H27 Sex-Determination of Koreans Using Metric Analysis of Vertebrae

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After attending this presentation, attendees will understand the results of sex determination of Koreans using metric analysis of vertebrae from the documented skeletal collection housed at Yonsei University in Korea.

This presentation will impact the forensic community by presenting the results of metric analysis about the cervical, thoracic and lumbar vertebrae, and the usefulness of the documented skeletal collection housed at Yonsei University for determination of the biological profile in Koreans.

Physical anthropology is a branch of anthropology concerned with the study of human evolution and human biological variation, including the investigation of the morphological characteristics of the human body including bone. There are two main ways to collect anthropological data: metric and non-metric. Through this process, physical anthropologists interpret and understand the characteristics of a population, such as biological evolution and genetic inheritance. In order to appreciate the characteristics of a population, it is important to statistically study documented human skeletal specimens. On the basis of these results, a reconstruction of the biological profile for unidentified skeletal remains can be possible. The Department of Anatomy, Yonsei University College of Medicine in Korea has collected skeletons after anatomy class since the 1990's, and about 100 specimens have been collected. This study will present the results derived from the documented skeletal collection at Yonsei University, which pertains to sex determination in Koreans based on metric study of vertebrae.

For this study, 34 whole vertebral columns were selected out of the total Yonsei sample since many cervical vertebrae were missing from the anatomy class and skeletal preparation. These consisted of 22 males and 12 females, and the average age was 54 years (from 18 to 88 years). For the thoracic and lumbar vertebrae there were a total of 9 measurements: upper & lower end-plate width, depth of upper end-plate and lower end- plate, anterior height and posterior height of vertebral body, transverse diameter of vertebral foramen, sagittal diameter of vertebral foramen, and width of vertebra. In the cervical region, measurements were taken of the length of the spinous process instead of the depth of the upper end- plate and lower end-plate because the vertebral body of the cervical vertebrae have the uncinate process. Measurements for atypical vertebrae (i.e., the atlas and axis) consist of 23 and 13 measurements, respectively. All measurements were taken with a digital caliper (Mitutoyo Co., Japan) and statistical analysis was performed using SPSS (version 13.0).

The measurement values related with the vertebral body dimensions, such as upper & lower end-plate width, were highly dimorphic between males and females. Also, results show that the measurement values were related to the size of the vertebrae, such as width of vertebra. The discriminant function equations were obtained by univariate, bivariate, and step-wise methods. The range of accuracy of the cervical vertebrae was from 78.8 to 100%, and accuracy for the thoracic vertebrae was from 86.1 to 100 %, and for the lumbar vertebrae it was from 76.5 to 97.1%. The accuracy of the 5th cervical vertebra, 3rd and 11th thoracic vertebrae, and 1st lumbar vertebra showed the highest accuracy of sex classification.

This presentation could indicate that metric data of vertebrae are useful for sex determination in Koreans, especially in the vertebral region where movement is frequent. However, further investigation is necessary to increase the sample size and work will continue in order to study the vertebrae from the digital Korean human model established by Computer Tomography (CT). Finally, the documented skeletal collection at Yonsei University is a useful resource for research related to the Korean biological profile.

Koreans, Sex-Determination, Vertebrae

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