



Anthropology Section - 2016

A10 Evaluating Elongated Pubic Bones as a Potential Sexing Method for Juveniles

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After attending this presentation, attendees will be informed about the issues with current subadult sexing methods and the utility of public bone elongation as a sex indicator in juvenile skeletal remains and its relationship with age.

This presentation will impact the forensic science community by helping to make sexing juveniles a simpler and more realistic task than it currently is, which will aid in identification and the return or curation of unknown remains.

In the field of anthropology, it is important to know the biological profile of individuals in order to understand past population structure, mortality rates, sex-specific burial practices and rituals, and demographics of study samples and populations. This information is critical to increase insight into archaeological populations and to establish standards for research techniques.

Specifically in biological anthropology, having enough information and applicable methods to estimate the biological profile from skeletal remains is imperative for the identification of unknown individuals. Current literature on juvenile sexual dimorphism is lacking, and existing publications on juvenile sexing methods have been known to result in low correct classification rates.¹ Furthermore, Holcomb and Konigsberg attest to a wide overlap between the two sexes and question the accuracy of current sexing methods in juveniles.² These issues lead to the hindrance of juvenile sex estimation analyses and the identification process. Cognizance of sexual dimorphism patterns and human variation within and between populations is important in order to produce a stronger academic and research foundation for the field and their resulting real world applications.

Bass noted the elongation of the pubic bone as being a female trait.³ This trait is often informally recognized by biological anthropologists, but it is seldom officially identified and used in non-metric trait studies. As of yet, pubic elongation and radiographic images of juvenile pubic bones have not been utilized as a potential method to quantify sexually dimorphic traits in subadults.

The present research includes a preliminary evaluation of juvenile pubic bones for sexual dimorphism. Radiographs of 20 juveniles from 9 years to 12 years of age were selected at random from the Pediatric Radiology Interactive Atlas (Patricia®) database.⁴ Each individual was scored three times for presence/absence of elongated pubic bones. Three rounds of scoring were used to ensure reliability of this method and to serve as intra-observer error for future research in this study.

Chi-square goodness of fit and Cramer's V statistics were employed to evaluate the significance of the results. Sex ($\chi^2=10.769$, p -value=0.001; Cramer's $V=0.734$, p -value=0.001) was found to have a stronger correlation with the presence of elongated pubic bones than age ($\chi^2=6.848$, p -value=0.039; Cramer's $V=0.569$, p -value=0.039). Females under the age of ten years used in this research were incorrectly classified as male based on their lack of pubic elongation.

Preliminary findings indicate that this method accurately classifies males aged 9 years to 12 years old and females aged 10 years to 12 years old. Other methods for sexing juvenile skeletal remains are often unreliable, inconsistent, and/or require extensive amounts of data and funding. The method proposed here is less expensive and more efficient than established methods and can have a profound effect on the identification rates of unknown juveniles.

Reference(s):

1. Vlcek D., Roksandic M., Schillaci M. Greater sciatic notch as a sex indicator in juveniles. *Am J Phys Anthropol* 2008;137(8):309-315.
2. Holcomb S.M.C., Konigsberg L.W. Statistical study of sexual dimorphism in the human fetal sciatic notch. *Am J Phys Anthropol* 1995;97(2):113-125.
3. Bass W.M. *Human osteology: a laboratory and field manual*. Springfield, MO: Missouri Archaeological Society, 2005.
4. Ousley S.D. *Patricia (Pediatric Radiology Interactive Atlas)*. Mercyhurst University, 2008.

Juvenile Skeletons, Sex Estimation, Pubic Bone