

ABSTRACTS

suggests that taphonomically-altered teeth lack the same structural integrity as preserved teeth and requires a dedicated protocol. Observed variation in cementum preservation resulted from fungus and bacterial invasion of the cementum layers; however, many regions of interest were still preserved and visible enough to estimate a minimum number of TCA for age estimation. This new protocol demonstrates that it is possible to yield usable regions of interest from highly taphonomically altered teeth for age reconstruction from archaeological remains.

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Comparative perspective on gaze during naturalistic locomotion in humans

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Human gaze behaviors are proposed to facilitate efficient striding bipedalism, minimizing the additional energy required to cross uneven terrain by targeting future footholds that approximate an individual's preferred stride length and timing. Whether these gaze behaviors evolved because of the shift to bipedal locomotion in hominins, evolved in basal primates along with other locomotor and visual adaptations, or are shared more broadly across mammals is impossible to determine without comparative data. Cats are the only non-human mammal with existing data on gaze during naturalistic locomotion, and research into their gaze during locomotion has demonstrated temporal correlations between stride cycle events and gaze behaviors like fixations. This study evaluates temporal correlations of human gaze during locomotion to provide comparative context for the evolution of human gaze behaviors.

Gaze and kinematic data were simultaneously collected as subjects crossed terrain of variable complexity ($n = 20$ strides). Gaze data were collected using a calibrated wireless infrared optical gaze-tracking system. A 90 millisecond (6 frame) threshold was used to identify fixations, a gaze behavior in which the subject's gaze remains stationary within their surroundings, allowing the collection of detailed visual information. Like cats, humans spent more time fixated on the substrate when crossing more complex terrain ($p < 0.01$). Unlike cats, humans showed no significant correlation between stride cycle events and fixations ($p > 0.05$), suggesting that the patterns of gaze during locomotion seen in humans is not broadly shared across mammals, though it may have evolved either in hominins or earlier primates.

Morphological differences in the macaque upper limb

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Currently, there are 23 recognized macaque species throughout Asia and northern Africa. Previous research has suggested that some species are taxonomically distinct morphologically, however, the specific ways in which they differ is currently unknown. As such, we explored which morphological aspects of the macaque upper limb contributed to their taxonomic differences.

Data included 3D surface scans from eight macaque species (*M. arctoides*, *M. fascicularis*, *M. fuscata*, *M. mulatta*, *M. nemestrina*, *M. nigra*, *M. radiata*, *M. sylvanus*) representing different geographic locations for 257 individuals. Fixed anatomical and semilandmarks were applied to three skeletal elements from the upper limb for each individual (scapula=66; humerus=38; radius=33), and a regression analysis was performed to minimize the effects of sexual dimorphism. Between-groups principal components analyses were employed to visualize the average morphological differences among species, distance matrices describing morphological and genetic differences were compared using Mantel tests, and least-squares Procrustes rotations based on 2D multi-dimensional scaling plots helped visualize whether morphology tracked genetic centroids for a given species.

Results suggested that different macaque species have unique morphology, which correlated with genetic distances. Some species like *M. sylvanus* and *M. fuscata* tended to be more morphologically unique for all three upper limb bones. *M. radiata* had a particularly distinct radius, while *M. fascicularis*, *M. mulatta*, and *M. nemestrina* tended to exhibit a more general macaque form. These results may be useful for paleoanthropological studies when fossils belonging to unknown taxa are discovered, as this work supports taxonomic distinction in the upper limb among closely related species.

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Evaluating cortical bone speed of sound (SOS) measured by a non-invasive ultrasound bone sonometer as an alternative age-at-death indicator for elderly: a pilot study

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Age-at-death estimation of the adult skeleton suffers from inaccuracy and bias due to decreasing predictability of traditional macroscopic age indicators past midlife. Of age-related changes in bone microstructures, the loss of cortical bone density is known to have onset past the 5th-6th decade of life which suggests its potential utility as an age-at-death estimator for the elderly. This study introduces the use of portable, medical quantitative ultrasound (QUS) that indirectly assesses BMD via the speed of sound-waves (speed of sound, SOS) traveling through radial and tibial cortical bone. The use of SOS as an objective metric to capture age-related bone loss on human remains is evaluated.

First, the applicability of QUS to human remains is assessed by comparing SOS values collected from intact anatomical cadavers and exposed bones of the same cadavers. Second, the study hypothesizes that the decrease in cortical bone density with increasing age is detected by SOS. A preliminary analysis on a pooled-sex sample ($n=26$) with ages ranging from 56 to 97 years indicates no significant difference between the intact-cadaver and exposed-bone SOS ($p=0.5$), suggesting its applicability to skeletonized remains. Piecewise regression indicates an accelerated decrease in the radial SOS past 91.5 years whereas the tibial SOS shows a steady decrease until 66 years followed by a gradual increase. Although SOS captures general age-related bone loss (and possible gain) in the oldest group, the study requires a larger, sex-specific sample representing more diverse age groups to fully evaluate the potential utility of QUS for age-at-death estimation.

More flex, more stress: Female stress responses to male social instability in wild *Colobus vellerosus*

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Success for female primates necessitates an ability to appropriately assess dynamic environments and scale maternal investment accordingly.