



Physical Anthropology Section – 2004

H4 Sex Determination of Infants and Juveniles From the Clavicle

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The goal of this presentation is to present the forensic community with rates of accuracy obtained by using the clavicle to sex sub-adults from a modern sample.

This presentation will impact the forensic community and/or humanity by directing attention to an underutilized skeletal element that may have potential in sexing subadults.

This poster will give the results of a test of the clavicle's accuracy in determining sex in subadults. This study was conducted because of the difficulty of accurately sexing subadult skeletons. Much of the research done up to this point focuses on the pelvis and the teeth. Unfortunately, the number of studies done on subadult sexing is somewhat sparse, largely due to a lack of sizable skeletal samples of known sex and age.

The present study uses a modern autopsy sample of infant and juvenile clavicles housed at the University of Tennessee in Knoxville. The McCormick clavicles were collected between 1986 and 1997 by Dr. William F. McCormick from individuals of known sex, age and ancestry. The sample available for this study consists of mainly Caucasian children, and, consequently, the results presented here should not be generalized to all ethnic backgrounds. Furthermore, there were no children between the ages of four and six from which data could be obtained. Future research and the inclusion of additional samples will eliminate this gap.

The sample consists of 86 individuals: 36 females and 50 males. The left clavicle was absent in seven individuals, but all others had both clavicles. For purposes of statistical analysis, the sample was divided into infants (0-3 years) and juveniles (7-17 years). Statistical analysis was done with SAS version 8.2. Three measurements were taken from each clavicle: (1) maximum length, (2) sagittal diameter at midshaft, and (3) vertical diameter at midshaft. Separate accuracy rates were obtained for each measurement.

Maximum length of the clavicle yielded accuracy rates of about 62% for both age groups and sexes: infant females=62%; infant males=59%; juvenile females=62%; juvenile males=63%. Vertical diameter at midshaft gave slightly better rates overall: infant females=60%; infant males=63%; juvenile females=69%; juvenile males=73%. The results for sagittal diameter at midshaft differed vastly between age groups: infant females=51%; infant males=53%; juvenile females=85%; juvenile males=77%.

The best rate obtained for the infant group was 63%, which suggests that, although the clavicle is sexually dimorphic at birth (or even before then), it is not a reliable indicator of sex in infants for forensic or archaeological purposes. Likewise, maximum length is not a reliable indicator of sex in juveniles. However, the measures of diameter proved fairly reliable for sex determination in juveniles (69-85%).

These results suggest that measures of robusticity may be more sexually dimorphic in juveniles than measures of length. Indeed, in a 1998 American Journal of Physical Anthropology article titled Growth Patterns in the Modern Human Skeleton (105(1):57-72), Humphrey states that sexual dimorphism in long bone length is attained at adolescence, whereas sexual dimorphism in long bone diameters develops between birth and five years. Specifically, Humphrey maintains that sexual differences in all dimensions of the clavicle are already present at birth. The present research suggests that sexual dimorphism in long bone diameter is greater in the juvenile group than in infants. These results warrant further investigation into this area, and the authors are working to increase the sample size and eliminate the information gap for 4-6-year-old children.

Sexing, Sub-Adults, Clavicle