A36 Introducing MorphoPASSE: The Morphological Pelvis and Skull Sex Estimation Database

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After attending this presentation, attendees will be familiar with MorphoPASSE, a free interactive database for estimating sex in unidentified adults.

This presentation will impact the forensic science community by providing a new computer-based, statistical database program for sex estimation that is multivariate and combines two skeletal regions.

According to a recent survey administered to current American Academy of Forensic Sciences Anthropology Section members, most practitioners prefer to use both qualitative and quantitative methods when estimating sex from unknown skeletal remains; however, when only one method is used, qualitative methods are preferred nearly twice as often as metric methods.[1] Benefits of morphological methods include ease of use, efficiency, no need for specialized equipment, and applicability to fragmentary remains. Unfortunately, many of the qualitative methods used for sex estimation are based on subjective interpretations of skull and pelvis traits.

Studies by Walker and Klales et al. attempted to remedy the aforementioned shortcomings of morphological methods by: (1) providing modified descriptions of commonly used traits; (2) creating standardized illustrations with systematic ordinal scales; and, (3) including statistical analyses for a number of morphological skull and pelvis traits.[2,3] This was conducted to reduce the level of subjectivity and better conform to the scientific expectations presented in the *Daubert* proceedings and the National Academy of Sciences (NAS) Report. The Walker method utilizes glabella, nuchal crest, supraorbital margin, mastoid process, and the mental eminence, while the Klales et al. method utilizes the ventral arc, medial aspect of the ischio-pubic ramus, and the subpubic concavity/contour.[2,3] The eight traits included in these two methods continue to be the most popular morphoscopic traits for sex estimation, according to the Klales survey.[1] Both methods have been well received in the anthropological community and are currently being used nationally and internationally for forensic casework. To facilitate easier application of these methods and sex classification combining the methods, research was undertaken with the goal of developing a free database program.

Data were collected from more than 2,500 individuals from various United States and international collections to: (1) examine the reliability and validity of both methods; (2) examine the impact of experience in applying the methods; and, (3) determine the effects of population variation, secular change, and asymmetry on the methods. This research has culminated in the development of the free, interactive morphological database Morphological Pelvis and Skull Sex Estimation, known as MorphoPASSE. MorphoPASSE allows forensic practitioners to analyze sex in their unknown cases in a manner compliant with *Daubert*. Practitioners enter ordinal scores of an unidentified individual into the program based on the traits available for scoring (i.e., the program does not require complete remains or use of all traits). Then, these trait scores are compared to the known samples in the database for sex classification, either by selecting a specific population and/or temporal period in order to compare the unknown individual to the most appropriate reference sample or by using the generic logistic regressions equations created from the entire sample when the other parameters are unknown. MorphoPASSE then provides the user with posterior probabilities and associated error rates for sex classification that the user can then include in forensic case reports.

A publicly available user manual and website (www.MorphoPASSE.com) have been created to accompany the database. The first portion of the manual contains detailed descriptions of the traits, with reference to the original publications, and detailed instructions on scoring the traits in light of the results from this research. The second portion of the manual contains specific instructions for using the database and interpreting the sex classification results generated from the program. Since each forensic case presents with a different suite of traits, the statistical software package will provide a graphical user interface to simplify the entry of variables associated with each case. The package interfaces with R to conduct the statistical tests and the results are displayed in a user-friendly format. The score data from this research is available in numerous formats, including a CSV file and an R package.

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Walker Method, Klales Method, Sex Estimation