H46 Test of a Method Regarding Sex Indication of the Human Hyoid Body

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After attending this presentation, attendees will become familiar with the three measurements of the human hyoid (out of 16 possible measurements) that have been used repeatedly to demonstrate differences between the sexes. Also, this presentation will evaluate the strengths and weaknesses of taking measurements of the hyoid from radiographs (or photographs) as opposed to measuring actual bones. Results of two studies will be discussed and compared.

This presentation will impact the forensic community and/or humanity through the value of the potential for using the hyoid as a reliable sex indicator.

For forensic anthropologists, one of the smallest bones in the human body may hold information that can identify an unknown victim. A discriminant function that correctly identifies the sex of 76% or more of human hyoids may aid in the sexual identification of an unknown person (especially when other bones are not available). The purpose of this project is to test the discriminant function method for indicating sex of human hyoids as outlined by Reesink et al. (1999). Reesink et al.'s function is based on three measurements taken from radiographs of the hyoid bone: the maximal medial height of the corpus (MMH), the anterior posterior thickness of the corpus (ATP), and the maximal transverse diameter of the corpus (MTD). With that method, Reesink et al. (1999) correctly identified sex 76% of the time. The current study repeats the research by Reesink et al. (1999), but instead of using radiographs, measurements were taken from actual donated hyoids curated at the Forensic Anthropology and Computer Enhancement Services (FACES) laboratory at Louisiana State University. The measurements used in the current study were interpreted as being the height of the body, the thickness of the body, and the width of the body (see also Devlin's hyoid body measurements pp. 95-97). The FACES lab collection consists of 198 total hyoids of which 107 are males, 27 are females, and 64 are of unknown sex. All three measurements must be present to correctly use the discriminant function, and 55 males and 20 females in the FACES lab collection met these requirements.

Preliminary results of the current study suggest that all three measurements of the hyoid show statistically significant differences between males and females at $\alpha = 0.001$. This finding is supported by Reesink et al. (1999 p. 358) and Devlin (2002). Therefore, all three studies reflect that size differences exist between the hyoid bodies of males and females. In fact, in her 2002 dissertation, Devlin states "Males exhibit taller, wider, and thicker hyoid bodies in comparison to females" (p. 148).

Reesink et al.'s (1999) results from their discriminant function suggest that male values will be less than zero while female values will be greater than zero. In contrast, preliminary results of the current study where the actual bones were measured suggest that while there is a significant difference ($\alpha = .05$) between the male and female results, as derived from the discriminant function, both female and male results are negative. Specifically, the mean for all discriminant function results is - 2.1783 for females and -1.2091 for males, respectively. Possible explanations for these differences in results for the two studies may include interpretation of the exact location of measurements taken (especially the ATP) and also the disparities that might arise from taking measurements from radiographs as opposed to actual bones. Future studies with larger collections could help address these concerns.

References:

1 Reesink, E.M., A.A.H Van Immerseel, R. Brand, and TJ.D. Bruintjes, (1999) Sexual Dimorphism of the Hyoid Bone? *International Journal of Osteoarchaeology*, 9: 357-360.

2 Devlin, Joanne Lorraine, (2002) Morphological Considerations of the Human Hyoid Bone. *Dissertation, University of Tennessee, Knoxville.*

Human Hyoid, Discriminant Function, Sexual Dimorphism

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