



## **OSTEOLOGICAL ANALYSIS OF HUMAN REMAINS FROM THE CEMETERIES OF ST ALEXANDER NEVSKY RUSSIAN GARRISON AND ST NICHOLAS CHURCH, PÄRNU**

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### **INTRODUCTION**

Archaeological rescue excavations that were carried out by MTÜ Arheoloogia ja Ehitusajaloo Grupp (AEG) in Pärnu (2011) revealed *in situ* altogether 45 intact or partly damaged skeletons on the cemetery of the St Alexander Nevsky garrison church (18th c) and on the St Nicholas churchyard (16th–18th cc) (see Heinloo & Vissak, this volume). There were 40 skeletons on the garrison churchyard and 5 on the St Nicholas churchyard. This paper discusses the osteological analysis of the human remains from those excavations.

All skeletons were well preserved. The sex of the deceased was determined by the morphological traits on the pelvis and cranium (Buikstra & Ubelaker 1994, 16–20), in case these skeletal parts were absent the maximum length of humerus, femur and tibia were considered instead (Garmus & Jankauskas 1993, 6–8). The age at death was examined according to changes in the pubic symphyseal face of the adults (Todd 1920; 1921), closure of the cranial sutures (Buikstra & Ubelaker 1994, 16–20), teeth attrition (Brothwell 1981, 72) and changes in limb joints (Data collection codebook 2005, 31–33).

The sex of the subadults was not determined because clear sexual traits develop only in the end of puberty (Buikstra & Ubelaker 1994, 16). The age of subadults was analysed by the development and eruption of teeth (Ubelaker 1989, 63), epiphyseal fusion (Recommendations 1980, 531) and the length of the long bones (Allmäe 1998, 183). In the case of adults and subadults notable pathologies were studied on the skeletons and teeth.

The minimum number of individuals was counted on the basis of commingled bones found on both cemeteries. The minimum number of individuals was determined according to long bones (humerus, ulna, radius, femur, tibia and fibula) (Adams & Konigsberg 2004, 138–151).

### **THE CHURCHYARD OF ST ALEXANDER NEVSKY GARRISON**

The anthropologically examined material consisted of seven female, five male, 27 subadult skeletons and fragmentary bones of a single adult in the garrison churchyard (Table 1, Fig. 1). The mixed bone material from the churchyard of St Alexander Nevsky contained remains of at least eight individuals (4 subadults and 4 adults). Subsequently more significant pathologies are discussed.

Fig. 1. The rate of male, female and subadults excavated from the St Alexander Nevsky garrison churchyard.

Jn 1. Püha Aleksander Nevski kirikuaist väljakaevatud meeste, naiste ja alaealiste suhtarv.

Drawing / Joonis: Martin Malve

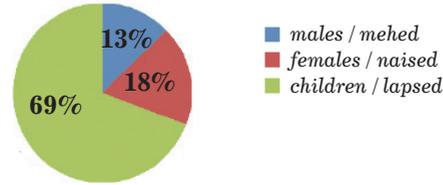


Table 1. Skeletons from the St Alexander Nevsky churchyard.

Tabel 1. Püha Aleksander Nevski kirikuaia luustikud.

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Burial No./ Matuse nr	Sex/ Sugu	Age/ Vanus	Burial No./ Matuse nr	Sex/ Sugu	Age/ Vanus
1	?	adult	11b	?	0–4 (6) months
2	-	-	12	?	6 years ± 24 months
3a	?	18 months ± 6 months	13	?	6 months ± 3 months
3b	?	0–2 months	14	male	40–45 years
3c	?	0–4 (6) months	15	female	30–35 years
4a	?	2 years ± 8 months	16	?	3 years ± 12 months
4b	?	0–4 (6) months	17	male	50+ years
4c	?	0–4 (6) months	18	?	0–2 months
4d	?	0–4 (6) months	19a	male	50+ years
5	?	7 years ± 24 months	19b	?	2 years ± 8 months
6a	female	25–30 years	20a	?	5 years ± 16 months
6b	?	9 years ± 24 months	20b	?	0–4 (6) months
6c	?	0–4 (6) months	21	?	0–2 months
7	male	21–24 years	22	?	2 years ± 8 months
8a	female	40–45 years	23	?	3 years ± 12 months
8b	?	9 months ± 3 months	24	-	-
9a	female	40–45 years	25	-	-
9b	?	4 years ± 12 months	26	-	-
9c	?	0–4 (6) months	27a	?	0–2 months
10a	female	45–50 years	27b	?	0–4 (6) months
10b	?	0–4 (6) months	28	female	40+ years
11a	male	25–30 years	29	female	40+ years

### Teeth

Among the teeth pathologies hypoplasia was recorded on seven (skeletons Nos 5, 6a, 8a, 10a, 15, 17 and 19a), tooth stone on six (Nos 6a, 8a, 10a, 15, 17 and 19a), alveolar reduction on five (Nos 6a, 8a, 10a, 17 and 19a), *ante mortem* tooth loss on three (Nos 8a, 10a and 19a) and caries on two individuals (Nos 10a and 12).

### Degenerative diseases

As the majority of the adult skeletons were at the age of 40–50 years and over, pathologies connected to ageing dominated among the osteological material. They were mostly visible on the surfaces of the limb joints of the long bones and vertebrae. Osteoarthritis was detected on limb joints (Nos 8a, 14, 17, 19a and 29). The spines of the deceased were often affected by three pathologies: spondyloarthritis (Nos 1, 9a, 10a, 14, 17 and 19a), spondylosis (Nos 1, 10a and 19a) and in one case cervical vertebrae osteochondrosis (No. 19a). Also Schmorl's nodes (*nodi Schmorl*) were observed (Nos

1, 8a, 9a, 10a, 11a, 14, 17 and 19a) that could be caused by physical activity, ageing, congenital abnormality or traumas. Disease was documented only on older adults (over 40 years old). Vertebrae compression fractures could be seen on two older adult men (Nos 17 and 19a).

### Traumas

In addition to the pathologies connected to ageing several traumas could be observed on the skeletons. The main traumas were various fractures of limbs and ribs.

Ulnae fractures were detectable on two skeletons (Nos 14 and 17). Irrespective of their exact location fractures of ulnae and radii are caused mainly by accidents, for example falling. Fractures of the mid-shaft of ulna are usually interpreted in paleopathological material as the result of interpersonal violence. It can be the case of the so-called 'Parry' or self-defence injury that occurs when a person defends oneself from a blow aimed at head. This fracture can be accompanied by injury of forehead or face (Smith 1996, 84).

The male skeleton No. 14 had healed fractures of the lower end of ulna and radius. This injury is known as typical or Colles fracture (*Fractura ossis radii in loco typico*) (Fig. 2), that is usually the result of falling on a stretched arm. The male skeleton No. 17 had a depressed fracture on his right frontal bone (Fig. 3) and an unhealed ulna injury on the mid-shaft (Fig. 4: a). Both of these injuries could be the traces of a self-defence trauma. On the site of the ulna fracture pseudoarthrosis also known as a false joint had formed. Pseudoarthrosis is characterised by the non-union of the ends of the fracture and they move relatively to each other. Moving of the fracture ends have rounded and polished the edges of the broken ends. On the injury site neo-arthritis has formed



Fig. 2. Typical fractures of the distal ends of left ulna and radius, also known as Colles fractures (St Alexander Nevsky Russian garrison churchyard).

Jn 2. Tüüpileline murd nn. Colles'i murd vasaku küünarvarre- ja kodarluu distaalses otsas (Püha Aleksander Nevski Vene garnisoni kirikaed).

Photo / Foto: Kristel Külljastinen



Fig. 3. Depressed fracture of the right frontal bone on the cranium of skeleton No. 17 (St Alexander Nevsky Russian garrison churchyard).

Jn 3. Luustik nr 17 lohukujuline fraktuur kolju paremal otsmikuluul (Püha Aleksander Nevski Vene garnisoni kirikaed).

Photo / Foto: Kristel Külljastinen



Fig. 4. a – false joint on the midshaft of the left ulna, b – close view to the fracture (St Alexander Nevsky Russian garrison churchyard).

Jn 4. a – vasaku küünarvarreluu keskosa eba-liigesega, b – murd lähivaates (Püha Aleksander Nevski Vene garnisoni kirikaed).

Photo / Foto: Kristel Külljastinen



Fig. 5. Child's left ulna and radius with a greenstick fracture (St Alexander Nevsky Russian garrison churchyard).

Jn 5. Lapse vasaku küünarvarre- ja kodarluu pajuoksamurd (Püha Aleksander Nevksi Vene garnisoni kirikaed).

Photo / Foto: Kristel Külljastinen

and there is a new bone formation in the area of the fracture (Fig. 4: b). The same individual had a healed fracture of his left VIII rib.

Also one subadult (No. 22) had healed fractures on the midshaft of the left ulna and radius. The child had an incomplete fracture called the greenstick fracture that is normally a trauma of the long bones of subadults. This injury is described by a bended shape due to a partial fracture (Fig. 5).

Two individuals had fractures on metacarpals (Nos 10a and 19a). Metacarpal injuries are usually caused by direct traumas: blows and pressure force with hard objects (Petlem 1974, 128).

Beside arm bone fractures the biggest injury group was healed traumas of the ribs. Rib cage traumas occurred mostly among older adults, both males and females (Nos 6a, 8a, 17 and 19a). Skeleton No. 6 (female) had a cut wound on the superior side of the midshaft of the right X rib. The surface of the cut mark was of the same colour as other parts of the rib showing that the trauma was *peri mortem* (at time of death) and the person died shortly after the trauma.

### **Other pathologies**

Periostitis or the inflammation of periost of the bone was present on the distal ends of radii, on the right fibula and on the talus of the female skeleton No. 8a. Periostitis can be caused by traumas, hard physical work or disease (for example syphilis, tuberculosis and osteomyelitis). The same skeleton had small rounded button osteomas on the frontal and both parietal bones. Their size varied from 3 to 6 mm. Button osteomas are benign tumours of bone (Ortner & Putschar 1985, 378). Usually osteomas appear on older adults over 40 years (Waldron 2009, 172).

Osteological analysis revealed also two anomalies of the bone growth and development. The fifth lumbar vertebra of skeletons Nos 7 and 14 had partly fused together with sacrum and had formed the so-called sacralisation. Skeleton No. 7 had also a rounded cavity on the lower part of the sternal corpus. This is known as sternal foramen and it is a widely spread anomaly caused by the defect of ossification (Anderson 1980, figs 1–10).

### **ST NICHOLAS CHURCHYARD**

Anthropological analysis of the bone material excavated from the St Nicholas graveyard distinguished the remains of three females (Nos 2, 4 and 5) and two males (Nos 1 and 3) (Table 2). In the mixed bone material at least 25 adults and 11 subadults were determined. Tooth pathologies were documented only on skeleton No. 4. She had hypoplasia, caries, alveolar destruction and tooth stone on her teeth. Spondylosis was documented on two older adult skeletons (Nos 3 and 4). The same individuals had also Schmorl's nodes on the lower spine. Skeleton No. 4 had a healed right rib fracture and skeleton No. 2 had a XI thoracic

vertebra compression fracture. Periostitis on left tibia and fibula were diagnosed on skeleton No. 1.

**CONCLUSION**

The osteological material of St Alexander Nevsky churchyard consisted of numerous healed and unhealed traumas. The large number of different injuries can be explained by the fact that the cemetery was used by a Russian military garrison. Three adults among the skeletons wore several injuries (burials Nos 8a, 17 and 19a). The number of injured individuals is higher if we consider Schmorl’s nodes as a trauma, although these can also be caused by physical activity. All these traumas may be the result of heavy training and hostilities. Similar material is studied in Vilnius, Lithuania, where in the 16th–17th centuries the Russian and Swedish troops raided the city repeatedly (the so-called ‘Deluge’) (Jatautis *et al.* 2010, 111). Numerous male and female skeletons with healed and unhealed traumas have been found from orthodox cemeteries of that time (Jatautis *et al.* 2010, 124, table 9).

In comparison to several other contemporary cemeteries it is noticeable that among the local civilian population the number of traumas was significantly lower (for example cemeteries of Lääniste and Hargla; see Lillak & Malve 2011; Malve *et al.*, this volume). Because no earlier research concerning the comparison of military and civilian cemeteries has been done, it is difficult to make further interpretations. The uneven level of research of contemporary graveyards and the small number of skeletons studied can also present problems. A large proportion of female and subadult burials indicate that St Alexander Nevsky churchyard was also used by the families of soldiers (Fig. 1). For example, it is known that in the Swedish garrisons of the Great Northern War (1700–1721) the number of soldiers’ wives and children exceeded at times the soldiers themselves (Laidre 1999, 209–211). The high infant mortality rate is a sign of poor life conditions of families in the garrison (Fig. 6). At the same time a high death rate among children was common at that time (Palli 1998, 26).

Previously, the St John’s 16th–18th century churchyard in Pärnu has been excavated and anthropologically studied (Allmäe 2008, 2009; Allmäe & Limbo 2008, 2009, 2010; Limbo 2009). Unfortunately the comparison of these cemeteries is complicated because the St John’s cemetery was firstly used by the local Lutheran congregation, then the Swedish garrison and finally the Russian garrison. It is complicated to distinguish the burials from different periods.

In comparison, although the anthropological material from the St Nicholas churchyard was scarce, it seems to represent

Table 2. Skeletons from the St Nicholas churchyard.  
Tabel 2. Püha Nikolai kirikaia luustikud.  
Compiled by / Koostanud: Martin Malve

Burial No. / Matus nr	Sex / Sugu	Age / Vanus
1	male	40+ years
2	female	40+ years
3	male	40–45 years
4	female	40–45 years
5	female	25–40 years

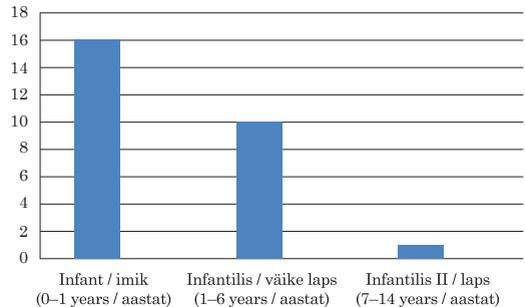


Fig. 6. The mortality of children from the St Alexander Nevsky garrison churchyard.  
Jn 6. Püha Aleksander Nevski garnisoni kirikaiaist leitud laste suremus.  
Drawing / Joonis: Martin Malve

a common cemetery with mostly older adults whereas the bones wore mainly traces of changes caused by ageing. As the churchyard and the Russian garrison cemetery are not simultaneous the comparison of the two is very difficult.

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## PÜHA ALEKSANDER NEVSKI VENE GARNISONI JA PÜHA NIKOLAI KIRIKAIA INIMLUUDE OSTEOLOOGILINE ANALÜÜS

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2011. aastal Pärnus MTÜ AEG korraldatud arheoloogiliste päästekaevamiste käigus leiti Püha Aleksander Nevski garnisoni kirikאיast (18. saj) ja Nikolai kirikאיast (16.–18. saj) kokku *in situ* 45 tervet või osaliselt säilinud luustikku: 40 garnisonikiriku kalmistult ja 5 Nikolai kirikאיast.

Maetute sugu määrati puusaluudel ja koljul olevate sootunnuste järgi, nende luude puudumisel õlavarre-, reie- ja sääreluude maksimaalsete pikkuste põhjal. Vanus saadi täiskasvanutel häbemelu sümfüüsi pinna muutuste, koljuõmbluste ühinemise, hammaste kulumise ja liigestel toimunud ealiste muutuste põhjal. Alaealistel sugu ei määratud, kuna selged sootunnused kujunevad luustikul välja alles pärast puberteedia lõppu. Laste vanus määrati hammaste arengu ja lõikumise ning epifüüside ühinemise ja jäsemeluude pikkuste analüüsil.

Mõlema kalmistu puhul vaadati läbi ka segatud inimluud ja määrati väikseim indiviidide arv jäsemeluude järgi. Püha Aleksander Nevski kirikאיast oli segatud materjalis vähemalt 4 last ja 4 täiskasvanut ning Nikolai kalmistul 27 täiskasvanu ja 11 lapse luud.

Kokku leiti Püha Aleksander Nevski kalmistult arheoloogiliste päästekaevamiste käigus 7 naise, 5 mehe, 27 lapse luustikku ning ühe täiskasvanu fragmentaarsed luud (vt tabel 1, jn 1). Alljärgnevalt on välja toodud peamised patoloogiad.

Hammaste patoloogiatega seas määrati hüpoplaasiat seitsmel (luustikud nr 5, 6a, 8a, 10a, 15, 17 ja 19a), hambakivi kuuel (nr 6a, 8a, 10a, 15, 17 ja 19a), alveolaarkaarte taandumist viiel (nr 6a, 8a, 10a, 17 ja 19a), *ante mortem* hambakaotusi kolmel (nr 8a, 10a ja 19a) ja kaariest kahel (nr 10a ja 12) indiviidil.

Kuna enamik leitud täiskasvanute matustest kuulusid 40–50 aastastele ja vanematele inimestele, siis luuaineses domineerisid just luustiku vananemisega kaasnevad haigused, mida võis täheldada peamiselt jäsemete ja selgroolülide liigespindadel. Jäsemeliigestel esines liigeste kulumisega kaasnev haigus osteoartrroos (nr 8a, 14, 17, 19a ja 29). Selgroolülidel täheldati kolme vananemisega kaasnevat patoloogiat: spondüloartrroosi (nr 1, 9a, 10a, 14, 17 ja 19a), spondüloosi (nr 1, 10a ja 19a) ja kaelalülide osteokondroosi (nr 19a).

Osteoloogilises aineses oli ka laialt levinud selgroo haigus Schmorli sõlmed ehk lülivaheketaste songad (nr 1, 8a, 9a, 10a, 11a, 14, 17 ja 19a), mida võivad põhjustada füüsiline aktiivsus, vananemine, kaasasündinud häire või traumad. Haigust esines vaid üle 40-aastastel täiskasvanutel. Selgroolülide kompressioonmurde esines kahel vanemal täiskasvanud mehel (nr 17 ja 19a).

Lisaks vananemisega kaasnevatel haigustele esines luustikel rohkelt vigastusi. Põhilisteks traumadeks olid erinevad luumurrud ülajäsemeluudel ja roietel. Kahel luustikul (nr 14 ja 17) olid küünarvarreluude murrud. Kodar- ja küünarvarreluude traumad on olenemata murru asukohast tingitud peamiselt õnnetustest, näiteks kukkumisest. Küünarvarreluude keskosa murde on tihti tõlgendatud paleopatoloogilises materjalis vägivaldalla tulemusena. Tegemist võib olla nn pareerimis- ehk enesekaitsemurruga, mis tekib, kui inimene kaitseb ennast pähe suunatud löögi eest. Osteoloogilises aineses võib see esineda koos otsmiku või näo vigastusega. Luustikul nr 14 oli vasaku küünarvarre- ja kodarluu alumise piirkonna paranenud luumurd. Tegemist oli tüüpilise ehk Collesi murruga (jn 2), mis on suure tõenäosusega tingitud kukkumisest väljasirutatud käele. Luustikul nr 17 oli paranemata küünarvarreluu murd ja kolju paremal otsmikuluul lohukujuline trauma (jn 3). Tegemist võib olla enesekaitsest tuleneva vigastusega. Vasaku küünarvarreluu keskosas polnud murd paranenud (jn 4: a), vaid oli tekkinud pseudoartrroos ehk ebaliiiges. Murrupiirkonnas on näha ka paranemist (jn 4: b). Antud indiviidil oli ka vasaku poole VIII roide paranenud murd. Üks paranenud küünar- ja kodarluu murdudega luustik oli ka laste matuste seas. Lapse luustiku nr 22 parema käe küünar- ja kodarluu olid keskosas murdunud, luud olid kaardus. Kuna lapse luud on elastsed ja nad ei murdu alati täielikult, nimetatakse sellist osalist murdu nn pajuoksamurruks (jn 5). Kahel indiviidil olid paranenud kämbaluude murrud (nr 10a ja 19a). Kämbaluude traumasid on tihti põhjustanud otsesed vigastused: löögid ja survejõud kõvade esemetega.

Lisaks mitmetele käeluumurdudele esines luumaterjalis ka roiete vigastusi, peamiselt vanematel täiskasvanutel, nii meestel kui naistel (nr 6a, 8a, 17 ja 19a). Luustikul nr 6a oli parema poole X roide ülemisel serval löikejalg. Löike pind oli sama värvi ülejäänud luupinnaga. Kuna roidel puudusid paranemise tunnused, on tegemist *peri mortem* vigastusega ja indiviid suri pärast traumat. Periostiit ehk luuümbrise põletik oli täiskasvanud naise (nr 8a) kodarluude distaalsetes otstes, paremal pind- ja kontsluul. Periostiiti võib põhjustada trauma, raske füüsiline koormus või haigus (nt süüfilis, tuberkuloos ja osteomüeliit).

Luustiku nr 8a kolju välisküljel, mõlemal kiiru- ja otsmikuluul olid 3–6 mm punktosteoomid. Tegemist on healoomulise luukoe kasvajatega. Peamiselt esinevad sellised osteoomid üle 40-aastastel täiskasvanutel. Osteoloogilises materjalis leidis kahel luustikul ka luu kasvu ja arengu anomaaliaid. Luustikel nr 7 ja 14 oli viies nimmelüli osaliselt kokku kasvanud ristluuga (sakraliseerumine). Lisaks oli luustiku nr 7 rinnalüli keha alaosas mulk. Rinnakuluu mulgu puhul on tegemist üldlevinud anomaaliaga, mida põhjustab luustumise defekt.

Nikolai kirikאיast leiti kolme naise (nr 2, 4 ja 5) ja kahe mehe (nr 1 ja 3) matused (vt tabel 2). Hammaste patoloogiaid tuvastati vaid luustikul nr 4, kellel oli ainukesena säilinud ka kolju. Hammastikus esines hambaemali hüpoplaasiat, kaariest, alveolaarkaarte taandumist ja hambakivi. Vananemisega kaasnevatest haigustest esines luustikel nr 3 ja 4 selgroolülide liigespindade kulumist. Samade luustikel olid selgroo alaosa lülidel jäljed Schmorli sõlmedest. Traumadest esines luustikul nr 4 ühe parema poole paranenud roide murd. Luustikul nr 2 oli XI rinnalülil kompressioonmurd. Luustikul nr 1 oli vasakul sääre- ja pindluul periostiit ehk luuümbrise põletik.

Püha Aleksander Nevski kirikaeda maetud luustikke iseloomustab paranenud ja paranemata traumade suur hulk, mis seostub garnisonikalmistu staatusega. Luustike seas oli kolm täiskasvanut, kelle skelettidel olid mitmed vigastused (nr 8a, 17 ja 19). Kui lisada juurde veel selgrool leitud Schmorli sõlmed, mis võivad tekkida ka füüsilise koormuse ja trauma tagajärjel, siis suureneb vigastustega inimeste arv veelgi. Vigastused võivad olla põhjustatud sõjategevusest või treeningutest. Võrdluseks võib tuua Leedust Vilniusest pärinevate 16.–17. sajandi õigeusu kirikaedade osteoloogilist ainet, mis pärinevad ajast, mil linna rüüstasid Vene ja Rootsi armeed. Nendelt kalmistutelt on leitud rohkelt paranenud ja paranemata traumadega meeste ja naiste luustikke. Samaaegsetel n-õ tavakalmistutel võib täheldada traumasid luustikel märkimisväärselt vähem (nt Lääniste ja Hargla kalmistu). Kuna Eestis pole varem sõjaväe- ja tavakalmistuid võrreldud, siis on laiemaid üldistusi raske teha. Laste matuste suur osakaal näitas, et kalmistut kasutasid aktiivselt ka sõjaväelaste perekonnad (jn 1). Põhjasõjast on näiteks Rootsi garnisoni perekondade puhul teada, et paljudel juhtudel on naiste ja laste osakaal isegi ületanud sõdurite arvu. Kõrge väikelaste suremus võib olla tingitud garnisoniperekondade rasketest elutingimustest ja tolele ajale iseloomulikust suurest väikelaste suremusest. Kõige suurem suremus oli vastsündinute seas (jn 6). Varem on kaevatud ja antropoloogiliselt uuritud Pärnu Jaani kiriku kalmistu (16.–18. saj) matuseid. Kahjuks ei ole neid kalmistuid võimalik omavahel võrrelda, sest Pärnu Jaani kiriku aeda on lisaks Vene garnisoni liikmetele, kasutanud luterlik kogudus ning Rootsi garnison ja matuseid ei ole võimalik periooditi eristada.

Püha Nikolai kirikאיast leitud osteoloogiline materjal oli vähene, kuid leitud luustike põhjal võib öelda, et tegu on tavakalmistu ainesega, kus esinesid vaid vanemad täiskasvanud ja luudel võis täheldada peamiselt vananemisega kaasnevaid muutusi. Kuna kirikaed ei ole Vene garnisoni kalmistuga täiesti üheaegne, siis neid otseselt võrrelda ei saa.