

ABSTRACTS

modern times and in the past. This research aims to identify osteoporosis in osteological assemblages in order to begin to untangle the factors that contributed to the presence of this condition in the past. Adult individuals with well-preserved vertebral columns ($n=79$) from three medieval burial grounds located in and around Cambridge, UK were assessed using Genant's semi-quantitative method to identify vertebral fractures. Significantly more vertebral fractures were found in old adult males (>60 years old) than in younger male individuals. However, this trend was not identified in females. This data was then compared to measures of mineral quantity of the trabecular bone in the femoral head ($n=115$), as quantified by micro-computed tomography. The micro-CT analysis of the femoral head indicated that females have greater bone loss with age than males. A subset of individuals ($n=47$) were examined to assess the relationship between the presence of vertebral fractures and bone loss. No correlation was identified between the incidence of vertebral fractures and trabecular bone loss in the femoral head in males or females. These findings highlight the difficulty of evaluating the health burden of osteoporosis by assessing fracture patterns in archaeological assemblages as low bone mass does not always result in fractures, and high bone mass does not always prevent it.

The After the Plague project is supported by the Wellcome Trust (Award no. 2000368/Z/15/Z).

Analysing the occlusal wear of the hominins of Sima de los Huesos

JESSICA AM. DOLDING-SMITH^{1,2}, ANNA F. CLEMENT³, PATRICK MAHONEY², SIMON W. HILLSON³, JUAN-LUIS ARSUAAGA⁴, JOSÉ MARÍA BERMÚDEZ DE CASTRO⁵ and MARÍA MARTINÓN-TORRES^{1,5}

¹Anthropology, UCL, ²School of Anthropology & Conservation, University of Kent, ³Institute of Archaeology, UCL, ⁴Centro de Investigación de la Evolución y Comportamiento Humanos, Universidad Complutense de Madrid, ⁵National Research Centre on Human Evolution, CENIEH

The occlusal surface of a tooth can provide evidence of past behaviour. In general terms, occlusal wear decreases through time, with industrialised modern humans having low occlusal wear because of the greater reliance upon processed foods. Neanderthals are thought to have exceptionally heavy occlusal wear, due to high mechanical loading from paramasticatory and masticatory behaviour.

Here, we compare occlusal wear of hominins from Sima de los Huesos (SH, $n=19$) to Neanderthals ($n=21$) and modern humans (Middle Palaeolithic, $n=5$; Upper/ Early Epi-Palaeolithic, $n=26$; Igloodik Inuit $n=79$; 19th-20th-century Madrileños individuals, CMH, $n=14$). The SH are thought to either be early Neanderthals or closely related to them, and

share a number of cranial and dental traits with both Neanderthals (e.g. shovel-shaped incisors) and modern humans (e.g. frequent absence of the hypoconulid).

Results deviate from the general and expected trend. The SH group had more wear on their upper I1 compared to Neanderthals ($p=0.022$), but not modern humans ($p>0.05$). We find that SH upper P3 is more worn than all other groups ($p<0.05$), except CMH ($p=0.201$), potentially pointing to masticatory behavioural differences. The mandibular dentition of the SH was significantly more worn compared to Neanderthals (C-M2, $p<0.05$), Inuit (I1-M2, $p<0.05$), and CMH (M2, $p=0.030$). It may be that SH were using their mandibular dentition less for paramasticatory activities or that the lower age range of the SH hominins used in the mandibular group meant that they generally had less wear.

Dirección General de Investigación of Spanish Ministerio de Economía y Competitividad (MINECO)/FEDER grant number: CGL2015-65387-C3-2-3-P and The Leakey Foundation (personal support of Dub Crook and Gordon Getty to author MM-T).

Sacrococcygeal fusion and its implications with age estimation and sexual dimorphism

PAULINA DOMINGUEZ ACOSTA and HANNAH N. TREVIÑO

Anthropology, Texas State University

Age and sex estimation are increasingly less accurate and precise as age increases due to degenerative changes on the skeleton. Tague (2011) uses sacrococcygeal fusion to estimate age, also to understand how sexual dimorphism affects sacrococcygeal fusion. Results provided by Tague (2011) and Passalacqua (2009) show conflicting conclusions on whether sacrococcygeal fusion is related to age. Both studies lack a large sample size for individuals over 80 years and have considerably less females than males. This research includes a preliminary examination of the methods Tague (2011) used to analyze sex and age correlation of sacrococcygeal elements. An analysis of the pelvic measurements, fusion rates between the sacrum and coccyx and the number of fused coccyx elements were conducted for this study. The individuals analyzed are from the Texas State Donated Skeletal Collection. Fisher's exact test were used to determine statistical significance.

Preliminary analysis of 30 individuals from a random sample yielded significant ($p=.01404$) results between male, female and the sacrococcygeal fusion, but no overall significant differences in age. There is also a significant ($p=0.0001935$) relationship between sacrococcygeal fusion and the number of coccyx elements fused. We did not find any significance between age cohorts; this could be due to the small sample size that was

utilized for the preliminary analysis. The final goal of this study is to include more females, as well as individuals from different age cohorts, to analyze if age is also a contributing factor to sacrococcygeal fusion.

Age-at-death estimation from features of the first rib

ELLEN DOOLEY and SEAN D. TALLMAN

Forensic Anthropology, Boston University School of Medicine

Several techniques for estimating adult age-at-death are used in biological and forensic anthropology, including morphological changes of the ribs. However, due to human variation and taphonomic damage, it remains difficult to produce accurate and meaningful age-at-death estimations based on skeletal remains. This research further explores morphological changes to the first rib, which is easily identifiable and relatively robust, including the costal face and tubercle facet identified by Kunos' (1999) and modified by DiGangi et al. (2009). A total of 400 European American individuals ($f=200$; $m=200$) from the William M. Bass Donated Skeletal Collection at the University of Tennessee, Knoxville, were observed using modified descriptions for Kunos' (1999) five traits of the costal face and tubercle facet on an ordinal scale of 1-8. Additionally, bone quality was assessed on an ordinal scale of 1-3 and was incorporated as a variable in order to improve estimations. Spearman's correlation coefficients demonstrate that all eleven traits correlate with age at a statistically significant level, with bone quality being the most significant feature, and the tubercle facet surface topography being the least significant feature for both sexes. Further, female and male differences were found, and cross-validated ordinal logistic regression equations are presented for females, males, and pooled sex. The results of this research underscore the importance of developing age estimation methods on skeletal regions that are under researched and for those that are more resistant to taphonomic damage.

Funding for this project was provided by the program in Forensic Anthropology at the Boston University School of Medicine.

Using remote sensing and machine learning to reconstruct paleoenvironmental features in the Koobi Fora Formation

ELIZABETH R. DORANS¹, JOÃO D'OLIVEIRA COELHO^{2,3}, ROBERT L. ANEMONE⁴, RENÉ BOBE^{2,5,6}, SUSANA CARVALHO^{2,3,5,6}, FRANCES FORREST⁷ and DAVID R. BRAUN⁸

¹Biological Sciences, Vanderbilt University, USA, ²Primate Models for Behavioural Evolution Lab, Institute of Cognitive & Evolutionary Anthropology, University of Oxford, Oxford, UK, ³Centre for