14th-century cemetery at Otepää, southern Estonia

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In December 2020, archaeological investigations were undertaken in the small town of Otepää (Valga County), on the medieval cemetery located at the crossing of Tartu and Piiri streets. The rescue excavations took place due to the extending of the central heating system to adjacent dwelling houses and the bus station (Malve 2021a). Investigations were carried out in two trenches meant for linking of and access to tubes which were installed by the method of drilling below the burial horizon (Fig. 1).

FORMER INVESTIGATIONS AND FINDS

The cemetery appears in Estonian archaeology in 1928 when rescue excavations were carried out to make space for a new building at Piiri street (Schmiedehelm 1928). Work continued in 1929 with two separate trenches (Schmiedehelm 1929). In 1938 another trench was opened just north-east of the crossing, beside Tartu street – in order to extend the road (Saadre 1938). During these excavations the total of 129 well-preserved skeletons with numerous finds characteristic for the 13th and 14th centuries[1] were unearthed from a low, ca. 60–80 cm high embankment north of Piiri street as seen from a photo taken before the excavations (Schmiedehelm 1928, fig. 3). The fieldwork of 1928 and 1929 has a special place in the history of Estonian archaeology, as this was the first case of systematic rescue investigations on a medieval cemetery, the study area in total was ca. 240 m².

A characteristic feature of the Piiri street cemetery were numerous multiple graves, where most often two, three or even more individuals were buried together. The density of burials was low. The near absence of skeletons disturbed by secondary burials gives evidence of belonging to a very limited time span. A more precise date is given by five coins from a grave, the latest being an artig of Tallinn minted between ca. 1363 and 1390, the others during the second or third quarter of the 14th century.

The town of Otepää suffered much in World War II and the houses at Piiri street south of the street crossing were burnt down in 1944. In post-war times the eastern part of Piiri street ceased to exist. The tiny embankment behind the demolished houses north of Piiri street was removed to the level of Tartu street probably during the 1950s. The cemetery lost all external features and a car park was built north of the former eastern part of Piiri street. It appeared that the cemetery had extended also south of the street: local inhabitants remembered that bones were found after the war when the boarding school was constructed. In 1956 a penannular brooch from the area of the cemetery near the local borehole was delivered to archaeological collections (AI 4269).

In 1996 the car park was reconstructed and covered with asphalt. The related levelling revealed additional human remains just below the surface – the bulldozer had worked right

[1] Finds: AI 2652: 1–54; AI 2676: 1–38; AI 2677: 1–34; AI 3680: 1–27.

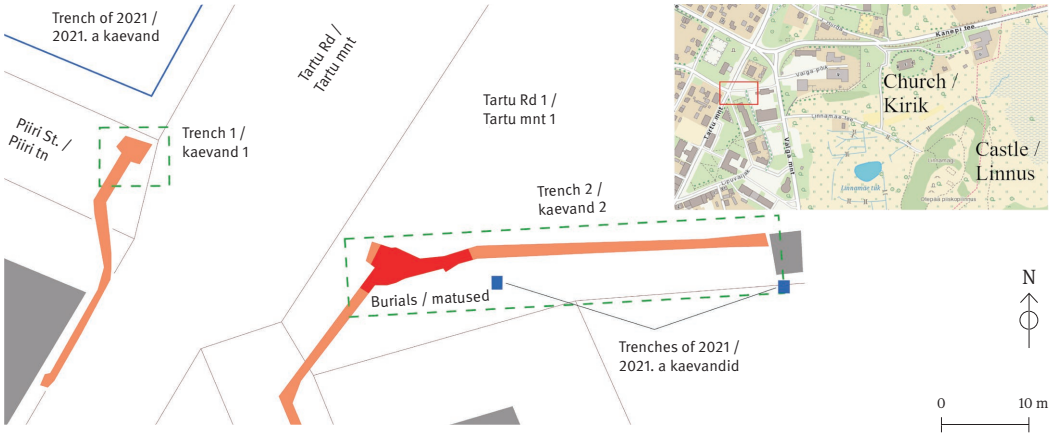

Fig. 1. *Map of the Otepää cemetery: trenches 1, 2 of 2020, and areas investigated in 2021.*
Jn 1. *Otepää kalmistu plaan: 2020. a kaevandid 1 ja 2 ning 2021. a uuritud alad.*
Drawing / Joonis: Raido Roog & Janika Viljat

in the burial horizon – and rescue investigations were carried out to study the partly disturbed graves (Valk 1997). During excavations the fragmented remains of six skeletons were found. In 2000 a new bus station and visitors' centre of Otepää were constructed east of the parking lot. It remains unknown if this work, performed without archaeological supervision, also damaged or destroyed a part of the cemetery. According to information from the locals, construction of the car park for the new Maxima chain grocery store around 2010 just south of the bus station had also revealed skeletons and jewellery. The latest fieldwork was carried out in 2021.[2]

BURIALS

As no burials were found from the first trench on the northwestern side of Tartu road, we can conclude that the cemetery did not extend this far (Fig. 1). Most of the second trench on the southern edge of Tartu St. 1 property up to the bus station was dug through natural soil and layers disturbed by the construction of the parking lot. It is likely that the cemetery extended to the eastern part of the second trench (the ground rises towards the bus station), but has been levelled, indicated by commingled human remains. In total, burial area with 17 intact inhumations were documented on the western end of the second trench (Fig. 1). Of these, 15 were excavated and have been subjected to detailed examination and analysis. The burials had survived on the periphery of the small slope. Burials nos 9–11, which were found just below the asphalt and rubble, were located right on the edge of the previously destroyed area. The burials were very fragmented and only partially intact, possibly damaged during the reconstruction of the parking lot in 1996. Burials nos 2 and 3 were likely disturbed by a possible house foundation cut, from which building refuse and ceramic sherds from the second half of the 19th century and first half of the 20th century were collected. A later pit was dug through burial no 12. The rest of the burials had remained intact.

The graves were dug into gravelly soil. Skeletons lay on their backs in stretched out positions, no remains of coffins were detected. The heads of the deceased were directed between

[2] In spring 2021 archaeological survey was carried out on the western side of Tartu street, but no human remains nor artefacts were found (Kraut & Lange 2021). In June, fieldwork was carried out on the northern side of the trench dug in December of 2020, but then only a few commingled human bones were found (Malve 2021b).

W and SSW (the azimuth varied from 200° to 260°). Hands were usually placed on the chest or the pelvic area. The topmost layer of the soil had been removed which makes determining the exact depth of the graves difficult. Two bodies were buried in single graves, ten in double graves and three in a triple inhumation (Fig. 2). Before the 2020 fieldwork, not many burials overlying one another were known. Among the newly investigated graves burial no 12 was of secondary character: the individual was placed on the triple inhumation (nos 13, 14 and 16). The time between the two burial events was short or very short – the cranium of burial no 12 (Fig. 3) had sagged into the triple grave during decomposition of the body (burial no 13). Also, the orientation of burial no 12 was different from adjacent graves.

Fig. 2. *Triple burial in Otepää cemetery (skeletons nos 13, 14 and 16).*
Jn 2. *Kolmikmatus Otepää kalmistul (luustikud nr 13, 14 ja 16).*
Photo / Foto: Martin Malve

Fig. 3. *The cranium of burial no 12 had sagged into the triple grave during decomposition.*
Jn 3. *Matus 12 kolju oli lagunemisel vajunud kolmikmatuse sisse.*
Photo / Foto: Martin Malve

THE FINDS

Most of the finds of 2020 were discovered from one burial (no 15) – judging by bones and jewellery, a probable girl of 15 to 18 years. The finds from the grave include three rings (Fig. 4). One of them is a spiral ring with a semi-thick flat, slightly segment-shaped middle coil from the II finger of the left hand. Such finds are common for rural cemeteries of southern Estonia from the mid-13th until the mid-15th century (Valk 1991, 185–186; Valk 2001, 48–49), and are also represented with several items among the earlier finds from Piiri street cemetery. A most rare find for Estonian medieval cemeteries is two open rings with four spiral endings– an artefact type characteristic for the final stage of the Iron Age (ca. 1050–1225) (Selirand 1974, 174; Valk & Laul 2014, 69). These were placed on the III finger of both hands. Considering the general find assemblage of the cemetery and the lack of other so early finds, these artefacts should rather be regarded not as a chronological indication for the grave but as a mark of long-term or secondary use of jewellery (e.g., maybe inherited items).

Fig. 4. *Finds from burial no 15 – rings and a necklace.*
Jn 4. *Matus 15 leiud – sõrmused ja kee.*
(TÜ 2926: 13–15; 8–12.)
Photo / Foto: Janika Viljat

Burial no 15 also had a necklace of 156 small yellow round seed beads (diam. 3–4 mm), 115 tiny yellow semi-transparent ring-shaped beads (diam. 3–5 mm), one bigger bead of similar kind (diam. 10–11 mm), and two faceted mountain crystal beads – a bigger and a smaller one (diam. 10 and 16 mm) – in its middle (Fig. 4). Likewise the spiral ring, the seed beads are common finds in medieval village cemeteries of southern Estonia (Valk 2001, 51),

Fig. 5. *Finds from Otepää cemetery: 1 – belt ring, 2–5 – belt buckles, 6 – knife.*
Jn 5. *Otepää kalmistu leiud: 1 – vöörõngas, 2–5 – vööpandlad, 6 – nuga.*
(TÜ 2926: 2, 4, 7, 5, 3, 6.)
Photo / Foto: Janika Viljat

including formerly investigated parts of Piiri street cemetery. The mountain crystal beads, which were used in necklaces together with yellow seed beads, yellow ring-shaped beads (Rus. *зонные*) and cowry shells, are quite rare in southern Estonia. Formerly only 23 finds were known from 14 cemeteries of the region (Valk 2001, 52), four of them from the same burial ground and one from the medieval cemetery east of Otepää hill fort.

The find assemblage also includes 4 iron belt buckles, one from the lower part of the chest of burial no 10, one from the left pubic bone of burial no 11, one from the left ilium of burial no 13 and one gained as a stray find (Fig. 5: 2–5). Burial no 13 also had a knife under the right ilium, with the sharp end directed towards the head (Fig. 5: 6). A tiny bronze ring with the diameter of 25 mm (Fig. 5: 1) which belonged to belt accessories was found as a stray artefact. Such finds appear in graves mainly until the middle of the 15th century. A stray artefact evidently not connected with the cemetery and found by using a metal detector, was a schilling of Sigismund III Vasa minted in Riga in 1618.

HUMAN REMAINS

Of the 15 skeletons excavated and available for analysis, six belong to adults and nine to non-adults (Table 1).[3] Among the adults, one was male and two were females, the fourth one was probably female. For the two partial adult skeletons, it was not possible to determine the sex. In addition to the skeletons, commingled bones and bone fragments were collected as well.

Medieval and Early Modern period pathologies were identified during osteological analysis (Table 1). Dental disease is one of the most frequently encountered types of pathology in archaeological human remains. The most most frequent dental pathologies were dental calculus and caries. On the spinal column, the most common pathology were Schmorl's nodes (intervertebral herniation). *Cribra orbitalia* was documented on one skeleton. *Cribra orbitalia* has many different etiologies, but a probable cause could be vitamin B12 deficiency (Walker *et al.* 2009, 119).

Fig. 6. *The blow had sliced the right ramus of the mandible (burial no 12).*
Jn 6. *Läbiv lõikehaav alalõualuu paremal harul (matus nr 12).*
Photo / Foto: Lisette Reinvars

In one *peri mortem* case, the injury was caused by a sharp instrument. An adult male of 30–40 years (burial no 12) had a cut mark on the right ramus of the mandible (Fig. 6).

[3] The sex of the burials was determined according to the morphological traits on the pelvis and cranium (Buikstra & Ubelaker 1994, 16–20), the 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 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), the maximum length of the long bones (Allmäe 1998, 183–184) 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 the measurements of the right femora.

The ramus was sliced diagonally. The blade had cut through the ramus to the body of the mandible. The length of the cut was 38.36 mm. There was no cut on the cervical vertebrae. The cut mark was the same colour as the rest of the mandible and had no signs of healing, confirming that the wound was fatal. The lesion was thin and with a polished surface and sharp edges, so it is likely that the trauma was caused by a bladed weapon (e.g., a sword). The location of the wound on the posterior and lateral sides of the mandible refers to a hit from behind or on the right side. Head trauma may also directly indicate conflict.

Table 1. *Osteological age, sex and pathologies of the recorded skeletons from Otepää cemetery.*
Tabel 1. *Otepää kalmistult leitud luustike osteoloogiline vanus, sugu ja patoloogiad.*
Compiled by / Koostanud Martin Malve

No / nr	Sex / Sugu	Age / Vanus	Pathologies / Patoloogiad	Stature / Kehakasv
1	?	3–4 y / a	–	–
2	♀	Adult / Täiskasvanu	Spondylosis on the 2nd–5th lumbar vertebrae and on the 1st sacral vertebra.	157 ± 3.72 cm
3	?	1 y / a ± 4 m / k	–	–
4	?	6–8 y / a	Teeth: dental calculus, caries, dental enamel hypoplasia. Metopic suture has not been fused (metopism), enthesophyte on the distal ⅓ of the right humerus.	–
5	♀?	Adult / Täiskasvanu	–	–
6	?	12 y / a ± 30 m / k	–	–
7	Left unexcavated / Ei puhastatud välja			
8	Left unexcavated / Ei puhastatud välja			
9	?	Adult / Täiskasvanu	–	–
10	?	Adult / Täiskasvanu	–	–
11	♂	15–18 y / a	Teeth: dental enamel hypoplasia. Schmorl's nodes on the 9th, 11th and 12th thoracic vertebrae.	–
12	♂	30–40 y / a	Teeth: medium dental calculus, caries, periapical lesion. *Peri mortem* cut mark on the right angle of the mandible, Schmorl's nodes on the 6th–7th and 9th–11th thoracic vertebrae, compression of the 12th thoracic vertebra, *os trigonum* on both calcanei	–
13	?	7–11 y / a	Teeth: slight dental calculus, caries. *Cribra orbitalia*.	–
14	?	12–15 y / a	Teeth: slight dental calculus, caries, dental enamel hypoplasia, periapical lesion.	–
15	♀	15–18 y / a	Teeth: dental calculus, caries, enamel hypoplasia. Schmorl's node on the 1st lumbar vertebra.	–
16	♀	30–45 y / a	Teeth: dental calculus, caries, enamel hypoplasia, caries, *ante mortem* lost teeth.	–
17	?	Non-adult / Alaealine		–

DISCUSSION

The cemetery at Piiri street in Otepää is most exceptional among the rural cemeteries of Estonia due to its high number of multiple graves which makes it possible to associate it with an epidemic, most likely the plague. The coins do not enable us to relate the cemetery to the first massive wave of the Black Death which reached Livonia in 1351 and Pskov in 1352 (Bergdolt 2000; Alttoa 2015; Raudkivi 2019), but rather to some of its later outbursts in the second half of the 14th century. According to the chronicle of Detmar from Lübeck, only one sixth of the inhabitants of Tartu Prince-Bishopric survived the plague wave of 1378 (Raudkivi 2010, 20), according to a letter written by the Master of the Livonian branch of the Teutonic Order – only one tenth (Napiersky 1846, 3, 10). Judging by the coins, the cemetery could rather be dated to the time of that population catastrophe. Analysis for the existence of *Yersinia pestis* bacteria among the skeletons is currently under way.

The cemetery also holds a special position among the medieval rural cemeteries of southern Estonia because of the almost complete absence of graves disturbed by later burials. While most of the ordinary village cemeteries were used long-term, dating from the mid-13th to the early 18th century (Valk 2001, 89, fig. 71), being characterized by numerous graves disturbed by re-burial, the burial ground at Piiri street dates from a limited time period. Only one grave was disturbed by secondary burials. This fact indicates, however, that the cemetery had been in use before the fatal wave of Black Death and some of the burials may date from the times before the plague. However, the overwhelming majority of the burials seems to relate to the epidemic. Although the find assemblage can be dated to the mid-13th – mid-15th centuries, the coin date and the short-time use indicate that the cemetery belongs to the 14th century. Probably, the graves predominantly date from a shorter time span in its second half.

Due to its location in the distance of 300–400 metres from the church of Otepää, and its short-time use, the cemetery at Piiri street cannot be regarded as a medieval parish graveyard. The short-time use also does not make it possible to interpret it as an ordinary village cemetery. Most likely, it did not belong to an ordinary rural village community, but to the population of the medieval borough of Otepää related to the prince-bishop's castle – the second most important in the Prince-Bishopric of Tartu. According to written data, the heyday of boroughs in medieval Livonia was in the 13th century and the first half of the 14th century when inhabitants of these settlements were noted in the archives of bigger towns (Selart 2019a, 32–33). Founding of a new cemetery around the middle of the 14th century may also be a sign of population growth. Considering the fact that a total of 150 individuals have been unearthed at Piiri street and only a part of the cemetery area has been excavated, the number of burials could probably have been at least twice as big as the number of those investigated thus far. The find assemblage characteristic for village cemeteries of southern Estonia testifies to the native origin of people buried here, indicating the presence of a large portion of Estonians among the population of the medieval borough of Otepää.

However, after an intensive short-term use the cemetery was deserted, probably due to the fatal plague which in general caused the decline of small towns and boroughs of medieval Livonia (Selart 2019b, 38–39). In addition to direct population losses caused by the epidemic, many of the survivors moved to bigger towns which, on the one hand, also had lost a large part of their population but, on the other offered better possibilities for the future.

Usually, the plague does not leave distinctive marks on the bones. The osteological material of Otepää cemetery is extraordinary due to its short period of use. These skeletons give a snapshot of the local population in the 14th century. Otepää cemetery is one of the few and the oldest plague cemeteries in Estonia that has been studied archaeologically and osteologically. Single and double graves of people that died of the plague have been studied in numerous town and rural cemeteries, but not many burial sites established specifically because of the outbreak have been found. Until now only two plague burials sites, both in Tallinn, have been excavated in Estonia: one from 1601–1603 for the victims of plague and famine in Tallinn's Early Modern Period suburbs (Ravi St. 6; Sokolovski 2009) and the other for the victims of the Black Death of 1710 at Liivamäe (Pärnu Rd 59B; Malve *et al.* 2019).

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14. SAJANDI KALMISTU OTEPÄÄL, LÕUNA-EESTIS

Martin Malve ja Heiki Valk

2020. a detsembris rajati Otepääl Tartu ja Piiri tänavate ristumiskohas keskaegse kalmistu kaitsealasse keskküttetrassi. Arheoloogiliste uuringute käigus avati kaks kaevandit (jn 1). Esimesed keskaegse kalmistu päästekaevamised Eestis toimusid just samal matmispaigal 1928.–1929. a Marta Schmidehelmi juhendamisel. Kalmistu uurimine jätkus aastal 1938. Hooned Piiri tänava ristmiku lõunaküljel hävisid II

maailmasõjas. Tänava idaosas hooneid ei taastatud ning sinna rajati parkla. Matmispaiga lõunaossa ehitati internaatkool, millega samuti kalmistut kahjustati. 1996. a parkla rekonstrueerimisel lõhuti varem puutumata haudu; järgnenud arheoloogilistel välitöödel puhastati välja kuus osaliselt säilinud matust. 2000. a rajati kalmistu idaossa uus bussijaam, kuid kuna toona arheoloogilisi uuringuid ei toimunud, pole ka teada, kas tollal matuseid leiti. Järgmised teated inimluudest ja leidudest pärinevad 2010. a-st, mil rajati uus Maxima kauplus koos parklaga.

Matmispaika aitavad täpsemalt dateerida ühest matusest pärinevad mündid, neist noorim on löödud vahemikus u 1363–1390, teised aga 14. saj teisel või kolmandal veerandil. Kokku on Otepää Piiri tänava keskaegselt kalmistult leitud 150 laibamatust, mis leidude üldilme, kalmistu lühiajalise kasutuse ja münditeeringu põhjal otsustades pärinevad 14. sajandist, valdavalt selle teisest poolest. Kalmistul domineerisid mitmikhauad, kuhu oli sängitatud enamasti kaks, kolm või isegi rohkem indiviidi. Hauad paiknesid hõredalt, esines üksikuid pealematmisi, kuid varasemad matused polnud hilisematega lõhutud.

2020. a välitöödel Tartu mnt lääneküljel asunud esimesest kaevandist (jn 1) kalmistule viitavaid leide ei tuvastatud. Teine kraavilõik läbis suures osas looduslikku puutumata mineraalpinnast ning siin olid pinnasekihid segatud parkla rajamisega. Tõenäoliselt ulatus matmispaik ka teise kraavi idaossa, kuid oli sel alal maha kooritud. Teise kaevandi lääneosast leiti 17 matust (jn 1), millest üles võeti 15. Luustikud olid säilinud kalmistu äärealal. Matused 9–11 leiti otse asfaldi ja killustiku alt ning paiknesid hävinud ala piiril. Matused 2 ja 3 olid kannatada saanud 20. saj alguse hoonestusega ja matus 12 keskosa läbis sissekaeve. Ülejäänud luustikud olid terviklikud.

Hauad olid kaevatud kruusasesse pinnasesse ja surnud olid sängitatud selili-siruli asendis ilma kirstudeta, peaga lääne ja lõunaedela vahele. Käed paiknesid enamasti rindkere ja vaagna piirkonnas. Kaks surnut oli maetud üksikhaudades, leiti ka viis kaksikmatust ja üks kolmikmatus (jn 2). Varasematel välitöödel oli üksteise peal asuvaid, eri aegadel maetud luustikke leitud vähe. Seekord avastati üks hilisem haud – matus 12 oli sängitatud luustike 13, 14 ja 16 peale. Matuste ajaline vahe on lühike, sest matus 12 kolju oli vajunud alumisse hauda (matus 13; jn 3). Matus 15 juurest leiti kolm sõrmust. Vasaku käe teises sõrmes oli spiraalsõrmus, mõlema käe keskmises sõrmes aga hilisrauaajale omane prillspiraalsõrmus (jn 4). Luustiku kaela ümber oli kee, mis koosnes väikestest kollastest kudrustest (156 tk), pisikestest poolläbipaistvatest ümaratest helmestest (115 tk) ning ühest suuremast ja kahest tahulisest mäekristallist helmest (jn 4). Spiraalsõrmused ja niisugused helmed on keskaegsetele Lõuna-Eesti külakalmistutele iseloomulikud leiud. Kalmistult leiti ka neli rauast vööpanalt ning segatud pinnasest juhuleiuna vasesulamist vöörõngas (jn 5). Matus 13 parema niudeluu all oli nuga (jn 5).

2020. a välitöödel võeti üles 15 skeletti ja arvukalt segatud inimluid. Luustikest kuus kuulusid täiskasvanutele ja üheksa alaealistele (Tabel 1). Täiskasvanutest üks oli mees ja kaks naised, neljanda sugu polnud võimalik fragmentaarsuse tõttu määrata. Maetutel tuvastati keskaegsetele ja varauusaegsetele matmispaikadele omased patoloogiad. Kõige rohkem märgiti hambahaigusi: kaariest ja hambakivi. Lülisambal esines enim lülivaheketta songa e Schmorli sõlmi. Ühe lapse koljul esines silmakoobaste pinnal poorsust (*cribra orbitalia*). Ühe 30–40 aastase mehe koljul tuvastati surmav vigastus: alalõualuu paremal harul oli lõikejälg (jn 6) ja alalõuga läbis 38,36 mm pikkune diagonaalne haav. Relv oli lõhestanud alalõualuuharu keha, kuid ei olnud tunginud kaelalülideni. Haaval puudusid paranemistunnused, see oli sama värvi ülejäänud luuga. Lõikejälg oli peenike, sile ja teravate äärtega, mis on omane õhukese teraga relvale (nt mõõgale). Vigastuse asukoht alalõualuu selgmises osas viitab rünnakule selja tagant või paremalt küljelt. Tõenäoliselt hukkus mees mõne konflikti käigus.

Otepää Piiri tn kalmistu puhul on tegemist erakordse matmispaigaga, kus esineb rohkelt mitmikmatuseid. Need viitavad epideemiale, tõenäoliselt katkule. Haudadest saadud mündid ei osuta mitte esimesele suurele Musta surma lainele, mis oli Liivimaal 1351 ja Pihkvas 1352, vaid tegemist oli mõne hilisema puhanguga 14. saj II poolel. Lisaks eristub kalmistu Eesti teistest keskaegsetest maakalmistutest pealematmisega lõhutud luustike puudumise poolest. Seega kasutati matmispaika vaid lühidalt. Suure tõenäosusega ei kuulunud Piiri tänavale maetud tavaliste külaelanike hulka, vaid olid seotud Otepää linnuse juures asunud aleviga – Otepää linnus oli tähtsuselt teine Tartu piiskopkonnas. Kirjalike allikate kohaselt oli alevite kõrgaeg keskaegsel Liivimaal 13.–14. sajandil, enne Musta Surma.

Uue kalmistu rajamine 14. saj keskpaigas viitab rahvastiku kasvule. Arvestades lõhutud ala suurust võib eeldada, et arheoloogiliselt on uuritud alla poole kalmistu matustest. Luustike juures olnud leiud viitavad eestlaste suurele osakaalule keskaegse Otepää alevi elanike seas. Lühikest aega kasutusel olnud matmispaik jäeti tõenäoliselt maha seoses katkupuhanguga ning väikeste linnade ja alevite allakäiguga Musta surma tagajärjel: paljud ellujäänud kolisid nüüd suurematesse linnadesse. Suuremad asulad olid samuti saanud epideemiates tugevasti räsida, kuid pakkusid paremaid võimalusi tulevikuks. Otepäält kalmistu teeb eriliseks selle lühike kasutusaeg, mis pakub võimalusi uurida kohalikku 14. saj populatsiooni.