POSTER 102

3D ANALYSIS OF PRIMATE HINDLIMB JOINTS: RECONSTRUCTING POSITIONAL ABILITIES IN EXTINCT PRIMATES

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Apes use more varied hindlimb positions than monkeys, particularly terrestrial species, in order to negotiate a complex 3D environment. Femoral and pelvic morphology both affect and reflect hindlimb positional adaptations, but the relative influence of particular aspects of hip and thigh morphologies on hindlimb postures is unknown, affecting our ability to use these features to interpret locomotor behavior in fossil taxa.

This study uses articulated 3D polygonal models of the pelvis and femur to simulate range of abduction during loading, and evaluates effects of different aspects of morphology on femoral postures. Continuous laser scan data of the pelvis and femur were collected for a large sample of extant primates, as well as fossil apes and hominins. Microscribe landmark data of intact pelves were used to orient innominate scans in 3D virtual space. Morphological variation and range of thigh abduction were quantified with PolyWorks software.

Our results show significant variation in femoral postures, and thus knee position, among species for any given hip position. In particular, more suspensory apes have femora that are inherently more abducted in neutral hip positions than cercopithecids. Features most influential on femoral postures include neck-shaft angle, neck length, femoral head and acetabular orientation, fovea capitis position, and bicondylar angle. Acetabular fossa size and greater trochanter height were less significant. Results of our study provide a basis with which to evaluate locomotor adaptations in extinct primates.