

**The relationship between maxillary sinus volume and craniofacial linear measurements in *Macaca fascicularis* and *Macaca mulatta*.**

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The paranasal sinuses have served as morphological characters in constructing phylogenetic relationships among hominoids. In particular, aspects of the maxillary sinus may be important markers for distinguishing members of *Homo sapiens* (*sensu* Stringer et al., 1979). In addition, maxillary sinus morphology has also been used with other facial features in characterizing a hypothetical ancestor of living great apes. However, most previous craniofacial studies involving maxillary sinus volumes have not included Old World monkeys. As part of our ongoing study on the form and function of the paranasal sinuses, we have investigated the relationships between maxillary sinus volume and linear measures in order to better understand systematic relationships and to assess the potential value of linear measurements for predicting maxillary sinus volume.

Dry crania of adult male *M. fascicularis* (n=12) and *M. mulatta* (n=12) were selected from the Anthropology and Mammalogy Departments of the American Museum of Natural History. Maxillary sinus and endocranial volumes were obtained via a seed-filling method (Márquez et al., 1995), and 32 linear measures were taken with a Helios digital caliper. Crania from each species were further examined by computer tomography (GE HiSpeed Advantage scanner) at the Department of Radiology, National Institutes of Health. Internal morphology was visualized from three dimensional reconstructions based on 1.0 mm coronal slice scans (120 kV, 160 mA) analyzed with VoxellView software on a Silicon Graphics Indigo 2-XZ workstation.

Results from regression analysis between maxillary sinus volume and linear measurements show four measures to be statistically significant in *M. fascicularis*, seven in *M. mulatta* and one measure, nasion to basion, in both taxa ( $r=0.67$ ,  $p<0.03$  for *M. fascicularis* and  $r=0.62$ ,  $p<0.03$  for *M. mulatta*). Having only a single measure with dual significance is somewhat surprising in light of the strong morphological similarity of the sinus and contiguous regions between these species as revealed by CT. Further study is required to see if other linear measures, or combinations thereof, may be more valuable as predictors for maxillary sinus volume.

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