EARLY MEDIEVAL CEMETERIES AND LIVING CONDITIONS IN SIGTUNA, SWEDEN

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Sigtuna is situated at a branch of the Lake Mälaren in eastern central Sweden (figure 1), about 35 km north of Birka and 35 km south of Gamla Uppsala (Old Uppsala). The town stretches along the south shore of a rocky and wooded strip of land, between two passages leading up to Uppsala. Sigtuna is the oldest - still existing - town in Sweden, founded in the 970th or 980th. Primarily, it was not a trading town, but a stronghold created by the king Erik Segersäll in his quest for power in the Lake Mälaren region. A mint, the first in Sweden, was set up in Sigtuna about 995 by his son king Olof Eriksson "Skötkonung". Extensive archaeological excavations have shown that the town was founded according to a predetermined plan (Tesch 1990, 1996, 2001b). In time Sigtuna succeeded the Viking Age proto-town Birka and preceded the 13th century town Stockholm. The foundation of the town was an important step in the development of the "Swedish realm" and made Sigtuna comparable to other contemporary larger settlements in Western Europe. From the 10th century and over the next 300 years it was the leading Swedish town and the largest and most densely populated place in eastern Scandinavia.

Figure 1.
Map showing the location of present day Sigtuna.

The town was also a central place for the Christian Church. A diocese was established in Sigtuna about 1060 by the archbishop of Bremen. Six or seven stone churches were erected before the middle of the 12th century. In 1237 a Dominican Friary was founded and the Dominican church St Mary is one of the oldest brick-buildings from medieval Sweden. The Sigtuna bishopric ceased by the middle of the 12th century, but a deanery remained. In the 14th century, after Stockholm had emerged as the new ´capital´ of the region, Sigtuna became a mere shadow of its former self.

This article is an abbreviation and a reworking of a longer article (Kjellström, Tesch & Wikström 2005). The original article deals with archaeological material from excavations made on 11 different occasions from 1983 to 1999 (nine rescue and two research excavations). The total number of excavated graves studied was 574, distributed between six churchyards and burial grounds. After the article was published a new excavation was carried out in the block Humlegården in 2006. This excavation turned out to be the largest one so far on a churchyard in Sigtuna. In total 220 graves were excavated, which has increased the number of excavated graves to almost 800 (or a 30% increase). The results from this excavation are still under processing and the report is due in the spring of 2008. No results from the excavation are presented in this article but some results will be presented at the Medieval Europe Conference in Paris 2007. The main focus of this article is instead to highlight the general living conditions in Sigtuna during the period based on graves studied in the doctorial thesis. The joint results of archaeological and osteological investigations are combined. Also comparisons between broad temporal phases are made to investigate trends in health and social structure through time.

SIGTUNA - THE CHRISTIAN TOWN

The period from the foundation of Sigtuna to the end of the middle Ages is long. It covers more than 500 years - the Catholic period - from the time of missionary to the Reformation. During this time major social, economic and cultural changes took place in the society. For instance the 11th century Sigtuna was not the same town as the 13th century, which is the time when the real urbanization took place in Sweden. Church organization and burial practices also developed and changed, which makes it necessary to divide the period into different more discernable and comparable phases.

Tesch (2000, 2001a) has suggested a four-phase chronology for the development of the church topography in Sigtuna. Petterson (1995) and Tesch (2001b) has also presented a separate four-phase development for the profane buildings (1). However, the chronology of these two development systems does not coincide. The division of four development stages for the church topography is not even obvious in the grave material. Thus, using different morphological criteria (such as stratigraphic analysis, signs of mortar which indicate the presence of a stone church and the arm position of the buried), an allocation of the graves into three burial phases have been made. Three of the churchyards and all burial grounds (se below) were no longer in use in phase 3, which means that there is a strong overrepresentation of graves from phases 1 and 2. Since the grouping of the grave material into phases is based on criteria that can be considered relative to each other, it is also difficult to specify a chronological span for each phase. The stone churches were not constructed at the exact same time and the dating of some of the churches is vague. The time differences are, however, short and general comparisons between the different grave materials should not be affected. Since the year 2000 96 skeletons (18% of the total material) have been ^{14}C dated. The three burial phases are thus chronologically established and the results were used to verify the phases. It is these three burial phases that are in focus throughout this article.

There were among 8 to 10 churches in Sigtuna during the middle ages (figure 2); St Peter, St Mary (Mariakyrkan, the Dominican friars' church), St George (hospital), St Olaf, St Nicholaus and St Laurence. From archaeological excavations we know of at least two additional churches, Church 1 in the block St Gertrud and Urmakaren and Church 2 in the block St Nicolaus (se below). Furthermore, Churchyards have been discovered in the blocks Magistern and Kållandet but the associated churches have not yet been located.

In spite of the fact that archaeological excavations have been carried out in Sigtuna since the late 19th century our knowledge about the sacral townscape are in some cases still sparse (until now about 370 archaeological excavations have been carried out). The dating of and function of the

churches are still discussed (Tesch 2000, 2001a; Wikström 2005). One reason for the ongoing debate is that few archaeological excavations have been carried out in the churches. On the other hand, the churchyards are more excavated and until now over 800 graves have been examined. However, the distribution of excavated graves is markedly unequal among the churchyards. The churchyard in the block Kållandet only consists of four graves compared to over 300 graves excavated on the churchyard to Church 2. An approximate calculation of the total area of all the churchyards gives a number between 25 000 and 35 000 m². The most common size of a churchyard in Sigtuna was c. 2000 m^2, and the largest was S:t Laurence, approximately 6000 m^2. Based on archaeological results there were between 1,1 and 1,3 burials per square meter, indicating that 25 000 to 45 000 people may have been buried in Sigtuna from 970 - 1530. This number can be compared with the total number of excavated graves from the twelve excavations, about 800 graves; which is only c. 2 percent.

THE CHURCHYARDS AND BURIAL GROUNDS IN SIGTUNA

The block Nunnan: The excavation results from the block Nunnan are the best known example of how burial grounds looked like (sw. gravgård) (2). The graves are widespread almost without any overlapping graves. So far no delimitation of a burial ground has been found, but at least three different groupings can be discerned. The size of a single burial ground is about 800 to 900 m². Some of the graves have been dated from coins, from the late 10th century until the middle of the 11th century.

Church 1: Excavations show that the stone church was constructed already in the latter half of the 11th century, which makes it one of the oldest in the Mälaren area (Tesch 2001a, 9ff). A wooden church, probably constructed in the middle of the 11th century, preceded the stone church. The results also show that the stone church was torn down around late 13th century or in the beginning of the 14th century. The early destruction of the church explains the lack of written medieval records naming or describing it. The plan of the stone church is 28 meters long and 12,4 meters wide with an apse. It was constructed directly upon the walls of the nave. In the western part there was probably a crypt. The excavated graves come from the south, southeast and northwest parts of the churchyard close to the church.

Church 2: In the block St Nicolaus in Prästgatan about a hundred graves where excavated in 1991-92. Fragments of what are considered to be the remains of the ground wall to the southern wall of the nave were discovered. The grave material suggests early medieval graves at both a stone church and an older wooden church. There are also indications of even earlier graves from a burial ground. The results suggest that the stone church was torn down already during the late 13th century. The stone church was probably constructed in the late 11th century or in the beginning of the 12th century.

St Laurence: Today only the western tower is visible above ground, however, a part of the northern wall of the nave is indicated as a raised mound above ground level. The plan of the stone church shows a western tower, a nave and a straight apse. A rune stone with preserved paintings have been found in the masonry, which suggests that the church was constructed in the early 12th century (Bonnier 1987:21) although this date has been questioned (Redin 1997:598; Tesch 2000:22). The excavated graves come from the southeastern and southern part of the churchyard near the church.

St Olaf: St Olaf has been excavated in 2001, 2002 and 2004. The results showed that the area in an initial stage (ca. 980-1050) was a burial ground, but that a wooden church was constructed later (about 1050-1075). The wooden church was later replaced by stone churches (Stone church I founded about 1075, Stone church II founded in early 12th century to the reformation) (Fogelberg & Tesch manuscript). The excavated graves are located in the south-western part of the churchyard.

Church 3: In the block Magistern, was excavated in 1992, 1997 and 1998, the presence of a stone church is suggested by graves with mortar in the filling (Wikström and Kjellström 2005).

The positions of the arms indicate that at least part of the churchyard have been used in high- and late middle Ages. The excavated graves are located south of the possible church.

Figure 2.
The burial ground and churchyards mentioned in the present paper. 1) The Block Nunnan 2) Church 1 3) Church 2 4) St Laurence 5) St Olaf 6) Church 3.

BURIAL PHASE 1 (ABOUT 970-12TH CENTURY)

The grave material and the finds from the settlement area makes Sigtuna stand out as a fully Christian town from the time of its foundation. About twenty Christian burial grounds lay in a wide half-circle behind the settlement. Graves from three of these burial grounds (the block Nunnan) have been excavated. One prevailing opinion is that there were no wooden churches in the early town and that there were no in the countryside either. It was not necessary to have a special sacred building when celebrating Christian mass. Of importance was to have a sacred altar, with a reliquary inside, to put a chalice and a paten on (Stolt 2001). Finds of sepulchral stones used in small portable altars as cover for the reliquary suggest that mass was celebrated in the hall building situated in the far end of each town yard. The use of the hall as a room for Christian ceremonies was a transformation of the pagan use of the chieftain's hall as a central place for the cult. (Tesch 2000, 2001a, 2005). At this time the grave fields on the countryside were also transformed into Christian burial grounds (Tesch 2000). In Uppland this syncretistic use of pagan grave fields seems to continue until the middle of the 12th century (Andersson 2004). The use of syncretism in this phase is illustrated by the fact that an apparently Christian person could be buried beside a pagan grave and by the mixture of "grave language". An excellent illustration of how an old grave field was consecrated to Christian burial ground has been excavated in Valsta about 10 kilometres southeast of Sigtuna (Andersson 2004:39ff).

During the second half of phase 1, when Sigtuna had become a bishop's seat, there are some indirect proofs of wooden churches in the town. Probably the first one to be constructed was Church 1. After a few decades it was replaced by a stone church. Bonnier (1989, 11) thinks the

supposed wooden cathedral ought to have had considerable proportions, since it should have had room for the Christian population in the missionary diocese. A related theory is emanating from the inscription on a runic stone found in front of the high altar in St Peter in Sigtuna. The stone is made of sandstone and has probably been used as a grave-slab. It is dated to the last quarter of the 11th century or to about the beginning of the 12th century. The inscription is fragmentary because the edges have been cut away; "Sven…carved the stone…who brought her to Sigtuna". The usual interpretation is that Sven brought the remains of his wife to Sigtuna to be buried on a Christian churchyard. This is meant to reflect a time in the missionary period when there were few churches, especially in the countryside (Snœdal Brink 1983). The interpretation could be right, but there are also several documented examples where Christian village people continued to be buried at nearby Viking Age burial grounds until the middle of the 12th century. At this time the earliest Romanesque churches were built in the countryside. In addition, Christianity at this early stage was a private matter and therefore mainly embraced the upper level of the society, the magnate families and the farmers that erected rune stones.

Of special interest when discussing the inhabitants of Sigtuna is the importance of the eastern contacts. Dynastic ties and political alliances between the Swedish kingdoms and KievRus and west-Slavonic principalities is well testified. Many rune stones tell of journeys eastwards to both Gårdarike (KievRus) and Miklagård (Constantinople). The old sagas and poetry of Iceland also mention Sigtuna in connection to journeys to Gårdarike. It is thus likely that a large part of the journeys eastwards from mid-Sweden departed from, and returned to, Sigtuna. Hence, it is not strange that Sigtuna is the foremost site in Scandinavia where most finds from 11th and 12th century Rus and Byzantium have been excavated.

BURIAL PHASE 2 (12TH-CENTURY-14TH CENTURY)

The kings´ power position in the lake Mälaren region had varying success during the 12th century. The elite was composed of magnate families loosely affiliated through marriage alliances and family ties. The church organization was weak and the members of the elite exploited it. A strong ambition to express power is demonstrated by the construction of all the Romanesque stone churches in Sigtuna and the hinterland.

As mentioned above the first stone church to be constructed was Church 1 1080. During the 12th century all churches were constructed along a new street, parallel and north to the main street, and in the same area as the line of graveyards. The churches topography reflects an intention to create a sacred ceremonial townscape for ecclesiastical processions. It also reflects the idea of the holy and heavenly city. All churches played a part in a lithurgic drama where each church had its special function and ceremonial meaning.

It seems likely that the powerful families who constructed the churches also were buried inside or at the south wall of the church. After some time the town example spread to the hinterland and stone churches were constructed by other powerful families, 4-5 miles from Sigtuna which may have been the extension of the Sigtuna diocese. By now there was also a good deal of prestige connected with being buried in one of the Sigtuna churchyards, at the kings´ church, or at the bishops´ church and so on. Most probably the graves in this period are more mixed considering both the origin of the persons and their social position. The construction of at least six stone churches also meant that there were a lot of specialists in town during this time period; priests, master-builders organizing the work, stone masons, carpenters and other craftsmen. Most likely some of these people also passed away in Sigtuna and got buried on some of the churchyards.

In the beginning of the 13th century Sigtuna was still a flourishing town with a strong religious and social position demonstrated in the foundation of a Dominican friary, a St George hospital and a royal mint, but the town changed. As a consequence of the 4th Lateran Council in Rome 1215 the parish organization was strengthened during the course of the 13th century. Some of the private churches were converted into parish churches. St Laurence´s became the parish church for the towns' people, while St Peter's and St Olaf's became parish churches for the surrounding countryside. St Nicholas´, later known as the "Old Russian church", remained private until the

Reformation (Bonnier 1989). The other two or three churches were torn down. This means that the graves in the later part of phase 2 and also in phase 3 from St Laurence's, irrespective of phase and church, are the only graves we clearly can determine as belonging to town-residents.

BURIAL PHASE 3 (ABOUT 14TH CENTURY – THE REFORMATION)

During this phase Sigtuna became a town in its "true" sense. However, the town experienced a decline and stagnation, which seems to have started during the end of the 13th century. In the 14th century, concurrently with a general population decrease in Europe caused by several plagues and climatic deteriorations, Sigtuna declined in population size and the town lost its former status as an urban centre. After the Swedish Reformation in A.D. 1527 several churches were abandoned and left to decay and the friary was completely torn down, except for St Mary, which became the church of the town parish.

Phase 3 differs from the earlier phases by the fact that we now have access to some written sources. In spite of the written sources we know less of this period due to the fact that the archaeological material is very sparse. The main focus at archaeological excavations in Sigtuna has been on the timeframe 970-1300, mostly because very little archaeological remains exist from later periods and also because antiquarian authorities have focused on the earlier periods.

DISCUSSION OF THE OSTEOLOGICAL RESULTS

Describing the life of the inhabitants of medieval Sigtuna using osteological data is complicated. Several factors, like sample size and preservation, affect the representation of the sample reducing the possibilities for interpretations. Admittedly the size of the sample is small considering that six cemeteries and three long chronological phases are represented. One cemetery (St Olaf) contains nine individuals and phase 3 consists of only 38 skeletons. Some of the skeletons are in a very poor state and in some aspects the data are not unequivocal and sometimes even contradictory. Nevertheless, in light of the archaeological and the historical sources, the osteological remains of the inhabitants of Sigtuna have been brought to "life". The utilization of a health index has facilitated the interpretation of the health status of the people. The results show a generally negative health trend where the quality of life in Sigtuna declined through time. This trend is evidently more marked for women whose stature declined in combination with increased frequencies of infection while at the same time men had to endure more marked frequencies of cribra orbitalia..

CHILDHOOD HEALTH

Pathological traits such as cribra orbitalia (pathological lesions in the orbital roof due to dietary stress), enamel hypoplasias (LEH, enamel defects as a result from disturbed tooth development) and stature highlight childhood health in Sigtuna. Cribra is mainly to be found in younger children (Aufderheide and Rodreiguez-Martin1998:349). The results of the Sigtuna study suggest that children lived under rather harsh circumstances. For boys the situation seems to have gotten worse through time. On the other hand lower mean stature and higher incidence of enamel hypoplasias indicates that girls, to an even greater extent than boys, suffered from stress at least during the years of tooth development i.e. during approximately the first seven years of life. Both the incidence of cribra and LEH demonstrate that the children endured periods of stress. The lack of tibial periostal reactions among children may seem surprising. This suggests that the cause of the skeletal lesions differed between cribra orbitalia and LEH on one hand and infections on the other. Alternatively, with reference to the osteological paradox (Wood et al. 1992), it could imply that some children died before exhibiting any signs of infectious diseases. The combination of poor diet and infections may lead to early death.

In Sigtuna the imbalanced sex distribution among individuals with LEH got even larger and the factors leading to enamel lesions increased in number or got more intense through time. The

increase of LEH for both sexes is more obvious for permanent teeth, which imply that also older children suffered from stress. Apparently, during the initial phase the girls suffering from stress to a higher degree than boys. With time, more children were born and raised in the town leading to a general increase of cribra and LEH for both sexes, but still more marked for girls. This could be associated to the negative trend in stature for adult females.

The reason why children suffered from stress related changes may be connected to poor nutrition in addition to a more frequent exposure to infection and parasites in an urban environment. The absence of observed cases of bone infections such as periostitis of the long bones in children, suggests that severe diseases seldom reached a chronic state. The osseous material implies that mainly adults survived long enough for bone changes to occur. The demonstrated risen frequency of non-specific infections is elevated in the latter phases in Sigtuna. The negative trend in childhood health can be connected to intensification of the urban character with more densely populated streets implied by the archeological context.

ADULT HEALTH

An increase of anemia related lesions and infections in general suggest that the immune system of a population has decreased, which in turn may have had work-functional consequences (cf. Goodman and Martin 2002, 30). Behavioral or activity related alterations are also highlighted by skeletal changes such as degenerative joint disease (DJD) and trauma. However, the deviating outcome from the study of DJD and trauma in Sigtuna are intriguing. The proportions of adults with DJD in lager joints and lumbar vertebras increase meanwhile the frequencies of cervical and thoracic DJD decrease with time. This indicates changes in the physical labor and possibly a heavier workload. The somewhat different distribution of DJD between the sexes indicates gender related differences in physical labour.

The small sample size most probably affects the frequencies of trauma rendering the results difficult to interpret. Except for some women in a unique massgrave, it is obvious that no females with clear weapon related lesions can be identified.

The decreased dental health through time in Sigtuna may be associated with a change in diet, i.e. probably food rich in carbohydrates regarded a common cause of dental caries. Regarding caries (in phase 1 and 2) and ante mortem tooth loss (in phase 2 and 3) a prevailing female dominance is observed indicating gender related differences in diet.

Exploring the difference between the sexes concerning the varying traits, a society apparently favoring men is discernable. Most of the stress indicators (mean age at death, stature, LEH, caries, ante mortem tooth loss and non specific infections) imply that women more often than men were subjected to greater amount and (or) more intense, stress as reflected in higher frequencies of these traits.

All together, the examined health indicators imply a successive deterioration of health through time in Sigtuna, most obviously from phase 1 to phase 2, i.e. a change in living environment. This could be associated to the establishment of a true urban settlement in phase 2. The data for phase 3 suffers to some extent from the small sample size but a general trend is still discernable. Except for weapon related injuries (affected by the results from a phase 1 mass grave found at S:t Laurence in 1998) no obvious positive trends in health are discernable. Considering that the health deteriorated and showed a negative trend through the phases, some effects on the demography have to be expected. The sex distribution in Sigtuna is distorted with more men than women, which initially could be associated with the presence of the royal power. The distribution of age groups demonstrates, however, that complete families, i.e. both sexes of all ages, lived in the town.

The mean age at death depicts a rather young population. Paradoxically, the proportion of infant's increases in phase 2 while the birth rate was lower compared to phase 1. The birth rate index of the churchyard at Church 2, consisting of 59% individuals below 20 years of age showed the same result with lowered birth rate in phase 2 was displayed. An increased immigration of

adults to Sigtuna would lead to proportionally more adults than children, but still allowing for greater amounts of children to be born.

Since the health index value is the result of a more holistic process than merely comparing the relative frequency of traits, and includes adjustment for age, the results are even more complex. But the general outcome of the health index shows the same negative trend with time as the separate variables discussed above. It is suggested that increased immigration and the resulting population density in Sigtuna affected the health of the town people, possibly to the worse.

CONCLUSION

The archaeological and osteological results coincide in several areas. Signs of social ranking are suggested archaeologically by differences in burial practice. Differences are exposed between the cemeteries in each burial phase. In the block Nunnan the many graves with coffins and with charcoal imply a more elaborate way of burial practice. The smallest amount of graves with coffins is excavated at St Laurence from all three phases. This could imply that those buried in the block Nunnan had a higher social rank compared to those buried at St Laurence. The osteological results show that the general health was better in the block Nunnan and that the women at this site had the highest mean stature of all the women in the study.

Already in phase 1 artifacts suggesting foreign contacts appear in the burials. Furthermore, the foundation of the stone churches and other institutions highlight the varied presence of craftsmen and clergymen. The osteological analyses verify the archaeological results in that an increase of adults is shown from phase 1 to phase 2 and a deterioration of health indicates a more densely populated town.

The negative health trend seen in the osseous material is demonstrated through several parameters. Both the osteological and the archaeological material suggest that changes in workload emerge in phase 2. It is suggested that this change is due to a more specialized handicraft. Thick layers of waste from professional craftsmen are common in phase 2. The emergence of master builders, stone masons, carpenters and priests are demonstrated by the extensive construction of stone church. This is a strong indication of immigration, i.e. specialized craftsmen. It might also imply a more differentiated society with a more varied composition of people living in Sigtuna.

The osteological results suggest that especially the health of the women declined from phase 1 to phase 2. Furthermore, there may have been differences in diet and workload between the sexes demonstrated in the increased frequencies of caries and DJD respectively. In general, the male dominance seen at five of the analyzed cemeteries may be explained by the fact that the excavations in large have been carried out in the southern part of the churchyards (the traditional male side in some Scandinavian churchyards). The graves at the oldest burial grounds in the block Nunnan are not associated to a church, which may explain the even sex distribution at this site.

The results in this article highlight specific issues about the living conditions in Sigtuna. They are important since this town is the only urban settlement in eastern medieval Sweden with continuity from the Late Viking Age to the Late Middle Ages. Moreover, the results could be compared with contemporary urban settlements in Scandinavia such as Lund, Trondheim and Oslo.

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NOTES

1. The four-phase chronology for the development of the church topography is divided as follows: 1) 980-1050, 2) 1050-1100, 3) 1080-1200 and 4) 1200-1350
The four-phase chronology for the development of the profane buildings is divided as follows: 1) late 10th century, 2) 11th century, 3) 12th – 13th century and 4) 14th century

2. Throughout this paper a distinction has been made between churchyard and burial ground. The term "churchyard" is used were burials have been placed near a church, either a wooden or of stone (sw. kyrkogård). The term "burial ground" is used for burial areas without a church- (sw. gravgård) (Tesch 2000, 2001a). The term "cemetery" may denote both types of contexts. No pagan graves have been identified.