A71   The Application of the Sub-Pubic Concavity/Contour for Sexing Subadult Human Innominates

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After attending this presentation, attendees will understand the timing and onset of sexual dimorphism in the morphology of the pubis which is commonly used for non-metric sex estimation of human remains.

This presentation will impact the forensic science community by testing the applicability, reliability, and validity of a trait commonly used in adult sex estimation for the prediction of sex in unknown subadult individuals encountered in forensic cases. The revised method presented in this research can be used to estimate sex in individuals younger than previously reported in the literature.

Sex estimation is essential for the assessment of a biological profile in forensic cases. While the innominate is considered the best indicator of sex in adults and is widely used for sex estimation in forensic cases, the use of the innominates for subadult sex estimation has been limited. Numerous studies have assessed the utility of other areas of the innominate (ilium/ischium), yet few studies have attempted to address the usefulness of the pubic bone for subadult sex estimation. A preliminary study on subadult pubic bones from the Hamann-Todd Osteological Collection has shown that it is possible to use a modified version of the Klales et al. method to estimate sex in subadult age categories younger than previously believed.[1] The results from this preliminary study were encouraging; however, a larger sample size was needed for the results to be statistically significant. The present research examines the subadult pubis using a revision of the Klales et al. Sub-Pubic Contour (SPC) scoring in a large sample of subadults.[1] The first goal of the study was to determine if this revised technique can be used to differentiate sexes in subadult remains. The second goal was to evaluate the timing or onset of sexual dimorphism in the SPC. The third goal of the study was to test the level of observer agreement for trait scoring.

The sample used in this research was derived from the PATRICIA Radiographic Data Bank. The database contains radiographs from a "geographically and ethnically diverse" sample of modern American subadults (born after 1990) with known demographic information collected from various coroner and medical examiner offices throughout the United States.[2] A total of 334 individuals of both sexes (149 females, 185 males) were included in this research. Individuals in the sample ranged in age from 1.19 to 20.47 years. The sample was divided into six age cohorts that were slightly modified versions of the age categories presented in Baker and colleagues: (1) Young Child Early (1.0 to 3.5 years); (2) Young Child Late (3.6 to 6.5 years); (3) Older Child Early (6.6 to 9.5 years); (4) Older Child Late (9.6 to 12.5 years); (5) Adolescent Early (12.6 to 15.5 years); and, (6) Adolescent Late (15.6 to 20.5 years).[3] Two observers, one experienced and one upper-level anthropology student, scored each radiograph using a revision of the Klales et al. adult SPC scale/figures.[1] For the present research, the original adult SPC scores were reduced from five ordinal scores to three. First, trait frequency distributions for each ordinal score by sex were calculated for each of the age cohorts. Next, sex classification accuracy using SPC ordinal scores was tested using Ordinal Logistic Regression (OLR). Lastly, the Intraclass Correlation Coefficient (ICC) was utilized to test the degree of agreement for trait scoring between the experienced and inexperienced observer.

Score frequencies varied by age cohort. Score frequencies shifted away from Score 2 (straight), which was most common in the younger age cohorts, to a higher frequency of Score 3 (convexity) in males and a higher frequency of Score 1 (concavity) in females with increasing age. Using OLR, sex classification accuracy was highest for the oldest age cohort (Adolescent Late) at 97.2% combined correction classification and then decreased in order of age. Using the ICC, inter-observer error between the two scores rendered a high level of agreement (0.806) and mirrored the results of the original Klales and colleagues study. Results from this research indicate that the SPC method used in adult sex estimation can be modified and applied to subadult remains to accurately estimate sex of unknown subadults following the onset of puberty (around 12 years of age) with a high degree of reliability and validity.

References:

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Biological Profile, Subadult Sex Estimation, Pelvis