



Physical Anthropology Section – 2004

H40 Population Variability in the Proximal Articulation Surfaces of the Human Femur and Humerus

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This presentation will demonstrate the magnitude of racial difference between American Indians and Whites with regard to two important long bone articulation surfaces, and then to provide a new, adjusted metric scale for accurate sexing of native remains.

Since Thomas Dwight, the father of American forensic physical anthropology, conducted his pioneering work on the human femur at the end of the 19th century, the maximum diameter of the head of the femur has been known to vary significantly between males and females. Since the work of Dwight's student, George A. Dorsey, on the vertical height of the head of the humerus (1897 – only three years after Dwight's historic Shattuck Lecture) the proximal end of that bone has likewise been acknowledged as a reliable indicator of sexual dimorphism. Pearson and others soon followed these earliest investigations with additional work, particularly on the femur. The majority of these metric studies however focused on the large-statured Whites of Europe and North America, with little attention to the more moderately proportioned populations indigenous to Asia and the Americas.

T. Dale Stewart, a pioneer of these kinds of sexual dimorphism studies within the modern era of forensic anthropology, did extend these same metrics to significant samples of American Blacks. He found the means for the two populations (U.S. Blacks and Whites) regarding maximum diameter of the femoral head, at least, to be nearly identical. White males average 48 mm in femur head diameter while Black males average 47.2. The White female mean of 42 mm is even closer to the Black female average of 41.5 mm. Such close patterning between these two large populations of North America has, over the years, led forensic anthropologists, bioarchaeologists and other human osteologists to tend to utilize a single scale for the sexing of the skeletal remains of all populations of *Homo sapiens*.

In order to test the reliability of the use of this metric scale (published first by Stewart and then later by Bass and others in modern standard textbooks) beyond the initial population samples of U.S. Blacks and Whites, the present study was undertaken. During the author's excavations and analysis of prehistoric skeletal remains from coastal West Mexico in the 1960s, data collection for these two measurements of the femur and humerus was initiated. The focus at the time was to test these dimensions collected on a short-statured population of indigenous Mesoamericans against those collected historically from samples of American Whites and Blacks. Initial results were suggestive of meaningful racial differences, so in order to develop further data from another contrasting sample of American Indians, similar measurements were collected on Northwestern Plains Indians. Within the past year all metrics have been compiled from both American Indian population samples, with a total adult skeletal sample of 67 Mesoamerican Indians, and 58 Northwestern Plains Indians. The means for these two Native American populations on both femoral head diameter and the vertical diameter of the head of the humerus are nearly identical. On the other hand, they are smaller than (and differ significantly from) the means for Blacks and Whites. This has led to the development of new metric scales for the sexing of American Indian skeletal remains that are specific to Native Americans and therefore provide more accurate results in skeletal analysis. These results also underscore the importance of testing for racial differences in important skeletal traits of *Homo sapiens* before using them beyond the initial population samples upon which they are based.

Population Variability, Femur, Humerus