



Physical Anthropology Section – 2008

H100 A Test of the FORDISC Sex Discriminant Function on a Korean Cranial Sample

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The objective of this presentation is to apply the software to a population excluded in the reference sample and to determine if the database from which FORDISC is based should include more specific modern reference groups.

This presentation will impact the forensic community by further contributing to our understanding of human biological variation and applying the software to a South Korean population where forensic anthropology is a relatively new discipline.

Sex estimation of human skeletal remains is one of the key analyses in forensic anthropology. Forensic anthropologists have been relying on discriminant function analysis as one of the powerful statistical tools in estimating individual characteristics in skeletal remains. FORDISC is a user-friendly computer software that is designed to assist in the estimation of sex and ancestry by employing discriminant function analysis. The reference groups used to create the program is based on the Forensic Data Bank (FDB) at the University of Tennessee-Knoxville, and includes the following populations: American black males and females, American Indian males and females, American white males and females, Chinese males, Hispanic males, Japanese males and females, and Vietnamese males. Due to human biological variation, the osteological methodologies developed from the reference groups may not necessarily apply to another population. However, due to the biological and cultural affinity among East Asian populations, FORDISC sex discriminant function may be applicable to modern Koreans. Thus, FORDISC 2.0 was tested on a pilot sample of modern South Korean crania for which sex was known through DNA, dental, and/or other identification methods.

Thirty-one ethnic Korean individuals in this study represent forensic cases from various regions of the South Korean peninsula that were submitted by local law enforcement agencies to the National Institute of Scientific Investigation (NISI) in Seoul. A tooth or a small bone sample was removed and sent to the DNA Analysis Division at NISI for analysis. The amelogenin locus was used in sex determination through the Polymerase Chain Reaction (PCR) and electrophoresis of PCR products. The DNA output was submitted as XY for males and XX for females. At the Forensic Medicine Division, up to 24 cranial and ten mandibular measurements were collected as specified in the standard osteological data collection procedure (Moore-Jansen et al. 1994). Measurements from the individual cases were entered into the FORDISC program. To run the sex discriminant function, we excluded the XRB measurement, or maximum ramus breadth, in all individuals as the inclusion of XRB dramatically reduced the group samples and the analysis was not possible.

FORDISC correctly classified the sex in 26 individuals (83.9%). Of the five that were misclassified, two individuals had cranial measurements which placed them close to the sectioning point or the overlapping region. Three of the five individuals were females and misclassified as males and two males were misclassified as females. It was expected that the software program would be applicable to modern Koreans due to their close affinity to the Chinese and Japanese populations, which are included in the FORDISC reference groups. However, the software should be tested on a larger Korean sample, and although ethnic Koreans in South Korea are relatively homogeneous, the need for FORDISC in Korea may be necessary due to the recent influx of immigrants from many regions of the world. As the authors of FORDISC intend, the FDB will continue to expand on the number of cases with definite sex and ethnicity and incorporate them into the database. Therefore, it is recommended that forensic anthropologists continue to employ multiple metric and non-metric methodologies when estimating sex and other individual characteristics.

FORDISC, Discriminant Function, Korea