

ABSTRACTS

218 calcaneus fragments for a total of 876 bone fragments scored. Regarding the nature of the repeated activity, we predicted that enthesopathies will highlight bilateral differences on the five different bones based on the genuflection stance (left leg forward, right leg back). Overall, there were several enthesopathies on the bones scored; however, bilateral differences were not heavily prevalent.

A novel method for collecting primate orbital volume in 3DSlicer

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This project proposes a novel method for the collection of orbital volume (OV) in the open-access post-processing software 3DSlicer. Traditionally, OV has been collected by 1) physically filling the orbit of cadaveric specimens/dry skulls, 2) collecting 2D measurements, and 3) by using 3D segmentation software on digital reconstructions of the skull to measure the orbital cavity. Previous literature has highlighted the need for a consistent and anatomically informed way of closing the anterior orbital aperture. The current lack of consistency may affect volumetric measurements, introducing error into studies of shape and size of the orbit. The semi-automatic method proposed here efficiently closes the anterior aperture by mapping a curved plane to user-defined points representing the fluctuating depth and projection of the orbital margin. An iterative semi-automatic segmentation of the cavity is then conducted to collect orbital measurements (e.g., volume).

A step-by-step workflow is presented here along with solutions to common sources of potential error such as the nasolacrimal canal and incomplete orbital walls. A measurement error study was conducted using multiple species of anthropoid primates. The orbit was segmented in three separate trials. Because of the range of species sizes, error was evaluated using a coefficient of variation (CV). For the dependent variables *orbit surface area* and *aperture circumference*, CV was well below 1% for all individuals. For *orbit volume* and *aperture area*, CV ranged up to 1.7%. This semi-automated method for segmenting the orbital cavity increases efficiency and repeatability and is freely available through the open-source software 3DSlicer.

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Enthesal changes and joint degeneration of upper limb bones in males and females in medieval Giecz, Poland

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Enthesal changes (ECs) and degenerative joint disease (DJD) in the upper extremity are often used as evidence of physical activity and handedness, and thus serve as indicators of behavioral patterns in past populations. The purpose of this research was to characterize ECs and DJD in upper limb bones in a medieval Polish population to identify patterns in sexual division of labor.

The sample included clavicles, humeri, and radii representing adult males (n=89) and females (n=53) from the early medieval (11th-12th c.) cemetery site, Gz4, in Giecz, Poland. Most entheses demonstrated a significant right-bias in both the sex-pooled sample and in each sex (p<0.003), except the conoid tubercle for females (chi-square test, p=0.194). Generally, side differences in ECs were not significantly related to sex, except the radial tuberosity (chi-square test, p=0.027), where males are ~5 times less likely to be scored "right" than females (nominal logistic regression, p=0.041). No relationship between side and DJD presence/absence was observed in the sex-pooled population or each sex (chi-square test). However, females demonstrated significantly lower odds of having DJD than males in the medial and lateral clavicle (68.3%, 48.2%), the distal humerus (43.7%), and the distal radius (58.9%) (binary logistic regression, p<0.05). This suggests that males may have engaged in more strenuous activities involving the upper limb. In addition, differences in radius ECs suggest sex-specific functional loading in the forearm distinct from the rest of the upper extremity, consistent with previous directional asymmetry findings in this sample.

A macaque model for the effects of admixture on body size

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Recent advances in genetics have shown that hybridisation occurred during human evolution, yet its morphological impact remains underexplored. Ancient DNA is a powerful tool but given the conditions required for its preservation, it is best used in combination with fossil morphology. Studies of non-human primates have suggested a signature hybrid morphology, which could be used to diagnose hybrids in the hominin fossil record. This signature may include extreme size, high levels of variation and markers of developmental instability, but how phylogenetic distance and admixture proportion affect these characteristics is unknown. Non-mammalian studies suggest extreme morphotypes are more likely in early generation hybrids and with greater divergence between parents. To understand the hominin fossil record, we must study admixture in taxa that approximate hominin hybridisation as closely as possible. Here, we use proxy taxa (Chinese and Indian *Macaca mulatta*) with comparable divergence time (in generations) to *Homo sapiens* / Neanderthals. Our sample is large, multi-generational and of known hybridity. Measuring crown-rump and limb lengths, we investigate the relationship between admixture and size variation, discussing these and further results. In contrast to previous studies in more phylogenetically disparate taxa and with more early generation hybrids, we find no individuals of extreme size, nor greater variation in hybrids than in full-bred taxa. We suggest that hybridisation between closely related taxa, such as Neanderthals and *H. sapiens*, may lead to more subtle morphological patterns than previously anticipated. However, investigation of the role of phenotypic, as well as phylogenetic, divergence is required.

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A noble childhood? Exploring the diet and health of high status individuals from medieval Stirling Castle, Scotland, through isotope analysis of incremental dentine

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Stirling Castle was a key garrison of the Scottish Wars of Independence, 1296-1328 and 1332-1357AD. In 1997, excavations at Stirling Castle revealed a lost royal chapel and eight burials that were radiocarbon dated to the 14th and early 15th centuries. Evidence of interpersonal violence, a preponderance of blunt-force injuries and scurvy within the sample suggests they may relate to the documented sieges of Stirling Castle. The significant burial location within a royal castle combined