H29   Beyond Taphonomy: Craniometric Variation Among Anatomical Specimens

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The audience will be introduced to the variation observed in anatomical cranial specimens and to methods beyond taphonomic indicators for discrim- inating these specimens from forensically significant remains.

This presentation will impact the forensic community by documenting the pattern and magnitude of variation among anatomical crania, beyond taphonomy.

Prior to 1987, the majority of human remains purchased in the United States originated from and were prepared in the modern Republic of India. In 1987, under pressure from human rights groups, the ruling government of India banned the exportation of human remains. However, the skeletal material purchased from India and used in classrooms, teaching laboratories, and medical schools in the United States is commonly encountered during routine forensic anthropological investigations. Unfortunately, craniometric data for anatomical specimens originating from India is not currently available, probably due in large part to the lack of provenience information for these specimens. Yet, the cranial material traditionally associated with anatomical warehouses is variously described as a single, homogenous group (e.g., a shared taphonomic history) or as an extremely diverse and biologi- cally heterogeneous jumble of populations.

This presentation will examine the pattern and magnitude of cranial variation among anatomical cranial specimens, using a procedure outlined by Jantz and Owsley (2001—AJPA 114:146-155). This study uses the tradi- tional linear craniometric data and three-dimensional coordinate data from 35 crania purchased from North American biological supply companies prior to the 1987 ban. In order to determine whether anatomical specimens can be considered an homogenous group, Mahalanobis distances (D^2) were calcu- lated between all pairs of anatomical specimens using a pooled within sample variance/covariance matrix calculated using Howells database. Next, a Defrise–Gussenhoven test between the paired distances was used to test the likelihood that the pairs of crania were drawn randomly from a single popu- lation. A sub-set of known Russian anatomical material was included to act as a test of the method. The calculated distances suggest the presence of at least three groups. The Russian sample and a spatially homogenous group of 7 anatomical specimen were distinct from the remaining twenty-two; the latter representing skeletal material likely from the Republic of India.

The calculated Mahalanobis distances were then used to calculate the "typicality" probabilities for each of the anatomical crania relative to Howells worldwide sample of cranial material. Understanding that these crania did not originate from any one of the Howells groups, the typicality probability was used to evaluate the observed variation within the anatomical specimens. The general pattern supports the Defrise– Gussenhoven test. The 22 homog- enous crania show greatest similarity to several Southwest Pacific groups (e.g., the Andaman from the Andaman Islands in the Bay of Bengal and the Atayal from Taiwan) and to European groups like the Berg from Carinthia, Austria. As expected, the Russian sample bears greatest similarity to European groups (e.g., Bergs and 20th century American Whites). The remaining 7 crania were most similar to African groups (e.g., Bushman and American Blacks).

The taphonomic indicators typically associated with anatomical specimen include the presence of reconstruction hardware, taphonomic indi- cations of reconstruction hardware—for instance, rust stains, holes drilled for screws, etc.—patina, and betel nut staining on the teeth. The crania used in this analysis exhibit at least one of these taphonomic profiles. However, staining on the teeth associated with betel nut chewing was documented only on the homogenous group of crania believed to have originated in India. The overall pattern of cranial variation and the associated taphonomic indicators suggest some level of homogeneity among anatomical crania purchased from India, but as expected, not among all anatomically prepared material.

Anatomical, Variation, Mahalanobis