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INVESTIGATING SYPHILIS IN EARLY MODERN ESTONIA USING SKELETAL ARCHAEOLOGICAL EVIDENCE FROM TARTU

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Abstract

Presented here are results of analyses of excavated skeletal material from the early modern period in Tartu, Estonia, for evidence of syphilis. Our understanding of the incidence of syphilis in Estonia, and the causes of its spread, are discussed. All of the skeletal samples that were positively identified for syphilis included evidence of bone lesions on the cranium. Percentages of remains with signs indicative of syphilis were found at a rate of 0.50%, which accords with a figure of 0.77% from Britain for the same period. Evidence presented suggests that syphilis was a problem not only in the metropolitan area of Tallinn, but also in the less populous cities of Estonia. It is concluded, given that the excavation sites represent different dates from the period, that syphilis was a significant health problem in early modern Tartu.

Introduction

The early modern period in Estonia — from the 16th century to the 18th century — was a period characterised by increasing globalisation (De Vries 2010), involving increased migration of peoples, trade contacts and urban population densities. This mixing of people and their concentration in small spaces encouraged the spread of a range of diseases. The distribution of agents of disease through this population movement was accompanied by threats to native populations' acquired immunity, where populations had no previous experience of novel diseases and no means to protect themselves immunologically. Likewise, migrant populations may have had no defence against indigenous disease organisms (Roberts and Manchester 2007).

In addition to these factors encouraging the transmission of diseases in general, other factors were of particular importance in encouraging the spread of syphilis in the early modern period in Estonia. During this period there were three significant wars: the Livonian War (1558–1583), the Polish-Swedish War (1600–1611) and the Great Northern War (1700–1721). These wars would have entailed movement into urban areas of refugees and soldiers, the latter known to be disproportionately high societal purchasers of sex (Laite 2017, p. 121). Evidence for the significant incidence of syphilis in Tallinn in the early modern period includes the establishment of two military hospitals to treat syphilis in the Swedish garrison in the city at that time (Jankauskas 1994) and the fact that public baths in Tallinn were forced to close for a period in the 16th century for fear of the spread of syphilis (Jankauskas 1994).

The origins of syphilis are disputed, with disagreement over whether the disease was brought from the American continent to Europe, or the other way around (Eccleston et al. 2008). Syphilis may have existed in Europe and the rest of the Old World prior to the time of Columbus. Here the historical evidence is suggestive. An early Chinese writer, Hoang-Ty, in 2637 BC described a chancre-like sore coupled with a virus infection of the blood stream. Perhaps more importantly, this sore was successfully treated with mercuric compounds, as are syphilitic sores, and mercury has been used to treat syphilis even in recent times. An early European writer, Gordonio (1303 AD), reported on an epidemic of 'lepra', or leprosy. He described the infection as highly contagious with a short incubation period.

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Gordonio stated that children were often born with 'lepra' and that it was acquired venereally. His description fits syphilis much more closely than it fits any known forms of leprosy, so it may be conjectured that Gordonio was describing syphilis even though he did not name it as such. The disease may then have spread through established trade routes to Estonia by the early modern period a century later. Whatever its origin, the first recorded case of syphilis in Estonia was surprisingly early, dating from 1495/1496 in Tallinn, with further outbreaks recorded in Tallinn in 1519–1520 and 1539 (Gustavson 1969).

An understanding of the diseases suffered by people in the past can give us insights into their lives, in addition to historical records and recovered artefacts. The study of historical epidemiology can therefore provide a more holistic understanding of history. In particular, the occurrence and severity of specific diseases can inform us about the way diseases shaped human environments and the ways in which different communities interacted with each other. The prevalence of syphilis in the early modern period has been estimated for Tallinn (Gustavson 1969), but the evidence has not previously been reported for Tartu, the second most populous city in Estonia. This work helps to fill this gap in our understanding.

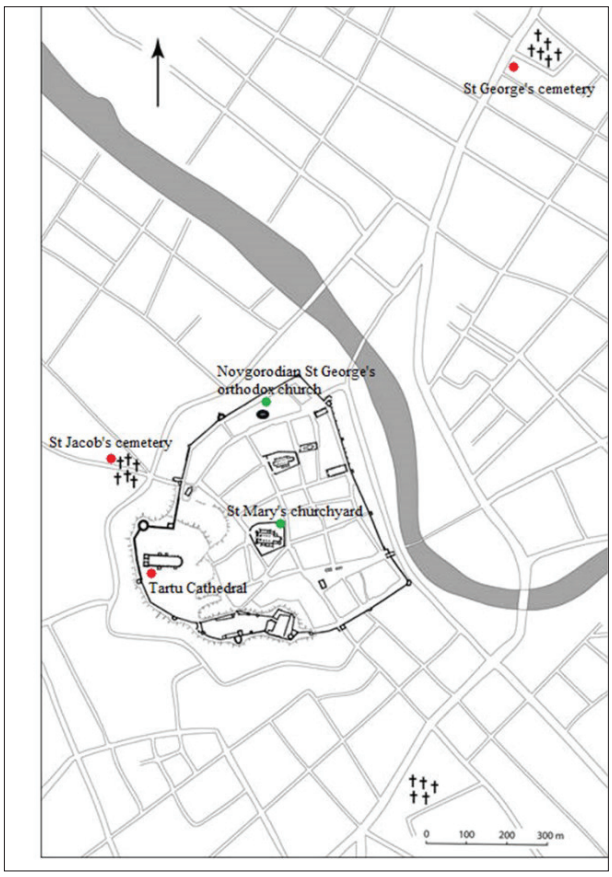

Figure 1. Location of excavation sites inside the town of Tartu. Green dots mark sites where no skeletons with syphilitic marks were found, red dots mark sites that contained syphilitic remains (map by M. Malve).

1. Method

Excavation sites were selected that were putatively understood locally to be dated to the early modern period, determined by the depth of the remains found and secondary knowledge of the settlements that were known to have existed at the time. The periodisation has not been confirmed by carbon dating or other instrumental methods of analysis, however. To identify evidence of syphilis, bones from discovered skeletal remains were individually analysed for any irregular topography. Bones were inspected with the naked eye for the presence of lesions. Special attention was paid to the long bones and the skull, as previous studies (Steinbock 1976) have indicated that lesions are most apparent in these areas. Lesions could range from a diameter of a couple of centimetres to spanning the whole length of the bone. Lesions were identified as erosion of the surface of the bone, such that the bone tissue had become friable.

To understand what the rate of syphilis may have been in Tartu, the number of syphilitic skeletons were compared with the total number of all skeletons found. The background data on skeletal remains were gathered from records from Tartu University. Since 1981, archaeologists have found 1,810 skeletal remains. The location, year and numbers of remains found are listed in Table 1.

Table 1. Excavated skeletal remains in Tartu, and the site of origin

Archaeological site and year of excavation	No. of skeletal remains
Tartu, St Mary's churchyard 2010–2011	743
Tartu Cathedral 2001	33
Tartu Cathedral 2002	9
Tartu Cathedral 2008	29
Tartu Cathedral 2013	3
Tartu, St George's cemetery 2006	39
Tartu, St George's cemetery 2016	14
Veibri 13th century mass grave 2010	10
Tartu, Novgorodian St George's orthodox church 1981–1982	14
Tartu, St George's church 2012	6
Lohkva village cemetery 2012	100
Tartu, St Jacob's cemetery 2014	590
Tartu, St Jacob's cemetery 2010	20

Most of the sites in Tartu were concentrated in an area that was once surrounded by a medieval defence wall. Most communities would have been concentrated inside this fortress and, therefore, most remains found have their origin within the city (Fig. 1).

Figure 2. St George's cemetery 2006, adult female exhibiting caries sicca on the frontal bone (photograph by author J. Arney).

Figure 3. St George's cemetery 2006, adult female exhibiting destruction of bone on tibia (photograph by author J. Arney).

Figure 4. Tartu Cathedral 2008, child with congenital syphilis exhibiting lesions on femur (photograph by author J. Arney).

The remains previously mentioned, and listed in Table 1, were visually analysed and if they showed signs of syphilis this was recorded. Examples of characteristic lesions are illustrated in Figures 2, 3 and 4. The exact location of the lesion or lesions, and the type of bone, were also noted and compared with other skeletal remains displaying evidence of syphilis.

2. Results and discussion

There were a total of 1,810 skeletal remains found from the excavations described. The number of skeletons with indications of syphilis present was nine (Table 2), meaning that approximately 0.5% of the skeletons showed signs of syphilitic infection. This is likely to be a significant underestimate of the actual incidence of syphilis. Bone lesions are tertiary symptoms and occur typically between three and ten years subsequent to initial infection (Chandrasekar 2017), so it is likely that many people who were infected with syphilis did not actually bear the signs of the disease on their bones; some would have died prior to the development of tertiary symptoms. But nevertheless, it is a proportional estimate of the actual incidence of syphilis in the period. This figure of 0.5% is similar to that reported in Britain (0.77%) in a similar period (Roberts and Cox 2003), and syphilis was considered to be a significant health problem in Britain during this time. The reason why the figure is comparatively low may be due to many factors. As noted above, many syphilitic individuals might have died before symptoms became evident, and many signs are not conclusive. Unearthed remains also suffer from deterioration over the centuries, which may have eroded or erased signs originally present. Nevertheless, the crude prevalence rate is comparable, and it is likely that syphilis affected a significant proportion of the population in Tartu. Moreover, because syphilitic remains appeared in different burial grounds, it is likely that syphilis was a long-lasting problem for Tartu and may have spanned the majority of the early modern period.

Table 2. Syphilitic skeletal remains in Tartu

Location and year	No. of syphilitic remains	Other properties
Tartu Cathedral, 2008	1	Congenital syphilis
Tartu St George's cemetery, 2006	1	Adult female
Tartu St George's cemetery, 2012	2	Adult males, commingled bones
Tartu St Jacob's cemetery, 2014	5	Adult females, commingled bones, five craniums

Evidence for syphilis was found to be present most frequently in the region of the skull (cranium) (Table 3). This is consistent with what other studies have shown (Steinbock 1976). Evidence of this disease was also frequently found to be present in the long bones (Table 3), which are likewise considered to show signs of the presence of syphilis proportionally more than other skeletal structures. It is worthy of note that every sample of skeletal remains with signs indicative of syphilis had such signs present in the skull.

Table 3. Location of syphilitic markings. Bones marked with an asterisk (*) were from individuals that had contracted syphilis congenitally.

Bone	Number of visible signs of syphilis
Cranium (total)	9
Frontal	6
Parietal	6
Tibia	2
Femur	2
Humerus	2
Molars*	1
Zygomaticum*	1
Maxilla*	1
Ulna*	1
Radius*	1
Clavicula*	1
Scapula*	1
Occipital	1

There are two major pieces of evidence that indicate that syphilis was a widespread disease in Estonia during the early modern period (from around the years 1500 to 1700). First, there are many written sources from this period that seem to be describing syphilis, even though they do not name it as such (Lobdell and Owsley 1974). This disease also affected the community in Tallinn so severely that many measures were ordered, and were implemented, to attempt to prevent the disease from spreading, e.g. closing public baths and establishing hospitals specifically for the purpose of managing patients with syphilis (Jankauskas 1994). As also previously mentioned, Estonia was ravaged by three wars during this period. This may have been the cause of the disease spreading so widely or it may have merely exacerbated an already existing problem. Secondly, there is archaeological evidence in Tartu, described here, that indicates syphilis also had a significant presence in Estonia's second largest community. However, these remains cannot be attributed reliably to a specific date range. Therefore, the findings in Tartu cannot be confidently linked to any of the wars that swept through Estonia in this period of interest. Even so, all the remains are from the early modern period, and it is probable that syphilis was a sustained problem in Tartu. It is not possible to conclusively predict exactly how prevalent syphilis was in Estonia from the evidence here, but it is possible that it had a significant presence during the majority of the early modern period, perhaps especially among vulnerable groups, such as prostitutes and foreign soldiers.

Analytical reliability of these remains would have been improved by using DNA analysis, which yields more robust results, as syphilis may not always manifest itself to such a degree that it is visually identifiable on bones. However, ancient DNA analysis would have been a very expensive process and this method was not available to the authors.

Conclusions

Osteological analysis from the archaeological skeletal samples from Tartu suggests that syphilis was a significant and sustained problem. Excavations in different locations from different times of burial have shown remains with evidence of syphilitic lesions, i.e. destruction of bone. The crude prevalence rate of unearthed syphilitic skeletons (0.5%) suggests that syphilis affected a considerable portion of the population in Tartu, as the rate was similar to that of a study conducted in Britain which analysed remains from a period that witnessed several syphilis epidemics.

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SIFILIO TYRIMAI, ATLIKTI REMIANTIS ANKSTYVŲJŲ NAUJŲJŲ LAIKŲ TARTU (ESTIJA) ANTROPOLOGINE MEDŽIAGA

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Santrauka

Ankstyvaisiais naujaisiais laikais miestams, kurie tapo traukos centrais, buvo būdingas žmonių skaičiaus didėjimas ir įvairiapusis komunikavimas. Tai ypač būdinga miestams, kuriuose koncentravosi karinės pajėgos ir vyko intensyvi prekybinė veikla. Būtent toks miestas aptariamuoju laikotarpiu buvo Tartu. Tikėtina, kad žmonių skaičius bei įvairialypis kasdienis gyvenimas ir kiti to meto miestiečių įpročiai didino lytiškai plintančių užkrečiamųjų ligų skaičių. Viena iš tokių buvo skaudžias pasekmes sukelianti liga sifilis.

Taline sifilio ligos tyrimai, remiantis antropologine medžiaga, buvo atlikti anksčiau. Šiame straipsnyje vertinami sergamumo sifiliu rodikliai Tartu mieste. Ieškant sifilio ligos požymių, buvo tirtos žmonių skeletų liekanos, rastos Tartu miesto kapinėse archeologinių tyrimų metu. Ši liga sukeldavo kaulo paviršiaus eroziją, dėl kurios kaulinis audinys tapdavo purus. Atlikti tyrimai leido įvertinti šia liga užsikrėtusių gyventojų dalį.

Straipsnyje naudoti 1 810 tirtų skeletų liekanų tyrimų rezultatai. Sifilio sukelti požymiai nustatyti 0,5 proc. tirtos antropologinės medžiagos dalyje. Panašus procentinis dydis nustatytas ir tirtoje to paties laikotarpio Jungtinės Karalystės medžiagoje. Iš visų skeletų, kurie turėjo požymių, rodančių, kad jie buvo paveikti sifilio, visi turėjo kaukolės kaulų pažeidimų. Antropologinės medžiagos su sifilio pažeistais kaulais buvo rasta skirtingose Tartu kapinėse, ir tai rodo, kad sifilis buvo nuolatinė problema, o ne trumpas infekcijos laikotarpis.

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