H15   Sex Determination of Koreans Through Cervical Vertebrae

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After attending this presentation, attendees will understand the preliminary results of biological profiles of Koreans from the documented skeletal collection at Yonsei University in Korea.

This presentation will impact the forensic community and/or humanity by demonstrating the results of a metric study about the cervical vertebrae that shows sexual dimorphism and the usefulness of the documented skeletal collection at Yonsei University for determination of biological profiles in Koreans.

Terry collection specimens housed at the Smithsonian Institution and Hamann-Todd collection individuals at the Cleveland Museum of Natural History are two well-known examples of documented human skeletal specimens. Many statistical studies of morphological characteristics about documented human skeletal specimens have been performed and provide information about the characteristics of a population. On the basis of these results, reconstruction of biological profile for unidentified skeletal remains can be possible. However, the statistical data about Korean ancestry has not been established because documented human skeletal specimens are lacking in Korea. The Department of Anatomy at Yonsei University College of Medicine has been collecting the skeletons from dissecting cadavers after anatomy class since the 1990s, and approximately 100 specimens were collected. This study will demonstrate the preliminary results on the determination of sex by metric study of the cervical vertebrae derived from studying this documented collection.

This study attempted to duplicate a series of metric dimensions as defined by previous studies; however, the sample size in the dissecting cadavers was limited. The list of measurements taken includes the dimensions of the vertebral body, dimensions of vertebral foramen (spinal canal), and the size of the vertebrae. Twenty-one measurements of the atlas [length and width of atlas, maximum length and width of superior and inferior articular facets, maximum breadth between superior and inferior articular facets, sagittal and transverse diameter of vertebral foramen (spinal canal)] and 14 measurements of the axis were taken. All measurements were taken using digimatic caliper (Mitutoyo Co., Japan) and statistical analyses were performed using SPSS (version 11.0).

Among the 21 measurements of the atlas, the maximum breadth between the superior articular facets exhibited the strongest principal component for determination of sex. Atlas width also exhibited strong relation with sex, while maximum lengths and widths of superior & inferior articular facet did not. The latter measurements were reported to suggest sexual dimorphism in previous studies, and this fact might cause difficulty in determination of sex for fragmentary atlas in Koreans. However, six measurements were selected in arbitrary discriminant functions, and showed more than 85% of hit ratio. Concerning the 14 measurements of the axis, axis width exhibited the strongest principal component for determination of sex, and discriminant functions showed more than 80% of hit ratio. The sagittal and transverse diameter of the vertebral foramen (spinal canal) of the axis appeared to exhibit a relationship with sex, but those of the atlas did not.

This presentation could indicate that metric data of cervical vertebrae are helpful to determine the sex in Koreans especially certain measurements of the atlas and axis. Also the documented skeletal collection at Yonsei University could be helpful to establish the Korean biological profile. Further investigation is necessary so that differences among ancestries could be performed, and common landmarks for measurements of sex-determination using cervical vertebrae would be established.

Koreans, Sex-determination, Cervical Vertebrae