Building a new understanding of immigration, diet, and health during the early medieval period: Assessing the maternal and infant health of Anglo-Saxon immigrants  (Ref IAP2-18-181)

Durham University In partnership with SUERC, Glasgow University, CASE partner Oxford Archaeology East

Supervisory Team
- Prof. Janet Montgomery, Durham University
- Dr Philippa Ascough, SUERC, University of Glasgow
- Dr. Elizabeth Popescu, Oxford Archaeology East
- Dr Rebecca Gowland, Durham University
- Dr. Darren Gröcke, SIBL, Durham University

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1. Anglo-Saxon diet, 2. mobility, 3. stable isotopes, 4. high-resolution dentine collagen, 5. IRMS

Overview
This project aims to understand diet, health, and mobility in early medieval Britain during the Adventus Saxonum. This is a period of reputedly large-scale migration and social change that is crucially important to understanding our human past, but for which there are key gaps in our knowledge. For example, we know from ancient DNA that females migrated great distances from continental Europe, but not how this fits into society at the time. The student will perform cutting-edge, new methods of high-resolution carbon, nitrogen and sulphur isotope analysis and radiocarbon dating of infants, children and adults excavated from two 5th-6th century AD cemeteries in Cambridgeshire, UK. These are geographically close but have very different demographic profiles and funerary assemblages. Migration during this, and the preceding Roman period, has tended to be characterised as a predominantly male endeavour. Female mobility and the impact on maternal and infant health has largely been overlooked until now. By reconstructing the life histories of these people, the student will build a new, high-profile understanding of how societies functioned at this time. This project resonates strongly with contemporary debates concerning the migration of women and children, as well as ethnic assimilation within their host community.

The research sites
Oakington is a large 5th-6th century AD cemetery (Fig. 1) that was virtually complete and undisturbed when excavated. 124 individuals, including double and triple burials (Fig. 2), were recovered with many female gendered grave goods. By contrast, just three spearheads and two shields were recovered. Over 27% (35) of the individuals were aged under five years old (Mortimer et al. 2017).

Figure 1. A site plan of Oakington Anglo-Saxon cemetery.

Hatherdene Close is a large, complete 5th-6th century AD cemetery of 126 individuals, with, like Oakington, many grave goods and double/triple burials. Unlike Oakington however, many more artefacts were from male burials with 18 spear heads and six shield bosses.
Around 18% (25) of the individuals were aged under five years. (Ladd & Mortimer 2017).

Figure 2. A triple burial of an adult, adolescent and child at Oakington

Previous and future work
Ancient DNA analysis at Oakington has identified individuals mapping to both indigenous Iron Age people, and the continental Dutch as well as hybrids of these genotypes (Schiffels et al. 2016, Schiffles & Sayer 2017). Of particular interest is the fact that the migrants identified were women, not elite warriors. These 6th-century individuals were buried in similar ways and with comparable objects. Despite their different biological heritage, they were treated the same in death, becoming part of the community and the narrative that early medieval families used to construct their identity. A ground-breaking paper has already identified the importance of death in childbirth and female fertility at Oakington (Sayer & Dickinson 2013), providing the starting point for this project. Further aDNA work and modelling of tooth metrics is planned from the sites during the project to assess the extent of migration, biological/familial relations and population diversity, and the student will collaborate with researchers from the Max Planck Institute for the Science of Human History and the University of Central Lancashire.

The current project
The Oakington project is the only comprehensive research-led excavation of an early Anglo-Saxon cemetery for the last 20 years. Alongside Hatherdene, this project provides an unparalleled opportunity to explore two well preserved, recently excavated sites within 10 miles of each other.

Figure 3. Contrasting δ13C and δ15N dentine collagen profiles for two early medieval individuals from West Heslerton, Yorkshire (Beaumont et al. 2014). Both were eating largely terrestrial protein, i.e. δ13C > -20‰ (the green line). A has high δ15N in infancy suggesting breastfeeding and/or stress and raised δ15N after the age of c. 5 years. B shows a period of nutritional or physiological stress after the age of 13 years with raised δ15N and lowered δ13C (Beaumont & Montgomery 2016).

Though geographically close, the two cemeteries are quite distinct with different proportions of male/female gendered artefacts, numbers of infant burials, and multiple occupancy graves. This allows the student to investigate migration and feeding practices of infants alongside aDNA, including how migrants integrated into local communities. Specifically, the study will investigate early life stresses and feeding practices from mothers and children (Fig.3), comparing those who survived to adulthood with those who died prematurely. Individuals will be radiocarbon dated where justified: there are currently only eight dates for Oakington and none from Hatherdene.

Methodology
The project will produce δ13C, δ15N and δ34S profiles from teeth of infants, children and adults to compare in utero and childhood dietary life-histories from those who survived to adulthood and those who did not. It will start with a literature review, familiarisation with
human teeth sampling methods and mass spectrometry. Fieldwork will involve the collection of modern environmental samples (plants, waters, soils) from the Cambridge region to provide background data for human and animal samples through visits in collaboration with excavators Dr. Elizabeth Popescu, Head of Post-excavation and Publications, Oxford Archaeology East (CASE partner) and Dr. Duncan Sayer, University of Central Lancashire. Statistical data analysis will be interpreted within current knowledge of human responses to dietary, growth and nutritional change and isotope variation in the biosphere.

Timeline

Year 1 - Background reading and familiarisation with past and current research to investigate human diet, physiological status and residence at relevant time periods. Visits to study sites to collect environmental samples and assess the skeletal collections to devise sampling strategies for both. Apply for sampling permissions and collect archaeological teeth.

Year 2 - Main analytical work and data analysis in the Isotope Preparation Laboratories and Stable Isotope Biogeochemistry Laboratory at Durham University. Draft thesis background and methods chapters. Draft papers comparing biosphere sulphur isotope variation and mother and infant early life experiences at both sites. National conference presentation.

Year 3 - Complete analytical work and data analysis. Draft overview paper of comparative archaeological study and complete results and discussion chapters. International conference presentation.

Year 3.5 - Produce final thesis draft and submit.

Training & Skills

The student will work under the guidance of experts in Anglo-Saxon and funerary archaeology, human osteoarchaeology and high-resolution dentine stable isotope analysis in an Archaeology Department ranked 5th globally (World University QS Rankings 2018). The cross-faculty supervisory team at Durham are already collaborating on this subject. The student will benefit from the recent acquisition of a new IRMS in SIBL dedicated to sulphur isotopes and will be trained in sample preparation for δ¹³C, δ¹⁵N and δ³⁴S, measurement by IRMS, data analysis and uncertainty, with training in human osteoarchaeology and the selection of samples for isotope analysis. The student will gain experience in working collaboratively in a cross-faculty team and within a large and research active Bioarchaeology Group in the Department and with external institutions and commercial units. They will have opportunities to present their findings in a variety of forums to gain communication and networking skills. The PhD project is part of an international research community investigating the project cemeteries including aDNA analysis and the student will thus benefit from significant networking opportunities. The student will have the opportunity to attend lectures in Early Medieval Archaeology, bioarchaeology and archaeological science. The student will be encouraged and supported to present their research at key national and international conferences and to develop an academic profile as a specialist in isotopic analysis of humans in addition to contributing to the considerable public outreach opportunities that already exist at Oakington.

References & Further Reading


Further Information

For further information, contact Prof. Janet Montgomery