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HIrisPlex (Walsh et al., 2013) is a statistical prediction tool of hair and eye color using 24 DNA variants influencing pigmentation. The tool was developed using European samples, with presumably predominantly European ancestry. Validation was performed using samples from the 51 worldwide HGDP-CEPH populations, who generally represent a single locale and single ancestry. Because HIrisPlex is targeted as a tool useful in forensic applications, it is imperative that its accuracy be tested on samples that represent the range of casework demographics.

Here, the prediction tool is used on a sample encompassing individuals with genetically estimated ancestries comprised of single origin ancestries (> 0.90) and individuals comprised of multi-origin ancestries (no single ancestry > 0.85). Mean accuracy of hair color (brown, black and blond) is lower (~71.2%) than reported in Walsh et al. (~78.5%). Mean prediction accuracy was greater for single-ancestry individuals than for those multiple-ancestry individuals. When exploring the effects of ancestry proportion on accuracy, Asian ancestry was significant, increasing accruacy. Although European ancestry was expected to demonstrate the greatest odds for misclassification due to the broad range of hair pigmentation, no significant impact on accuracy was found. These preliminary results indicate that 1) HIrisPlex does not perform with similar accuracy across broad ancestry groups and 2) individuals genetically estimated as having multiple ancestries potentially decreases the accuracy of the prediction tool. Therefore, genetically estimated ancestry likely influences the ability of HIrisPlex to accurately predict hair color, and integrating it as a variable in the prediction tool may increase accuracy.

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The influence of morbidity and socioeconomic status on the relationship between stature and mortality in industrializing London

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This study explores the relationship between skeletally estimated adult stature and mortality, and the effect of controlling for non-specific indicators of stress (cribra orbitalia and porotic hyperostosis, skeletal inflammation, and linear enamel hypoplasia) on that relationship, in two early-industrial skeletal samples from London, England (high status Chelsea Old Church, and low status Saint Bride's Lower), using the Cox proportional hazards model.

In the combined sample, short stature is associated with significantly elevated risk of death. The association does not persist when the effects of morbidity are removed, except in the case of skeletal inflammation. When sex and socioeconomic status are considered, short stature is associated with increased risk of mortality only in high status males. Again, the association is diminished by controlling for non-specific indicators of stress, with the exception of skeletal inflammation.

Results suggest that the relationship between stature and mortality may not be universal, and is likely dependent on sex, social status, and morbidity. An additive model that takes into account biological interaction between non-specific indicators of stress may help clarify the nature of the relationship between morbidity, stature, and mortality. Exploration of the juvenile component of mortality is warranted to determine if low status juveniles whose growth was severely disrupted were more likely to die before adulthood, and therefore not be included in this sample, than high status juveniles who were presumably better buffered from metabolic insult, as this could explain the lack of association between stature and mortality in the low status sample.

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Slaves at Stonebridge: Diet and health at the Stonebridge Site, Virginia

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The Stonebridge site in Midlothian Virginia is an unmarked African-American cemetery that dates from the mid to late 19th century. Although small with just six burials, its analysis represents an important addition to the growing body of information on the enslaved African experience in Virginia. This study uses stable isotope analysis of carbon and nitrogen from bone collagen to reconstruct diet, as well as evidence of antemortem pathologies to reconstruct the health of those interred at this cemetery. The health indicators employed here (enamel hypoplasias, dental caries, antemortem tooth loss, evidence of non-specific infection, and osteoarthritis) as well as the analysis of markers of occupational stress indicate that these individuals suffered from multiple episodes of stress and disease during their early developmental years and considerable musculo-skeletal stress during their adult years. The results of both the health and dietary analysis are then compared to other African-American cemetery samples from Virginia. While broadly similar, the diet and health of the Stonebridge individuals in comparison to other samples helps demonstrate the regional variability in diet and health in enslaved African- American populations in Virginia, and provides both a larger sample and a more comprehensive understanding of the experience in this dark period of American history.

Non-uniform osteocytic lacunae distribution across the femoral cortex

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Osteocytes, the most prolific of the bone cells, have increasingly been the focus of clinically based studies into bone health over the past few decades. As a major regulator of metabolic activity, these cells are fundamentally linked to the bone's ability to withstand normal and pathological insults. Osteocytic lacuna density (Ot.Lc.N/B.Ar) is used as a proxy for osteocyte cell density as empty lacunae are mineralized following apoptosis of its inhabitant. Previous studies have employed sampling methods limited to a specific anatomical region of the femoral cortex to examine age related changes. However, remodeling events demonstrate nonuniform distribution across the femoral cortex as well as variation with age. For this study, twenty male cadaveric mid-diaphyseal cross-sections were chosen based on nonsystemic causes of death subdivided into four age categories (<50, 51-59, 60-69, 70-79). Under bright field light, 40x total cross sectional images were obtained and divided into anterior, medial, lateral and posterior regions of interest (ROI) of standardized size. Using cellSens Dimension, osteocytic lacunae were automatically counted (and manually verified) over the entire cross-section as well as per ROI and normalized by cortical bone area (B.Ar). Results demonstrate intra-individual variation across the cortex as well as inter-individual variation in total count per sample and ROI density distribution based on age. Future research includes comparisons between intra-individual sampling sites (including rib and distal radii sections) and regional OPD. This approach has implications for the study of skeletal health maintenance in past and present populations.

Endocranial regions associated with deception in nonhuman primates

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Possible examples of deception have been reported in several species of nonhuman primates. Though exactly what constitutes deception has been heavily debated, some authors believe that unequivocal examples are prevalent throughout the literature. True deception requires knowledge of another individual's mental world and is often thought to be diagnostic of higher brain function and social complexity. The goal of this project was to assess if there are any features of endocranial shape that are predictive of the level of deception reported anecdotally in non-human primate species. Non-rigid deformation techniques were used to quantify localized variation in endocranial morphology across 16 non-human primate specimens using CT scans from the Open Research Scan Archive and the Smithsonian Institution. Examples of deception were taken from Byrne (1990) and correlated with the degree of localized distortion required to morph each species' endocranial form into a common atlas (*Pan troglodytes*). Initial results suggest areas of particular association with reported deception in the following endocranial regions: Broca's cap, temporal pole, lateral occipital, orbital frontal and occipital pole. Possible corrections for multiple comparisons

will be discussed, as well as the possibility that these patterns are largely driven by Pan troglodytes, which has both relatively large cranial capacity and high levels of reported deception in this sample. Possible implications for assessing cognitive evolution in fossil hominins will be discussed.

Intrinsic shape variation in the human femur: Evidence from Late Pleistocene Eurasia

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Recent research has shown that the shape of the human femur provides taxonomic information, even at low taxonomic level (Hutchinson 2013; Holliday et al. 2010). Three-dimensional morphometric assessment can differentiate archaic human and modern human femora most reliably when the entire bone is present while shape differences in the femoral articular ends are less distinct between these groups. This analysis investigates the levels of intrinsic shape variation in the proximal and distal femur among Neandertal and modern humans in order to better understand the low-level variation in the femoral articular complexes that consistently distingush the femora of Neandertals and modern humans.

Twenty proximal and twenty-six distal landmarks were registered on Neandertal and Late Pleistocene to recent modern human femora. Generalized Procrustes Analysis (GPA) was applied to standardize the shape data and create mean group 'shapes' using Procrustes residuals. Principal Components Analysis (PCA) and wireframe models were used to assess shape variation within and among the different human subsamples. Finally, Procrustes distances between specimens and samples were used to provide more rigorous statistical evaluation of the significance of shape differences within and among subsamples.

Variability in isolated portions of a skeleton is essential to understanding the morphological basis of systematic and functional differences between taxa. Further, compartmentalizing the sources of shape variation is important for identifying those portions of the postcranial skeleton that most reliably indicate taxonomic status.

An overview of intentional dental modification in Micronesia

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Intentional dental modification observed in bioarchaeological samples from Micronesia includes multi-linear incisions and horizontal abrading of the labial tooth surfaces in the Mariana Islands and tooth blackening in Palau. The social implications of deliberate tooth alteration have been the focus of past studies in the region, with little attempt to explore the biological implications, due to the small number of affected individuals. Cultural practices that expose the dentin or the dental pulp chamber, such as incising and abrading, are expected to increase an individual's risk of oral-dental infection. When protective tooth enamel, the hardest tissue in the body, is removed, dental decay can advance more rapidly in the underlying soft dentin, exposing the pulp. When the pulp is invaded by pathogenic microorganisms and their toxins, it can become inflamed. If left untreated, this will progress to pulp necrosis and infection, and subsequently spread to the surrounding alveolar bone (e.g., periapical abscess formation). To understand the biological impacts of intentional modification, we examined over ten pre-European Contact (pre-1521) dental samples from the Mariana Islands to test for a correlation between intentionally modified teeth and two indicators of oral-dental health, carious lesions and periapical abscesses. Although differences in data collection methods and poor bone preservation prevented the use of both indicators across the board, our preliminary results indicate that horizontal abrading in at least one sample appears to be associated with carious lesions while dental incising is not. We contextualize these results by comparing them with bioarchaeological data from the Pacific-Asia region.

Changes in fat and muscle patterning among Maya groups in the context of the epidemiological, nutritional and behavioral transitions

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The Maya families living in the urban areas of Merida, Mexico have been undergoing a rapid epidemiological, nutritional and behavioural transition. The aim of this poster is to analyse changes in muscle and fat patterning among Maya groups in Merida taking into account: i) age-related changes, ii) intergenerational changes (i.e. differences between children, mothers and maternal grandmothers and, iii) changes in the ratio of lower to upper body fat distribution.

Previous research suggests that central adiposity is more closely related with immune function and less susceptible to environmental modification than extremity fat. Our sample is composed by 109 Maya children (7.00-9.00 years old) their biological mothers and their maternal grandmothers from urban areas of Merida, Mexico. Fat and muscle patterning (obtained by measuring triceps and subscapular skinfolds) is analysed using the method of Healy and Tanner (1981) that involves logarithmic transformation, regression analysis, and principal component calculations to determine the changes in body size and shape. Results show significant differences in fat and muscle patterning among the generations that may be associated with the epidemiological, nutritional and behavioural transition. Results on regional fat distribution and central adiposity patterning also differ among generations and should be further clarified by adding additional sites of skinfold measurements.

The Holly Project: Continuing behavioral changes in a young adult female chimpanzee (*Pan troglodytes*) identified with sensory-integration difficulties

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In 2009, a young adult female chimpanzee (*Pan troglodytes*) was identified with sensory integration and processing difficulties at the Saint Louis Zoo. Holly was conspicuous in range and frequency of stereotypies, restricted social interactions, lack of rest times and poor occupational performance in routine activities. Holly's abnormal behavior tended to isolate her and affected group social dynamics, for example through avoidance behavior. A plan providing therapeutic intervention (TI) for Holly using human sensory integration theory was implemented during 2010 and 2011. Periodic monitoring of Holly's activities using interval sampling of focal individuals continued, allowing examination of changes in behavior and peer comparisons.

Throughout this project, stereotypies and social behavior were used as indicators of Holly's functioning. Following initial TI, Holly's stereotypic behavior dropped from 22% of activity to 6.5%, then rose again to 20%. Two years post-TI, the frequency was 12% of her observed activity. Holly's proximity to others increased following TI, with time spent alone falling from 20% pre-TI, to 7% at 2+ years post-TI. Social grooming increased from 20% pre-TI, to over 30%. Time being groomed remained low, but rose from 1.88% pre-TI, to 5.28%. One marked social change for Holly was time spent interacting with adult males, increasing from 5% pre-TI to 16% two years post-TI. Interpreting these changes in Holly's behavior can be problematic. Some appear related to TI, others to changes in social dynamics or Holly's maturation, though her behavioral profile remains distinct from peers. Differences continue to be observed between enclosure types.

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Can we predict mandibular kinematics from patterns of EMG activity in primates?

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The muscular system that controls mandible movement in mammals is highly redundant. For example, for a particular mandibular motion,