



30th Urban Archaeology Conference in Ribe, May 22-23, 2017

Landscapes of the Dead

ABSTRACTS

The archaeological potential of multi-isotope analyses

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Genomic History of the Vikings

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The Vikings are one of the most famous and well discussed group of ancient people in modern society. Their vast expansion during the 750-1050 CE had a prominent role in the history of Europe shaping the demographic structure of the continent. However, our knowledge of their expansion is largely based on historical sources and archaeological evidence, which alone cannot provide a comprehensive understanding of Viking demographic history and their genetic contribution to the formation of modern European societies.

With the advent of Next Generation Sequencing (NGS) technologies and the improvements of DNA sampling and processing methods, large scale ancient genomic projects became feasible which has proven to be the most powerful tool for addressing questions of demographic histories of ancient populations. In this project, we aim to genetically analyse fossils of Vikings excavated in Denmark, and adjacent countries in the north Atlantic and Scandinavia using genome wide NGS data. This will be used to reconstruct the genetic history of the Vikings by engaging in the following questions: (i) What is the pattern of genetic diversity of ancient Vikings and how do they resemble the gene pools of present day Europeans? (ii) Can we trace any admixture events in the areas where Vikings expanded? (iii) What were the routes of Vikings' migrations in the north Atlantic region? (iv) Is there any difference between the paternal and maternal genetic histories of Vikings? (v) Can we trace the demographic trajectories in terms of temporal changes in population size during the Viking expansions and collapse?

Aging Adult Skeletons: Recent Work Heralding a New Age

George R. Milner, Professor, Department of Archaeology, Pennsylvania State University

Accurate age estimates are essential for our understanding of past peoples, especially their population structure; disease experience; and mortuary practices, hence social organization. For juveniles, existing procedures are sufficient for these tasks. For adults, they are not.



Estimates are biased, underestimating age beyond about 50 years, and nothing can be done with individuals thought to have been older than that, except to say they were old. Much of interest to archaeologists and historians -- the length of life, the years of life lost through disease and trauma, a community's productive and reproductive capacity, and social and economic life-course changes – remains unknown without better methods.

Fortunately, researchers from Southern Denmark, Penn State, and Mercyhurst universities are developing through National Institute of Justice (NIJ, USA) funding a new age-estimation procedure, with a planned roll-out in 2018. Initial results indicate the NIJ procedure outperforms everything else developed over the past century. It is now possible to estimate age throughout the adult lifespan. For archaeologists, that is important because preliminary work shows that the most easily detectable differences in prehistoric and historic age-at-death distributions are found in the older segments (ca. >50 years) of these populations.

Osteological reports from cemetery excavations – value for money?

Jesper L. Boldsen, Unit of Anthropology (ADBOU), Department of Forensic Medicine, University of Southern Denmark

Large parts of the area of medieval towns and cities have been used as cemeteries during the medieval and post-medieval periods. This means that human skeletons are among the most found in excavations.

Human skeletons are unique as a source of knowledge about life in the past. They give unbiased knowledge about the life of individual human beings in the past. This does not mean that samples of skeletons necessarily give unbiased knowledge about populations in the past. Age estimation of individual skeletons must be accurate, precise and unbiased in order to use samples of skeletons to create knowledge about life in the past.

The routine documentation of skeletons from archaeological excavations contained in the site reports from ADBOU is based on state of the science methodology. In particular, the age estimates in ADBOU site reports are in a category of their own. The fact that research at ADBOU is leading in age estimation and epidemiological disease diagnostics from skeletons makes the ADBOU reports an unsurpassed source of information both for research and for communication results about life in the past through museum exhibitions. So, yes, osteological site reports do give value for money.

The Norse in Greenland and the big picture.

Niels Lynnerup, Laboratory of Biological Anthropology, University of Copenhagen

The remains of the medieval Greenland Norse provide a unique biological anthropological material for the investigation of human and environmental interaction. As a population, they were generally secluded from much of the contemporary European medieval society, and land suitable for their way of life was limited in Greenland. The archaeological and historical record is excellent, clearly establishing the 500-year period of colonization. In other words: the



Greenland Norse represent a relatively isolated population, constrained in both space and time.

Living in an environment with very little buffering capacities, climate and ecological changes immediately had repercussions. It seems that the Norse in Greenland responded to these changes, although inside “cultural” limits. Our stable isotope studies confirm shifts in climate and diet. Demographic modelling indicates that emigration may account for the final abandonment of the settlements. A changing climate thus seems to have driven the Greenland Norse out of Greenland. The presentation will focus on an integrative approach to the study of past populations, focusing on inter alia stable isotope data, climate data and paleodemographic and economic modelling.

Leprosy - two sides of a coin

Ben Krause-Kyora (PhD), Institute for Clinical Molecular Biology, University Kiel

Leprosy, a chronic infectious disease caused by *Mycobacterium leprae* (*M. leprae*), was endemic in medieval Europe, from where it almost completely disappeared in the 16th century. A recent ancient DNA (aDNA) study of medieval leprosy cases suggests that this decline is unlikely to be explained by mutations in the pathogen genome leading, for instance, to a loss of virulence factors. However, changes in host genetics over the past 500 years may well have played a role in the disappearance of leprosy in Europe. Here, we conducted an aDNA investigation in skeletal remains of individuals suffering from the severe form of lepromatous leprosy (LL) that were excavated from the St. Jørgen leprosarium (11-14th century AD) in Odense, Denmark. First, we generated ten complete high-coverage *M. leprae* genomes. Eight of the ten strains clustered and were very similar to extant types in European squirrels. Further, we analysed human leukocyte antigen (HLA) genetic variation in LL-positive individuals from St. Jørgen. To this end, we developed an aDNA method that targets the most polymorphic HLA class I and II genes. We showed a statistically significant association between HLA class II variation and LL-susceptibility in medieval Europeans.

“The City of the Dead” project – Ribe’s first inhabitants and the urbanization of North-Western Europe

Sarah Croix, University of Aarhus, Museum of South West Jutland

In this paper I will present new insights gained in the frame of the “City of the Dead” project, where the archaeological remains from Ribe’s oldest cemetery on the North side of the river (c. 700-850) were analyzed with the aim at shedding light on the first urban community in Scandinavia. To collect information concerning demography, place of origin, chronology and use of resources, a range of different methods was applied: osteology (human and animal); strontium isotope analysis; C14 dating; anthracology; computed tomography; XRF. As a trial experiment, a few samples for aDNA and protein analysis of dental calculus have been taken as well. The graves as complex archaeological contexts were studied in order to reconstruct



the ritual process, following the chain of actions undertaken by the mourners and the involvement of animals and things in this process. This approach was used to compare the various burial practices at Ribe's oldest cemetery with that of the surrounding and neighboring regions as a more effective means to assess cultural affiliation than object provenience or the schematic typologies of burial customs often used. As a result, I will argue that the buried population reflects a permanently settled community which, despite being locally anchored, show strong cultural connections with the neighboring regions south of the Danevirke. This contributes to the more general discussion of Ribe's character in the first century of its existence and to the question of mobility and multi-culturalism as a characteristic of early medieval urban communities in North-Western Europe.

St. Mary's Cathedral between the 9th and 19th Century

Morten Søvstø, Museum of South West Jutland

Several excavations between 2008 and 2012 led to the discovery of a large (9000 m²) Christian cemetery dating to the Viking Age underneath the present day Cathedral Square in Ribe. Series of C14-dates to the 9th, 10th and 11th Century confirms that the missionary Ansgar was indeed the founder of the church, which for the first Century of its existence remained a minority religion in pagan Denmark. The paper presents both the initial phases of the Cathedral cemetery and its development over time. Several interesting burial patterns can be observed and very few would probably argue against that a cathedral and its cemetery is an extremely dynamic and challenging archaeological phenomenon.

Digitizing and analyzing Ribe's Franciscan Friary and its cemeteries

Maria Knudsen, Museum of South West Jutland

Ribe's Franciscan Friary (founded 1232) was completely demolished during the 16th and 17th Century and even the exact location was unknown until archaeological excavations in 1993 exposed a major part of the church. 582 burials both within and outside the church were documented on drawings along with complex building remains in many phases. As a part of the Velux project the excavation has been digitized opening up to new levels of understanding both the development and use of the complex and the associated cemeteries. Subterranean *sound boxes* and the positions of the burials reflect the architecture of the church and also the sex and age of the people buried there show some interesting results..

The presence of leprosy and tuberculosis in Ribe from Viking age to early modern time.

Dorthe Dangvard Pedersen, Unit of Anthropology (ADBOU), Department of Forensic Medicine, University of Southern Denmark

Leprosy and tuberculosis are chronic infectious diseases that potentially will affect the skeleton. It is possible through studies of well-preserved skeletal remains to trace the prevalence and spread of the diseases in the past. The two diseases are related through their



mycobacterial origin and it has been suggested that they have co-existed through history and that increases and declines of in the prevalence of the diseases in the past are connected due to natural vaccination brought about by host-pathogen interactions.

Bone lesions related to the two diseases were systematic recorded in the ca. 1093 adult skeletons available from Ribe dated to the period AD 850 – 1800. The degree of co-infection of leprosy and tuberculosis in Ribe in Viking Age, medieval and post-medieval periods was studied and related to the estimated prevalence of the two diseases in the same time periods. The aim was to clarify whether a pattern of association was seen in the increases and declines of the prevalence of leprosy and tuberculosis in Ribe.

Provenance isotopic investigations of archaeological human remains of large groups of individuals vs. single individuals

Professor, Ph.D., Karin Margarita Frei, National Museum of Denmark

Strontium isotopic investigations are often applied to archaeological human remains in order to identify if the individuals found at a certain site are of local or non-local origin. Depending on the research questions and the nature and amount of the human tissues preserved, the approach in which this technique is used can differ. For example, when large groups of individuals are found at a cemetery the aim of applying strontium isotope analyses is often to provide an overview of the size of the non-local population. For this purpose only one sample per individual is often used as to identify if that particular individual originated from the area he/she was buried at or not. However, in cases where scalp hair and/or nails are preserved our novel methods developments have recently allowed us to investigate in-detail mobility of the last months/years of a person's life. For this type of investigation several samples from the same individual are required. This paper aims at presenting some case studies using both types of approaches, and discusses the potentials as well as the limitations of such investigations.

Demography in Ribe

Peter Tarp, Unit of Anthropology (ADBOU), Department of Forensic Medicine, University of Southern Denmark

Almost 1500 skeletons from a 1.000-year period have been excavated in Ribe. These skeletons set the basis of the demographic analysis presented here.

Dividing the skeletons into three groups, Viking Age, medieval period, and post medieval period it is seen that the overall mean age at death increases over time.

A small dip in mean age-at-death is seen going from the Viking Age to the medieval period, however the number of Viking Age skeletons is fairly small. In both periods male and female survival is almost identical.

Going from the medieval to the post-medieval period life expectancy increases for both males and females. However, the life expectancy increases twice as much for females as for



males – six years vs. three years. This is almost the same difference that is seen in a present day society like Denmark with a difference in survival time at four years.

Burial Rites in Viborg – a Critical Analysis of the Skeleton's Arm positions from three Medieval Churchyards

Marie Haarup Rasmussen, ADBOU

Following the excavation and examining of many medieval churchyard burials, scholars have suggested that a chronological development of the position of the skeleton's arms have taken place. They observed four different arm positions: Arm position A (arms against the sides) which were suggested to dominate in the beginning of the medieval period. Arm position B (hands over pelvis) takes over and dominates from 1250 to 1350. Arm position C (lower arms parallel over stomach) dominates from 1350 until the mid-15th century, after which the arm position D (hands over chest) becomes the dominant position.

In this study presented, 744 graves from three medieval churchyards from the Danish town Viborg were analyzed. By observing the skeleton's arm positions and their stratigraphical interrelationship, the material from Viborg could not confirm this chronology. The material from the graves clearly indicates that the four types of arm positions were not in compliance with the expected chronology. Therefore, this disagreement must urge to a re-evaluation of the proposed theory of a chronological change of arm positions during the Medieval Period, leading to a new consideration whether the attitude towards death might give an explanation to the various arm positions.

The population chemistry of Ribe – Results of trace element analysis of skeletons from Ribe.

Lilian Skytte, PhD, Postdoc in CHART at SDU.

The skeletal material of past populations is a unique source of information about the individuals in these populations. 430 individuals found in three excavations in Ribe – around the Cathedral and in and around the Franciscan friary, have been analyzed for trace elements of various kinds. Here I will present our finds of mercury in relation to the health and medicinal status of Ribe, and of lead in relation to social status and availability of artifacts with lead. Results will be compared to other populations in Denmark.