations for pigs – remarks and experience. – Handout distributed at the 6th ICAZ Conference, Washington D.C., May 1990.
- Thomas, R. 2005.** Perceptions versus reality: Changing attitudes towards pets in Medieval and Post-Medieval England. – *Just Skin and Bones? New Perspectives on Human–Animal Relations in the Historic Past*. Ed. by A. Pluskowski. *BAR International Series, 1410*. Oxford, 93–101.
- Todd, T. W. 1920.** Age changes in the pubic bone. I: The male white pubis. – *American Journal of Physical Anthropology*, 3: 3, 285–334.
- Todd, T. W. 1921.** Age changes in the pubic bone. III: The pubis of the white female. IV: The pubis of the female white-negro hybrid. – *American Journal of Physical Anthropology*, 4: 1, 1–70.
- Tomek, T. & Bochenski, Z. M. 2000.** The comparative osteology of European corvids (Aves: Corvidae), with a key to the identifications of their skeletal elements. Krakow.
- Tõnisson, E. 1981.** Esiaja ahjud Eestis. – *TATÜ*, 30: 1, 43–56.
- Trotter, M. 1970.** Estimation of suture from intact long bones. – *Personal Identification in Mass Disasters*. Washington, 71–83.
- Tvauri, A. 2005.** Eesti hilisrauaaja savinõud (11. sajandist 13. sajandi keskpaigani). *MT, 16*. Tartu-Tallinn.
- Tvauri, A. 2014.** Rahvasterännuaeg, eelviikingiaeg ja viikingiaeg Eestis. Tartu.

Ubelaker, D. H. 1989. Human Skeletal Remains.

Excavation, Analysis, Interpretation. Manuals of Archaeology, 2. Second edition. Washington.

Valk, H. 2001. Rural Cemeteries of Southern Estonia 1225–1800 AD. *CCC papers*, 3. 2nd edition. Visby-Tartu.

Valk, H., Malve, M., Juus, T., Liblik, M.-A. &

Jonuks, T. 2019. Kodavere medieval cemetery – a parish churchyard? – AVE, 2018, 119–138.

Wigh, B. 2001. Excavations in the Black Earth 1990–95. Animal Husbandry in the Viking Age Town of Birka and its Hinterland. Stockholm.

ARHEOLOOGILISED UURINGUD RAKVERES PIKAL TÄNAVAL JA PÜHA MIHKLI KIRIKAIAS

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2019. aastal paigaldati Rakveres Pikal ja Posti tänaval uus kaugküttetorustik (jn 1). Kaasnenud välitöödel (u 615 m²) uuriti lisaks tänavaalale osaliselt Püha Mihkli kirikaeda.

Tänavakihtide all oli mitmes lohus säilinud muinasaegset kultuurkihti ja maapinda süvendatud majapõhi, millest leiti leasemega kerisahi ja väike tulekolle (jn 2). Majapõhja puhul oli võimalik eristada tõenäoliselt muldpõrandat, maapealseid konstruktsioone ei olnud säilinud. Võimalik, et keskaegse tänava alal toimunud mullatöödel eemaldati pealmised kihistused ja kultuurkiht on siin säilinud vaid lohkudes. Neist koguti väike hulka käsitsi- või keraamist fragmente, mis tõenäoliselt pärinevad nooremast rauaajast (jn 3). Segatud pinnasest leiti riibitud pinnaga savinõukatke, sellist keraamikat kasutati nooremast pronksiajast kuni 5.–6. sajandini. Lisaks leiti segatud pinnasest meri- või kaljukotka küünisest valmistatud ripats ja üks pronksist helmes, mis pärinevad samuti nooremast rauaajast. Kuigi seni on arvatud, et esmane asustus sai Rakveres alguse Teatrimäel ja Pika tänava põhjapoolses osas, siis leiuainese põhjal saame oletada, et mingisugune rauaegne asustus oli olemas ka Pika tänava alal hilisema Mihkli kiriku piirkonnas.

Muinasaegsete ladestuste peal ning hilisemate tänavakihtide all oli näha tumedat tihket kokkutatud pinda, mille puhul võis olla tegemist keskaegse tänavaga. Nende kohal oli kohati säilinud kuni kolm eriaegset sillutist (jn 4), mille alla ehitatud liivapatjadega üritati mõnes kohas ühtlustada maapinna tasandit. Sillutiste vahel asunud kolm orgaanikarikast kihistust sisaldasid peamiselt uusaegseid leide. Nendest kõige tüsedam, sügavaimal asunud 1. must kiht, kuulub 17.–18. sajandisse, ehkki sisaldas ka üksikuid 16. sajandi esemeid. Võimalik, et nimetatud kiht kuhjati teeolude parandamiseks. Kõige esimene sillutis oli laotud keskaegse kirikaia piirdemüüri peale, mistõttu on võimalik sillutis dateerida 18. sajandisse.

Arheoloogilistel päästekaevamistel Püha Mihkli kirikaia dokumenteeriti 57 *in situ* matust, millest üles võeti 56. Enamik avatud haudadest olid üksikmatu-

sed, leiti neli kaksikmatust ja üks võimalik kolmikmatust. Matmistihedus oli üpriski suur (jn 5). Paljud luustikud jäid osaliselt kaevandist välja. Enamikul juhtudel olid surnud hauda asetatud selli-siruli asendis, kuid kaks last olid sängitatud ka kõhuli. Kõik surnud olid maetud peaga läände. Kirstupuitu saadi kuue matuse juurest, ühtegi kirstunaela ei tuvastatud. Käte asendit oli võimalik määrata 19 luustikul, enamasti olid need asetatud kehale.

Hauapanuseid avastati vaid kuue matuse juurest. Kahe täiskasvanu juurest puhastati välja helmekeed (jn 6: 4), neist ühel olid helmestega (jn 6: 2–4) pea täielikult korrodeerunud mündid. Kolmanda luustiku kaelapiirkonnast avastati ripats (jn 6: 1). Ühe lapse hauast leiti rõngassõlg (jn 6: 6) ja teise juurest keskaegne käevõru (jn 6: 7). Lõhutud kalmistikuhist leiti hulgaliselt haudadest pärinevaid esemeid, mis dateeriti keskajast kuni 18. sajandini (jn 7).

Maetute seas oli 39 täiskasvanut (15 meest ja 24 naist) ja 17 alaealist. Hambahaiguste kohta oli võimalik teavet saada 39 maetu puhul, kellest ainult viiel alaealisel ei esinenud ühtegi patoloogiat. Enamlevinud oli hambakivi, järgnesid kaaries, hüpoplaasia, periapikaalsed tühimikud, lõualuude taandumine ja hammaste surmaeelne väljalangemine.

Kõige levinud luudel tuvastatud haigus oli selgroolüliliste spondüloos, mida esines 20 täiskasvanul, enamasti üle 40-aastastel. Schmorli sõlmi ehk lülivaheketta songi esines 16 indiviidil – võrdsetel nii meestel kui naistel. 14 skeletil tuvastati ka jäsemete- ja selgroolüigeste kulumist. Ühe täiskasvanud naise parema reieluu distaalses 1/3 olid osteomüeliidi tunnused (jn 8).

Skelettidel esines erakordselt palju vigastusi ja murde. Kuuel maetul olid koljul paranenud lohukujulised traumad. Esines ka mitmeid roide- ja toruluu-murde. Märkimisväärseim oli noore, 18–20-aastase mehe V kaelalülil esinev üksik mõõga- või saabli-tera löikejalg. Tõenäoliselt oli mees hukatud. Teisest hauast leitud 40+ eluaastates mehel oli koljul (jn 9), kaelalülidel (jn 10) ja roidel kokku seitse paranemata löikehaava ning vasakul kiirulul üks paranenud

terariista lõige (jn 11). Traumade täpset asukohta ja olemust arvestades, on mees suure tõenäosusega hukkunud sõjategevuses.

Välitöödel koguti 817 alanumbrit leide, mis pärinesid nii tänavakihtidest, erinevatest konstruktsioonidest kui ka kirikaiast. Arvukaimad olid uusaegsete glasuuritud punaste savinõude killud, leidis ka kivikeraamikat ja hallide savinõude, valgete savipiipude ja ahjukahlite katkeid, luuesemeid ja töödeldud loomaluud ning metall-leide. Suur osa leidudest koguti 1. mustast kihist, mis dateeriti 17.–18. sajandisse. Pikk tn 17a hoone ette rajatud kaeviseosas koguti segatud pinnasest arvukalt loomaluud ja punaste savinõude katkeid. Neid võib tõenäoliselt seostada sel alal 18.–19. sajandil asunud turuplatsiga. Hilisemate kaev- ja ehitustööde tõttu esines segatud pinnases palju hauapanuseid nagu münte, helmeid, tekstiilikatkeid ja savinõude fragmente.

Loomaluud leiti Rakverest kokku 7812 (Tabel 2), mis jagati viie analüüsiüksuse vahel (Tabel 3). Luuainetes olid arvukamalt esindatud imetajad, vähemal määral linnud, kalad, kahepaiksed ja karbid. Väiksemaid liike ja luud oli tõenäoliselt vähem seetõttu, et luud korjati käsitsi. Üksus 1, mis koondas loomaluud nooremast rauaajast, koosnes peamiselt vähestest veise-, lamba-/kitse- ja sealuudest, mis olid tõenäo-

liselt tavapärased majapidamisjätmed. Üksuste 2 ja 3 arvukad loomaluud (jn 12) pärinesid 16.–19. sajandi tänavakihtidest. Sealgi olid valdavad koduloomad ehk veis, lammas, kits ja siga, lisaks leidis hobuse-, koera- ja kassiluid. Koeraluude hulgas leidis kaks lõikejälgedega luud (jn 13). Metsloomadest olid esindatud vaid jännes ja siil, lindudest kodukana, hani, part, hakk jm liigini määramata jäänud linnud. Kalade hulgas olid esindatud karpkalalased ja haug, lisaks leiti kaks karpit. Peaaegu pooled valdavalt väikesed ja värskest fragmenteerunud luud jäid määramata. Üksuste 2 ja 3 põhjal oli võimalik arvutada koduloomade turjakõrgused, mis sarnanevad mujalt Eestist leitud kesk- ja varauusaegsete isenditega. Üksuste 2 ja 3 puhul oli tegemist tavapäraste toidu- ja tapajätmetega (jn 14). Üksus 4 oli mahult kõige väiksem ja pärines 20. sajandi tänavakihist ning koosnes valdavalt veise-, lamba-/kitse-, sea- ja kanaliste luudest. Üksus 5 sisaldas haulohkudest leitud loomaluud, mis pärinevad tõenäoliselt haudade süvendamisest lõhutud kultuurkihist. Selles kogumis olid veise-, lamba-/kitse-, sea- ja hobuseluu ning muud määramata jäänud imetajad. Kaladest oli esindatud haug ja lindudest hani ning kodukana. Arvuliselt peaaegu poole moodustasid haulohkudest leitud konnaluu.