

ABSTRACTS

of pre-menarcheal impact loading history. In combination, tibial diaphyseal cortical bone and epiphyseal trabecular bone parameters identified differences in the timing of impact loading relative to menarche in premenopausal adult females. This whole-bone approach has potential to more accurately reconstruct lifetime loading histories from adult limb bones.

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Primate gait diversity: Comparing quadrupedal kinematics of lemurs in free-ranging and laboratory environments

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Laboratory studies are valuable for testing hypotheses related to the biomechanics and evolution of primate quadrupedal gait but may not fully reflect primate gait diversity in a natural habitat. We filmed quadrupedal walking of three free-ranging lemurs (*Eulemur flavifrons*, *Eulemur mongoz*, *Lemur catta*) at the Duke Lemur Center. We quantified the diameter and orientation of locomotor substrates using remote sensors and tested for the effects of substrate variation on gait kinematics (N = 117 strides). We then compared the results to published data on congeneric lemurs filmed in a laboratory setting. Consistent with data reported for lemurs filmed in laboratory settings, free-ranging lemurs preferred diagonal sequence gaits on all substrates, adjusted duty factor in response to substrate orientation, increased walking speed on inclined substrates, and did not adjust duty factor or limb phase in response to substrate diameter. Free-ranging lemurs did not significantly adjust limb phase in response to substrate orientation, though we lack comparable data on lemurs filmed in a laboratory setting. The consistency of gait type and limb phase across substrate types accords with our previous comparisons of wild versus laboratory platyrrhines, as does our finding that free-ranging lemurs use higher duty factors than those in laboratory settings, suggesting slower walking speeds in natural habitats. Future research will extend this analysis to strepsirrhines in their native ranges in Madagascar, where we expect increased variation in both substrate complexity and kinematic response.

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Oral pathologies of late Holocene populations from Volta Grande do Rio Xingu, Amazonia, Brazil (2,240 – 248 years BP)

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Archaeological studies based on material culture in the Amazon suggest that the economy of late indigenous groups was centred on consumption of cultivated plants complemented by gathering, fishing and hunting of wild foods. However, the Amazon forest covers a very vast area, with different phytosociology compositions and indigenous societies. It is hypothesized that the cultural responses and practices of different groups to the daily dietary needs be different, and different choices will produce different signatures on the teeth and health of these populations. In this study we approach the dietary patterns through bioarchaeology, with direct observations on the oral pathologies of human remains exhumed in the region of Volta Grande do Rio Xingu (Amazonia, Brazil), during the late Holocene (between 2,240 and 248 BP). A total of 114 teeth and, when present, mandibles, and maxillae of 13 individuals exhumed from five archaeological sites were analysed. Despite the problems with poor preservation of organic material in a Tropical Forest environment, it was possible to observe a high percentage of caries, calculus, and tooth wear. These results are compared with archaeological studies of the Maracá population (ca. 500 years BP) and with data on oral health from recently contacted indigenous groups from the second half of the 20th century. Results indicate that different eating habits can exist within the same type of subsistence pattern; and that different modes of food processing and consumption can trigger greater or lesser occurrence of oral pathologies.

Lessons from the coywolf (*Canis latrans* var.): patterns of mandibular integration in hybrid canids and its implications for the hominin fossil record

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Morphological integration allows for an organism's form to function as a whole through the coordinated variation of related developmentally or functionally traits. Previous studies of hybrid mammals suggest that hybridization reduces constraint on integration resulting in greater

morphological variability, and potentially more evolvable phenotypes. The hybrid eastern coyote and their parental taxa act as ideal models to further investigate this relationship since they naturally occur in the wild. Seventeen landmarks were collected from 3D surface scans of canid right hemi-mandibles (*Canis lupus*, n=30; *Canis latrans*, n=30; *Canis latrans* var., n=30). From the collected landmarks, interlandmark distances were extracted and a resampling technique was applied to control for the number of traits compared to number of specimens. Interlandmark distances were mean-standardized, and distributions of integration coefficient of variation (ICV) values were retrieved. Levels of integration between and within groups were assessed with the Mann-Whitney U test. Results indicate that the hybrid sample expresses an overall reduction of morphological integration compared to wolves in all modules (ramus, corpus, and whole mandible), and a slightly higher level of integration compared to coyotes. Both the corpus and ramus modules depicted significantly lower levels of integration than the whole mandible in all taxa. Overall, in canid mandibles, hybridization seems to reduce integration. A reduction in levels of integration in multiple mammalian taxa may reveal a consistent pattern which could have been expressed by early hybrid hominins as well. This could have been a catalyst for novel variation to evolve during hybridization episodes in human evolution.

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Examining the Influence of Psychosocial Stress on Telomere Length in NCAA Collegiate Swimmers

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Regular physical activity protects against cellular aging, but a recent study found shorter telomere length (TL) in professional swimmers compared to less active controls. Shorter TL is associated with increased cellular senescence and functional decline with age, suggesting swimmers may be at increased risk for age-related morbidity. Previous studies reported competitive swimmers face high levels of psychosocial stress, which, in turn, is posited to accelerate TL shortening. We hypothesize that competitive collegiate swimmers experience increased psychosocial stress, leading them to have shorter TL despite their active lifestyles.

We are conducting a mixed-methods study to examine whether TL differs between Division-1 and Division-3 NCAA swimmers (N=20 respectively) and their non-athlete counterparts (N=20) and if differences in TL is associated with