

An almost endless number of measurements may be made of the human cranium. Most anthropologists use only a small standard set of measurements. These only require spreading and sliding calipers, relatively inexpensive instruments found in most biological anthropology laboratories. Unconventional cranial measurements require costly instruments such as the radiometer and coordinate caliper that are not common in laboratories. These measurements also are more difficult to complete. Which cranial measurements are best for classifying when constructing a discriminant function? Will the use of variables requiring more time, training, and equipment improve discrimination?

65 measurements were taken from 155 crania of European American, African American, and Coyotero Apache ancestry. Measurements were separated into four subsets for statistical analysis: (1) FD2 (1996), (2) Howells (1973), (3) Gill (1984), and (4) All Measurements. Forward stepwise methods were used to develop a predictive discriminant analysis using SPSS 14.0. Classificatory power of discriminant functions was determined using the Leave-One-Out hit-rate estimates for each subset: (1) 85.5%, (2) 90.3%, (3) 61.9%, (4) 93.5%. Results lead me to suggest that biological anthropology laboratories should purchase radiometers and coordinate calipers. They record data missed with spreading and sliding calipers. In addition, standard measurements may be combined with non-standard measurements to produce more powerful discriminant functions for determining ancestry.

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Nonmetric cranial variation of the ancient Okhotsk cultural people around the Okhotsk Sea coast.

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From the 5th to 12th century A.D., the prehistoric Okhotsk culture was distributed about Sakhalin, the Okhotsk Sea coast of Hokkaido and the Kurile Islands. The people of the Okhotsk culture are believed to have developed a considerable maritime infrastructure.

Diversity of the Okhotsk cultural people was investigated in terms of nonmetrical cranial traits. The incidences of the transverse zygomatic suture vestige in the Okhotsk series are high among the populations compared, while the frequency of the supraorbital foramen of the Okhotsk is as high as those of the comparative samples except for the Ainu.

The MMD based on the 22 nonmetric traits between the northern and eastern Okhotsk

was small but significant. The northern Okhotsk was closest to the Sakhalin Ainu. The multivariate analyses based on the MMD matrix showed the peculiarity of the eastern Okhotsk. The estimated *F*_{st} using an average heritability rate = 0.55 for the nonmetric cranial traits used in this study, displayed low levels of interregional variation, as already indicated in analyses of genetic, cranial and dental metric data. The greater observed variation compared with the expected variation in the northern Okhotsk sample was calculated using the Relethford and Blangero's (1990) method. It seems that the northern Okhotsk had experienced some gene flow from outside.

Paleodemography under duress: Growth and sexual dimorphism of the minimum femoral circumference.

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Paleodemographic analyses often must rely on fragmentary and incomplete skeletal material. In these cases, Black (1978) suggested that midshaft femoral circumference could be used for adult sex estimation, and Konigsberg and Frankenberg (1984) considered minimum femoral circumference for subadult age estimation when dental development was unobservable. In this study we examine the utility of the minimum femoral circumference for both subadult age estimation and adult sex determination using a large sample of individuals from the Mississippian Averbuch site (40DV60).

The subadult sample consists of 135 individuals with minimum femoral circumferences less than 68 mm who also have Moorrees, Fanning, and Hunt (1963) ages. The squared-correlation coefficient between dental age and femoral circumference is 0.80, indicating that the femoral circumference can be used as an age estimator in paleodemographic analyses when the dentition is unavailable.

The adult sample consists of 376 individuals, 110 of whom have unambiguous sex assignments based on two or three Phenice (1969) characteristics. We fit a mixture model to the 376 individuals using a log-normal distribution for each sex and estimating the mixing proportion. We then find the posterior probability for each case from five parameters (the proportion of females, and a log-mean and log-standard deviation for each sex). Sex assignments from the mixture model agree with the Phenice-based estimates 81% of the time. We show that the minimum femoral circumference can be used successfully for proxy estimates of subadult age and adult sex when one must do "paleodemography under duress."

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A control bone for trabecular architecture variation

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While it is widely believed that trabecular bone reflects habitual loading history, there is no "control bone" that establishes the variations in trabecular architecture that would be expected in a known load history. The sheep calcaneus was selected as a potential "control bone" based on in vivo data showing that is relatively simply loaded in bending. We hypothesized that differences would be found between the compression vs. tension regions of this bone, possibly reflecting the well know disparity in the mechanical properties of trabecular bone in tension (weaker) vs. compression (stronger). The parameters included: trabecular number, thickness, separation, connectivity, and volume fraction. Eleven mature sheep calcanei were Micro-CT scanned at 46-micron resolution and analyzed (MicroView program) in 3mm cubic regions from compression and tension regions at 20%, 30%, 40%, and 50% of diaphyseal length. Parameters at each location were analyzed using paired T-tests. Although statistically significant differences were inconsistent at the locations examined, several trends were found: 1) trabecular number, thickness, and connectivity density all decrease in the compression aspect and increase in the tension aspect between 20-50% locations, 2) bone volume fraction decreases for both compression and tension regions between 20-50% locations, and 3) there may be evidence of trabecular adaptation to mixed loading (20-30% locations) vs. pure bending (40-50% locations). In view of these results, we will also discuss how additional measures of trabecular morphology, and morphology of the surrounding cortex, should also be considered when attempting to determine how a bone's morphology correlates with its load history.

An allometric approach to maxillary sinus growth in *Pongo* and *Pan*

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Despite substantial variation in maxillary sinus morphology, it has been suggested that the maxillary sinus volume (MSV) in adult hominoids scales isometrically with measures of the craniofacial skeleton. Since recent studies indicate that variation in the craniofacial morphology of adult forms of primates is due, in part, to differences in