contrast between increased load-resistance ability in the anterior dentition versus relatively reduced symphyseal strength suggests both a potentially complex loading environment during gouging and a mosaic pattern of dentofacial adaptations to this derived biting behavior. This study was funded by NSF Doctoral Dissertation Improvement Grant 0622479 and NSF grants: BCS-0924592, BCS-0412153, BCS-0094666, BCS-9908847.

Body proportions of the Jebel Sahaba sample.

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The Epipaleolithic site of Jebel Sahaba (Sudan) was discovered in 1962, ca. 1 km from the east bank of the Nile, and ca. 3 km north of Wadi Halfa (the site is now submerged beneath Lake Nasser/Nubia). From 1962-1966, a total of 58 intentionally-buried skeletons were uncovered at the site. Diagnostic microliths suggestive of the Qadan industry as well as the site's geology suggest an age of 14 – 12 ka for these burials. In this study, the body proportions of the Jebel Sahaba hominins are compared to those of a large (N = ca. 1100) sample of recent human skeletons from Europe, Africa, and the north circumpolar region, as well as to terminal Pleistocene "Iberomaurusian" skeletons from the northwestern African sites of Afalou (Algeria) and Taforalt (Morocco), and Natufian skeletons from the southern Levantine sites of El Wad and Kebara.
Univariate analyses distinguish Jebel Sahaba from European and circumpolar samples, but do not tend to segregate them from North or Sub-Saharan African samples. In contrast, multivariate analyses (PCA, PCO with minimum spanning tree, NJ and UPGMA cluster analyses) indicate that the body shape of the Jebel Sahaba hominins is closest to that of recent Sub-Saharan Africans, and different from that of either the Natufians or the northwest African "Iberomaurusian" samples. Importantly, these results corroborate those of Irish (2000), who, using non-metric dental and osseous oral traits, found that Jebel Sahaba was most similar to recent Sub-Saharan Africans, and morphologically distinct from their penecontemporaries in other parts of North Africa. This study was funded in part by NSF (grant number SBR-9321339).

The Hobbit Brain: Some questions about its 'derived' features.

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One of the major problems with paleoneurological interpretations is that these are based on extremely small samples. Irrespective of whether the "Hobbit" is indeed a new species, or an unmatched form of pathology, claims regarding derived or primitive characteristics require testing against larger samples of anthropoid endocasts. The endocast collection collected by Holloway is roughly 200, including some 40+ *Pan paniscus*, 30+ *Pan troglodytes*, 40+ *Gorilla*, 25+ *Pongo*, and roughly 100 Hylobatids.
These endocasts have been recently CT scanned, and form a good basis for examining the seven character states that Falk et al (JHE) have suggested are derived features on the endocasts of LB1. *Pan paniscus* in particular shows a set of features including a squared prefrontal profile, cerebral cortex caudal to the cerebellar lobes, pronounced prefrontal poles (gyri recti), and protuberant Broca cap regions. Additionally, two microcephalic endocasts do show cerebral lobes overlapping and caudal to the cerebellar lobes, suggesting that if the microcephalic sample were increased, morphometric analyses might show more overlapping between microcephalics and LB1. We are NOT suggesting here that LB1 is therefore a microcephalic, but simply that overlapping cerebral lobes is an ambiguous feature that does not help clarify LB1's status as a valid taxon. Because the proposed derived features of LB1 can be found in ape endocasts, they cannot be regarded as diagnostic. Expanded comparative analysis will be required to determine whether there truly are any derived features of LB1, or whether it exhibits any pathologies.

Contrasting growth patterns in strength of the human mandible and long bones.

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Previous authors have demonstrated divergent developmental patterns in cranial and postcranial skeletal elements. These differences have been attributed to separate driving forces of distinct regions related to varying functional demands. However, comparison of differential growth patterns in bone strength properties has received little attention. This study aims to quantify and compare ontogenetic trends of cross-sectional structural properties between two skeletal regions with different functional demands – the mandibular body and femoral and humeral diaphyses.
Using bi-planar radiographs, strength properties were determined for the mandible, humerus and femur from 47 individuals within the Sully (Arikara) archaeological sample. Ages, determined from dental eruption, tooth development, and epiphyseal closure, ranged from infancy to adulthood. Both sagittal bending rigidity (Ix) and strength (Zx) were calculated for each skeletal element. To assess developmental relationships between crania and postcrania, variables were subjected to loess regression, percent adult attainment and growth velocity analyses.
Results of this study revealed divergent growth trajectories of strength properties between the mandible and postcrania. Specifically, mandibular strength achieves near-adult values by early adolescence, whereas postcrania continue to grow in strength into adulthood. Furthermore, developmental patterns of mandibular strength properties are highly related to molar emergence. In contrast, growth of femoral dimensions in particular is closely related to increase in body mass. Earlier development of strength properties in the mandible appears to be needed for a fully functioning masticatory apparatus, while postcranial growth is delayed until sufficient energy can be allocated to its development.

Do impact forces associated with horseback riding result in stronger femora?

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Archaeological evidence suggests horse riding originated during the Bronze Age and that early riders did not use stirrups, a method that places the rider frequently in front or behind the horse's center of mass, requiring high adductor and rotator muscular effort to maintain balance. Bronze Age human femora often exhibit musculoskeletal stress markers associated with these muscle forces around the hip joint and proximal epiphysis. The high muscle forces should result in medio-lateral expansion of the proximal femur.
We tested the hypothesis that muscular forces engendered by riding lead to remodeling of the proximal femur. We analyzed femoral cross-sectional properties of 15 adult males from the Bronze Age site of Olmo di Nogara (Italy), all exhibiting markers associated with riding, and a comparative sample of non-riders from the Mesolithic. Olmo femora should exhibit medio-laterally reinforced proximal cross-sections, reflecting hip muscle forces. Cross-sectional dimensions were obtained from CT scans and a combination of bi-planar radiographs and molds for the Olmo and Mesolithic samples, respectively. Contrary to expectations, the Olmo femora have lower cross-sectional rigidity than the Mesolithic femora, and did not differ in ML dimensions. These results suggest that the strains involved in riding are not high enough to trigger remodeling, confirming results from one study of muscle strength and bone mineral density (BMD) in adolescent riders that found that, while riders had stronger thigh muscles than non-riders, they did not differ in femur BMD, suggesting that the strains associated with riding do not result in stronger bones. This study was funded by NSF grant # 0642710.

Heterogeneity of maternal diet in a stable isotope weaning study.

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