

The morphological differences in the size, shape and enthesal attachments of the clavicle from the Erie County Poorhouse Cemetery

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Within the anthropological literature, enthesal changes and morphological variability are often addressed as the result of the interplay between biomechanical loading and bone's functional plasticity. Much of this research has focused its attention on directional asymmetry as assessed using metric data or the degree of rugosity of attachment sites. Through the analysis of adult skeletal remains from the Erie County Poorhouse, Buffalo, New York, this study specifically addresses the relationship between the morphological shape of clavicles and enthesal changes. The unique s-shaped clavicle is the sole osseous structure that connects the upper limb to the axial skeleton. Acting as a strut between the sternum and the upper limb, as well as the site for numerous ligament and muscle attachments, the clavicle allows for an array of movements of the pectoral girdle without obstructing the soft tissue structures that pass beneath it. Data on enthesal changes of fibrous attachments, i.e. *pectoralis major*, *deltoideus*, and *trapezius* and fibro-cartilaginous attachments, i.e. *costoclavicular*, *conoid*, and *trapezoid* ligaments were assessed using both Villotte (2006) and Henderson et al. (2012). Morphological shape variability was assessed using both metric and nonmetric data, including the mid-shaft diameter and the shape of the anteriomedial surface. In addition to presenting the relationships between shape and enthesal changes, correlations with sex and age variables are presented. Discussion of the results includes the complexities associated with establishing relationships among morphological and enthesal changes, as well as the difficulties in distinguishing how these changes may reflect activities found in the historical record.

Seasonality and niche partitioning among sympatric gorillas and chimpanzees in Loango National Park (Gabon) revealed by stable isotope analysis

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The feeding ecology of sympatric great ape species yields valuable information for palaeodietary reconstructions in fossil hominin species. Here we present the first isotopic study on sympatric great apes, namely lowland gorillas (*Gorilla gorilla gorilla*) and central chimpanzees (*Pan troglodytes troglodytes*) from Gabon. We analyzed the stable carbon and nitrogen isotope ratios in a selection of great apes' food plants (n = 31) and ape hair samples (n=30) retrieved from sleeping nests to test whether niche partitioning among sympatric chimpanzees and gorillas is detectable using isotope analysis of hair. Ape

hair strands with roots were sectioned into sequential segments (total n = 100) to investigate temporal isotopic variation related to seasonal variations in food resources. We found significant $\delta^{13}\text{C}$ -differences between herbaceous plants and fruits due to canopy effects. While the $\delta^{13}\text{C}$ values of chimpanzees indicate the consumption of fruit, the low $\delta^{13}\text{C}$ values in gorilla hair indicate folivory, most likely the consumption of ^{13}C -depleted terrestrial herbaceous vegetation. Our isotopic data also confirmed dietary overlap between chimpanzees and gorillas, which varied by season. Gorillas showed significant variation in $\delta^{13}\text{C}$ values in response to season due to shifting proportions of herbaceous plants versus fruits. In chimpanzees, seasonal variation in $\delta^{15}\text{N}$ was likely related to the seasonal availability of fruit species with particularly high $\delta^{15}\text{N}$ values. Our findings provide a valuable reference for palaeodietary research on fossil hominins using $\delta^{13}\text{C}$ analyses, particularly for studies focusing on sympatric taxa and on temporal isotopic variation within incremental tissues such as tooth enamel.

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Social inequality and differential prestige in the prehistoric Atacama oases: The impact of foreign cultures on local lifestyle during the Middle Horizon

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The Tiwanaku polity played a significant role in the social and cultural developments of northern Chile's Atacama oases. However, most studies assume that Tiwanaku influence was homogeneously distributed across the oases, disregarding the role of foreign cultures in the establishment of social inequality among the oases communities. Here, we address this limitation by testing the hypothesis that Tiwanaku goods, along with other imported cultural material, may have served as prestige wealth within the oases. Grave goods associated with 453 burials from four Middle Horizon (AD 500-1000) cemeteries (Quitor 5, Solcor Plaza, Solcor 3, and Tchecar Túmulo Sur) were analyzed and categorized as either Tiwanaku, foreign or local based on stylistic differences. Individuals associated with each of these categories were evaluated based on indicators of skeletal stress (i.e., porotic hyperostosis and cribra orbitalia), trauma, and cranial modification. Fisher's exact tests and correspondence analyses were performed to assess the relationship between these indicators and associated grave goods. The presence of cranial vault modification is clearly associated with Tiwanaku mortuary goods, however this trend appears to be true only for males. This association suggests that males who were born into elite families were more likely to acquire Tiwanaku goods as symbols of status. In conclusion, our data favors previous archaeological information that Tiwanaku style grave goods were used as prestige items in San Pedro de Atacama during the Middle Horizon.

Dental decay on the Atacama oases during the period of the influence of the Tiwanaku Empire

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The oases of San Pedro de Atacama were occupied during the entire Holocene period, but from 1500BC this occupation was intensified and consequently transformed the Atacama landscape. Hunter-gathering was replaced by agriculture. Between 400 AD and 1500 AD, two Andean empires influenced the atacameñan society before the Spanish conquest: the Tiwanaku Empire and the Inca Empire. The influence of the Tiwanaku Empire on the local quality of life was assessed in this study based on oral pathologies of 402 individuals from 12 sites of the Atacama desert. Dental decay, one of the main pathologies that infer the diet of ancient societies, was analyzed to evaluate if and how this empire influenced the health of the Atacama people. Differences between males and females and between people with or without cranial deformation were analyzed. To improve the analysis, the presence of fluoride ion in the water of the local rivers was measured, however the results presented a low natural quantity of this element in them. The results show that there was a positive influence of the Tiwanaku Empire on local life conditions. Both men and women and also people with or without cranial deformation were affected indistinctly. These results suggest that the contact between a local small-scale society and an expansionist state is not always detrimental to the former.

Landscape genetics of western Black Crested Gibbons (*Nomascus concolor*) in China

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Of the living apes, Western black crested gibbons (*Nomascus concolor*) number among the fewest. A formerly broad distribution across much of China and Southeast Asia has been reduced to a handful of fragmented populations numbering fewer than 1,500 individuals, rendering them critically endangered by the IUCN. The majority of the species (~1,000) remains in isolated mountaintop forests in Yunnan, China. While several behavioral studies of this species have recently been published, almost nothing is known of their molecular ecology.

In the course of one year of fieldwork, 92 genetic samples were obtained from free-ranging individuals in the three predominant population fragments, Wuliangshan, Ailaoshan, and Yongde Daxueshan. Fecal samples were located and identified with a scat-detecting dog trained in China and collected with the 2-step EtOH/silica method. Samples were barcoded by sequencing a ~600 bp fragment of the mitochondrial d-loop for each sample. 454 genomic sequencing of one *N. concolor* tissue sample from the Kunming Institute of Zoology, was used to generate 621 putative microsatellite markers. Eight