one another than either is to any other archontan. Although Euprimates appears as a monophyletic clade, Plesiadapiformes is not monophyletic to the exclusion of Euprimates. This leads to the adoption of a classification that includes all plesiadapiforms in Primates as the most primitive members of that order. Volitantia is well supported and may be closely related to Scandentia. In the absence of a link between plesiadapiforms and dermopterans, the taxa Primatomorpha and Eudermoptera (both *sensu* Beard, 1993) are not considered valid.

This study highlights the importance of simultaneous analysis of multiple types of data in forming conclusions about phylogeny and taxonomy. This is particularly key in a clade that shows as much variability, convergence, and parallelism as Primates.

Phylogenetic distribution of craniofacial traits in papionin primates.

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Traditional classifications of the cercopithecine tribe Papionini assumed monophyly of the mangabey genera *Cercocebus* and *Lophocebus*; however, molecular phylogenetic studies consistently have found *Cercocebus* to be the sister-taxon to *Mandrillus* with *Lophocebus* more closely related to *Papio* and *Theropithecus*. While a suite of post-cranial characters supporting the *Cercocebus-Mandrillus* clade has been identified, both traditional and geometric morphometric studies give little support to molecular findings and relatively few discrete cranial traits have been suggested as potential synapomorphies of the recognized molecular clades.

This study examines the distribution and polarity of craniofacial characters within the Papionini. The study sample comprises over 300 adult individuals of known sex and provenience representing all recognized cercopithecine genera. Both three-dimensional landmarks and standard dental measurements were collected. A series of qualitative characters emphasizing the sub-orbital and maxillary regions also was scored for each specimen and character state frequencies were calculated.

Cranial and dental proportions are analyzed using size-adjusted linear measurements and ratio-based indices. Cranial shape features are explored via multivariate analysis of Procrustes-aligned landmark coordinates. Patterns of within-taxon variation are documented and character polarity is assessed in order to distinguish primitive retentions from shared derived features. Implications for the evolution of papionin cranial form are considered.

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Digital image analysis for osteological aging: a preliminary assessment.

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Traditional age estimation methodologies rely on the appearance of certain features of a bone that are visually compared to a set of published age-progressive stages developed from morphological changes in skeletal samples of known age. Inadequacies associated with visual scoring include the inability to accurately distinguish discernible aging features in older adults. To address this issue, we examine the application of image analysis techniques, such as superimposition, visualization, surface rendering, and feature analysis, for quantifying age-progressive changes in skeletal morphology.

Image analysis techniques have the potential to identify discernible morphological changes related to age more accurately and in detail than is possible with the human eye alone. The increased comparative capability of imaging analysis software addresses the issues associated with estimating the age of older adults by recognizing age-progressive traits overlooked by visual scoring.

The results of a preliminary investigation on image analysis techniques for estimating age from the pubic symphysis are reported. Measures of image pixel brightness and pixel intensity data translated into line plots represent the range of elevations on a surface. Elevation data correspond to the different textures and relief exhibited in the various age phases of the symphyseal surface.

This study suggests that imaging analysis may be a useful tool in age estimation methodology. Computer assisted analyses promotes increased standardization in methodology, benefiting the observer by improving the efficiency and accuracy of skeletal age estimation in comparison to actual chronological age. Future directions in this area are discussed.

56. Mathematical analysis of trabecular trajectories in apparent trajectorial structures: the unfortunate historical emphasis on the human proximal femur.

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Wolff's law emphasizes the "mathematical" correspondence of trabecular orientation in the human femoral neck with stress trajectories in a curved crane-like structure [Wolff, 1892]. In true trajectorial structures, trajectories form orthogonal (90°) intersections with axisymmetric paired trajectories (curves) at any point along a neutral axis. Wolff's view of the proximal femur as a trajectorial structure has become rooted in contemporary orthopaedics and physical anthropology. This view assumes that the femoral neck is habitually loaded in bending. Anthropologists are interested in interpreting loading history of the hip in anthropoid lineages. However, the nature of the prevalent loading condition(s) in this region remains controversial. This issue was examined comparatively by quantifying the angles subtended by paired trabecular tracts in modern adult human femoral necks (n = 12, normal neck-shaft angles), and fetal-to-adult artiodactyl (sheep n = 10; deer n = 10) calcanei [simple bending systems]. In each bone two-to-three sets of paired trabecular tracts were traced. Cartesian coordinates of each tract were fit to non-linear equations (TableCurve™ program). Calcaneal trajectories exhibited orthogonal intersections, while femoral intersections were acute (60-80°). This may represent adaptation for shear stresses in the complexly loaded femoral neck [Pidaparti & Turner, 1997, *J. Biomech.*]. Cranial trajectories yielded the equation $y\ exp(-1) = a+b/x$ (100% of sheep; 90% of deer; 33% of femora). Caudal trajectories: $y = a+b\ exp(-x/c)$ (80% sheep; 70% deer; 80% femora). Therefore these calcanei approximate "mathematical" trajectorial structures, while the human femora do not. Calcaneal trabecular patterns were consistent throughout the entire growth range, and caudal tracts corresponded exactly to the orientation of the growth plate, which may constrain their morphologic development.

Strategies for analysis of DNA extracted from skeletal material.

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The origins, evolution, and interactions of prehistoric populations are the focus of considerable debate. Utilizing ancient DNA technology, we propose to address these issues in a molecular study of selected collections of skeletal remains from the Florida Museum of Natural History (FLMNH). The collections have been screened based on the