ABSTRACTS

Fisher-forager mortuary complexity during the African Humid Period: the view from Lothagam Lokam, Kenya

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Lothagam Lokam (formerly the Lothagam Harpoon Site) near Lake Turkana, Kenya records multiple episodes of human occupation between ~10,000-7,500 years before present (BP). First excavated in the 1960s, Lokam has also yielded one of the best-known assemblages of human remains from eastern Africa during the African Humid Period (AHP), a time of moist conditions, high lake levels, and long-distance hydrological connections. However, many questions remain about the site's context and scope, particularly because skeletons were recovered from surface erosional deposits. Excavations by the Later Prehistory of West Turkana project since 2017 have revealed a more complicated picture than previously reported: burials exist in many parts of the >100,000m^2 site, and individuals from different locations have yielded direct radiocarbon dates with calibrated ranges from 7426-7407, 7561-7540, 9535-9411, and 9537-9475 cal BP (95% CI, IntCal 20) indicating at least two periods of mortuary activity. These are among the oldest direct dates on human remains in eastern Africa. Recovery of 16 new individuals, most from primary interments, along with isolated remains brings the total number of individuals to ~45, providing insight on human morphological variation and lifeways during the AHP. Osteological analysis indicates that men and women ranging in age from young to old adulthood were interred in this beach. In 2022, we recovered the first remains of a child at the site, whose distinctive burial treatment raises new questions about mortuary practices. Alongside emerging habitation and palaeoenvironmental data, bioarchaeological findings from Lokam challenge assumptions about stability within the AHP.

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Associations between age, physical activity, and physical and cognitive function in Hadza foragers

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Physical and cognitive function are key components to quality of life during older adulthood, and finding ways to prevent or slow age-related declines in both is an important public health concern. Engaging in a physically active lifestyle appears to improve physical and cognitive function during aging. Our understanding of the role that physical activity (PA) plays in functional aging, however, comes from work with mostly sedentary populations. In this study, we examine the relationship between age, physical activity, and physical and cognitive function in a population known for exhibiting high levels of PA throughout life: the Hadza foragers in Tanzania. We recruited 122 Hadza adults (n_{female}=66, n_{male}=56; ages 19–87 years) to participate in this study. We used wrist-worn accelerometers to evaluate levels of PA, and asked participants to complete tests of physical and cognitive function. Participants in this study displayed high levels of moderate-to-vigorous physical activity (MVPA), even at older ages. We found that age was negatively associated with grip strength (p<0.001), gait speed (p<0.001), and performance on a test of processing speed (p<0.001), but not associated with performance on a test of spatial working memory (p=0.17). We also found that time in MVPA was significantly associated with gait speed—participants with the lowest amounts of MVPA displayed slower gait speeds (p<0.01)—a relationship also seen in industrialized populations. In addition to characterizing age-related differences in physical and cognitive function, we believe this study offers insight into the relationship between PA and function in a highly physically active population.

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Body by Colonialism: Interrogating the False Binary in Bioarchaeology

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Feminist and Queer theorists have made a profound impact on (bio)archaeological research that reimagines 'the opposition to the normative' as not mutually exclusive to the categories of sex and gender (Blackmore 2011; Geller 2016; Voss 2000). The word 'queer' derives from the German word 'quer' and can be translated in different ways depending on the context; for example, it can translate to 'askew', 'crosswise', and 'transverse'. In this sense, queer contends against the normalized, legitimized, and legible aspects of analysis. As noted by other archaeologists that engage with feminist and queer theory (Arden 2008; Blackmore 2011; Geller 2008; Hollimon 2011), the inclusion of a queer analysis is not predicated on excavating or uncovering ancient 'homosexuality'; rather it centers those that are typically at the margin, or completely left out in academic inquiry.

Bioarchaeologists and Skeletal Biologists typically rely on the remaining bony elements to make to make scientific inferences about ancient peoples. Our analyses follow standardised practice following Buikstra and Ubelaker (1990), however, many of the methods in the bioarchaeologist's toolkit do not adhere to a strict binary. This paper critically interrogates this growing awareness by specifically focusing on how queer theory changes and transforms scientific knowledge about the human body and experience within biological anthropology. Approaching the body as a fully realised blueprint prevents a deeper investigation into human behaviour and physiology outside the binary. Challenging hegemonic categories does not erase biology, rather by critically engaging with biology it refuses the false binary that haunts bioarchaeological research.

None:

Effects of height in the canopy on gait mechanics in wild lemurs

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Arboreal locomotion is thought to be particularly precarious. Branch diameter and orientation can impose certain biomechanical challenges to maintaining a desired trajectory. Branch discontinuity and height above ground also mean that failure to compensate for precarious branch morphology can lead to risky falls. Using high-speed cameras, we recorded the quadrupedal locomotion of four wild lemur species – *Eulemur rubriventer*, *Eulemur rufifrons,* and *Hapalemur aureus* at Ranomafana National Park and *Lemur catta* at the Anja Community Reserve. We quantified branch diameter, orientation, and height using remote sensors and tested their effects on gait kinematics (N = 60). Preliminary data indicate lemurs primarily use diagonal sequence gaits. Only *E. rubriventer* changes gait type with branch height, increasing the use of lateral sequence gaits higher in the canopy. Lemurs tend to increase duty factors as branch height increases, though variation is inconsistent between hindlimbs and forelimbs. Furthermore, *E. rubriventer* increases the mean number of limbs used to support the body during a stride on higher substrates. In contrast, *L. catta*, unlike the other lemurs, tends to increase duty factors and the mean number of supporting limbs as substrate diameter decreases. This may be due to differing locomotor environments as *L. catta* generally walked on substrates lower to the ground. Overall, these results suggest that lemurs change their gait in response to varying substrate properties and that adjustments vary among species. The results also underscore the importance of including branch height alongside more typically measured substrate characteristics like diameter and orientation.

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Organizing anatomical 3D data for long-term storage and frequent reuse

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Sharing and reusing basic research data are currently challenges to researchers in many scientific disciplines. Their benefits, including synergy effects and transparency of research, are only realized if data are well annotated and the connection between basic data and research outcome conclusively demonstrated. RDFBones is a domain ontology within the Resource Description Framework (RDF). It has been successfully applied to document research objects, processes and outcomes as semantic data models. These can be implemented into all kinds of databases but are also a perfect medium for long-term storage of research data.

With three-dimensional craniofacial data sets, RDFBones can be used to describe the processes involved in their production. It can address specific elements within these data objects and define them as input to further data processing. Semantic data modeling provides a thorough and transparent account of how basic data are used in investigations to the effect that research results can be traced back to the originally acquired data. Moreover, RDFBones semantic data models can serve as a translation layer to bridge several independent data sources and combine information from all of them.

We present the worked example of a semantic data model representing a three-dimensional landmark configuration derived from a CT scan, including the entire process chain, and employed in a geometric morphometric analysis. We also provide examples complex queries across this model as a basis for additional research. These resources include expressive in-line documentation which makes them highly appropriate for long-term storage and reuse in later, unrelated investigations.

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How has Keith's multi-stage model performed in light of experimental data on locomotor mechanics in monkeys and apes?

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When Sir Arthur Keith first formulated his multi-stage model of human evolution, he did so with little information on fossils or experimental comparative anatomy, an approach that Washburn would call for 30 years later. Since then, kinematic and kinetic data have been collected on Old and New World monkeys and all the apes, providing robust tests of several prescient ideas Keith presented. Keith proposed that human evolution proceeded through pronograde, orthograde "hylobatian", large-bodied ape "troglodytian", and then to a "plantigrade" phase with erect limbs. Keith described significant changes in the hindlimb and fewer in the forelimb, which retained suspensory features and he explicitly connected human hindlimb and foot development with gorillas. Experimental data on Old World monkeys, suspensory New World monkeys, and apes have supported the idea of a functional shift from pronograde to antipronograde postures with forelimbs used in tension during normal and inverted quadrupedalism and climbing. Regarding hindlimb function, we know a lot about *Pan*, including pedal mechanics and pressures, less about *Gorilla* and far less about *Pongo*. Our latest experiments show that *Gorilla* hindlimb and foot mechanics are deeply reflective of humans. Chimpanzees show some of the same patterns, while orangutans and suspensory New World monkeys form an essential mechanical bridge between "hylobatian" and "troglodytian" stages. Our collective years of data on forelimb and hindlimb mechanics, especially our latest results, provide new opportunities to interrogate these key transitions. Keith's models provided explicit hypotheses to be tested and fare fairly well in light of these novel data.

Stronger maternal social bonds and higher rank are associated with accelerated infant maturation in Kinda baboons

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Social relationships are critical components of health and fitness for humans and other animals. For female-philopatric species, affiliative relationships among females (kin and non-kin alike) can influence components of fitness that include individual survival, interbirth interval, and offspring survival. Affiliative relationships with males have attracted somewhat less attention, with most studies focusing on female-male relationships as adaptations for infanticide avoidance. Here, we use eight years of behavioral data on Kinda baboons (*Papio kindae*) to assess whether maternal social relationships—both among females and between females and males—affect infant survival, interbirth interval, and the pace of infant development. Kinda baboons are an ideal system for these analyses because males and females form strong relationships outside of the periovulatory period and in the absence of obvious infanticide threat. We calculated social metrics that reflected dominance status, total social integration, and social bond strength and paired these metrics with data on offspring survival, interbirth interval (IBI) duration, and infant behavioral maturation. Neither dominance rank nor sociality had a significant effect on interbirth interval or survival, but higher rank and the stronger affiliative relationships between a female and her top female and top male social partners predicted more rapid infant behavioral maturation. These results suggest that maternal dominance and sociality may confer advantages related to infant development and independence that ultimately