fragments, we repositioned the elements and reconstructed the missing portions based on comparisons with known early *Homo*, *Australopithecus*, and modern human pelves. This resulted in a revised anatomical reconstruction that includes a slightly wider sacrum, more laterally flaring and transversely oriented ilia, shorter ischia, and longer pubes. The anatomical consequences of this reconstruction present wider biiliac and interacetabular breadths – both of which have implications for body form and locomotion thus requiring reassessment of the adaptive history of African *Homo erectus*.

Who's your Daddy? Developmental simulation yields insights into the hybrid origin of *Rungwecebus kipunji*.

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Rungwecebus kipunji is a critically endangered papionin primate endemic to southern Tanzania. Although phenetically similar to mangabeys, kipunji mtDNA sequences nest within *Papio hamadryas cynocephalus*, suggesting that *Rungwecebus* originated through ancient hybridization between female yellow baboons and males of an unknown mangabey species. Nuclear sequences have failed to identify this paternal lineage, and the juvenile status of the sole available voucher specimen (FMNH 187122) complicates evaluation of the kipunji's morphological affinities. To identify the kipunji's likeliest paternal ancestor, we used developmental simulation to estimate adult kipunji cranial morphology and determined the phenetic affinities of simulated kipunji adults (SKAs). Our dataset comprised 153 landmarks and semi-landmarks collected on 205 juvenile and adult-male cercopithecine crania. Following generalized Procrustes analysis, the male developmental trajectory for each model species was approximated by regression of aligned coordinates on dental stage. Adult landmark configurations were simulated by addition of the resulting developmental vectors to the juvenile kipunji's landmark coordinates. Simulated adult morphologies were visualized by morphing a surface model of the juvenile cranium to each adult landmark configuration; phenetic affinities were assessed using several Procrustes-distance-based metrics. SKAs generated using different species vectors were extremely similar to each other and distinct from other papionins. Procrustes distances between SKAs were comparable to papionin within-species distances, suggesting our estimate of adult kipunji morphology is robust. SKAs were consistently most similar to *Lophocebus aterrimus* under all metrics. Based on these findings, *Lophocebus* is the most likely source of the kipunji's hypothesized paternal lineage. This research was supported by National Science Foundation Grant IIS-0513660 (to SRF).

82. Trabecular eccentricity: This new characteristic reveals relative influences of tension and compression stress in adapting metaphyses/epiphyses for habitual bending.

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'Trabecular eccentricity' (TE), a new characteristic for considering potential interactions between cortical and cancellous bone adaptation, helps reveal synergism in cortical/cancellous distributions that may not be intuitive. TE is the placement of the cancellous envelope within the entire bone cross-section; greater TE increases non-central placement of the cancellous envelope and increases asymmetry in cortical thickness of opposing cortices. In a computational study of modern human femoral necks, Fox and Keaveny (J. Theoretical Biology, 2001; erratum 2003) show how the superior ("tension") and inferior ("compression") cortical thicknesses can be adjusted via TE to achieve an overall protective effect during bending. If opposing "tension" and "compression" cortical thicknesses are considered in terms of conventional understanding of local adaptation, and not TE, then cortical asymmetry (e.g., thinner "tension" cortex where bone is most prone to fracture) would not be recognized as having an overall protective effect. We explored implications and limitations of using TE for understanding potential synergism between cortical/cancellous bone envelopes in human and chimpanzee femoral necks, and sheep and deer calcanei—all have arched trabecular patterns consistent with habitual bending. Results reject the hypothesis that TEs are consistent in all the bone types. Marked differences in TEs between humans and chimpanzees possibly reflect species differences in relative cross-sectional robusticity (greater cortical robusticity in chimpanzees); hence, TE analyses may not be valid above some robusticity threshold. Results in the calcanei illustrate that when ligaments/tendons are considered that TE values can dramatically change interpretations of potential synergism between opposing tension- and compression-loaded cortices.

Environmental change during