POSTER 27

ESTIMATING RADIAL CURVATURE IN FRAGMENTARY HOMININ FOSSILS: A COMPARATIVE STUDY IN APES AND HUMANS

Kelly A. Bowers (Undergraduate)

(Carol V. Ward, PhD)
Department of Pathology and Anatomical Sciences

Forearm bone curvature has been invoked in interpretation of fossil hominin behavior. Apes have curved radii, reflecting hypertrophied forearm musculature needed for below-branch arboreal locomotion and increased leverage for pronation and flexion of the hand. As bipeds, humans have straighter radii adapted to manipulatory rather than locomotor activities. When this evolutionary transition took place, however, is poorly understood. Several radii are known from fossil hominins but they are all incomplete. If curvature could be estimated from fragmentary fossils, it would be possible to evaluate the evolution of forearm curvature in hominins.

This study tests the hypothesis that bone curvature could be estimated from proximal radii fragments. 3D polygonal models were developed from laser scan data from 10 of each *H. sapiens* and all four great ape species (*Pan troglodytes, Pan paniscus, Gorilla gorilla,* and *Pongo pygmaeus*) using Polyworks® software (Innovmetric, Inc). A plane was fit to the radial head and best fit vectors assigned to the radial neck and proximal shaft. Angles among the head and these vectors were compared to two measures of whole bone curvature.

We found no significant correlation between either measure of bone curvature and our measures of proximal radial geometry, thus proximal radii fragments cannot infer radial curvature. However, we discovered that humans have more obliquely inclined radial necks than great apes. This morphology is likely related to a different adaptation to forearm supination and elbow use in flexed postures during manipulation and provides a basis for inferring the functional adaptations of fossil hominins.