



Physical Anthropology Section - 2014

H84 Determination of Sex From the Human Hyoid Bone in a Contemporary White Population

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After attending this presentation, attendees will: (1) have an understanding of differences in accuracy rates of discriminant functions developed on White archaeological skeletal populations when applied to contemporary White skeletal populations; (2) have an understanding that methods developed on archaeological populations are not necessarily accurate for estimation of sex of modern populations; (3) learn how to apply discriminant function equations for estimation of sex from human remains; and, (4) learn how to test discriminant functions developed on archaeological populations on modern populations.

This presentation will impact the forensic science community by outlining the manner in which: (1) this is unique research that has not been published previously for a modern population; (2) this new data will help in the positive identification of unknown human skeletal remains in modern White populations; (3) this data shows that, for forensic cases, methods employed for estimation of sex must be developed using modern skeletal remains; (4) the *Daubert* and *Mohan* rulings require forensic methods to be scientifically tested and reproducible, which this presentation does for the hyoid bone in modern White populations; and, (5) this research establishes methodologies for the hyoid bone in modern White populations via reproducible, scientifically tested results, in line with *Daubert* and *Mohan* rulings.

This project evaluates a method for sex determination using the human hyoid bone. It evaluates the accuracy of six discriminant functions developed by Kindschuh *et al.* on an archaeological white skeletal population and then applies the functions to a contemporary White skeletal population. The hyoid body and the left and right greater cornua were measured from 134 individuals (68 male; 66 female). Fifteen measurements were taken from fused hyoids and 12 measurements were taken from unfused hyoid bones. Applying discriminant functions developed from archaeological hyoid bones yielded accuracy rates ranging from 79.1% to 92.3% for contemporary White hyoid bones. Mean and sex specific accuracy rates indicated that two functions developed on archaeological fused hyoids were not accurate in determining females in a contemporary White skeletal population. Discriminant functions developed on the unfused hyoid and the hyoid body of fused and unfused hyoids had accuracy rates ranging from 88.1% to 92.3%, indicating that they were efficient for determining sex for a contemporary White skeletal population.

Two-sample *t*-tests showed statistically significant differences between archaeological and contemporary populations in the height of the anterior cornua (CHI) of both fused and unfused males. Significant differences were also observed between the archaeological and contemporary populations' Total Hyoid Length (THL) in both males and females. Four of the six discriminant functions developed by Kindschuh *et al.* can be applied to contemporary White hyoid bones; however, significant differences in THL and CHI between archaeological and contemporary skeletal populations indicate that discriminant functions developed solely on archaeological-fused hyoids are less accurate when applied to contemporary White hyoid bones.

The use of the hyoid bone for determination of sex from discriminant function calculations remains promising, with accuracy rates as high as 92.3% in contemporary White hyoids. In forensic contexts, this new data will aid in the positive identification of unknown human skeletal remains. The *Daubert* and *Mohan* rulings require forensic methods to be scientifically tested and reproducible. As secular and allometric changes have been observed in skeletal anatomy as populations evolve, it is therefore essential that methods developed on an archaeological population be tested for accuracy on a modern population.

Sex Determination, Hyoid, Modern