A89 The Effects of Parturition on Pelvic Age Indicators

Rosanne Bongiovanni, PhD, University of South Florida, Dept of Anthropology, 4202 E Fowler Avenue, Tampa, FL 33620*

After attending this presentation, attendees will understand the need for consideration of parity when assessing age of the pelvis in a recent forensic sample from the United States, the necessary methods utilized on the pelvis, the process and reasoning behind the collection of data, and subsequent statistical analysis employed in this study.

This presentation will impact the forensic science community by indicating whether parturition affects an accurate assessment of age on the pelvis in a recent forensic sample from the United States and if it needs to be considered as an addition to the methods employed in human identification.

Estimating age from skeletal remains is a critical component of the biological profile of an individual. To date, there are different methods used on select parts of the skeleton to assess the age of the individual, and currently the pelvis is relied upon heavily to obtain accurate and reliable age ranges.[1-3] Other researchers have found that age-related changes follow different trends in males and females, with parity presented as one of the possible causes for such differences.[1,4-6] There is reason to believe that parturition may increase the rate at which the areas of interest of the pelvis degenerate; however, this hypothesis has yet to be formally tested on a recent skeletal collection. The purpose of this study, therefore, is to assess the effects of parturition on the pubic symphysis and auricular surface and determine whether it influences the physiological age of the individual enough to cause an inaccurate estimate of the chronological age.

Data were collected from the William M. Bass Skeletal Collection located at The University of Tennessee, Knoxville. This is a collection of recent forensic skeletons with known age-at-death, ancestry, sex, and medical background. The features of the pubic symphysis were noted and matched with the best-fitting phase in both the Suchey-Brooks and Todd pubic symphysis scoring systems.[2,7] Next, the features of the auricular surface were noted and matched with the best-fitting phase in the system presented by Lovejoy and colleagues and were individually scored, resulting in a composite score following the method proposed by Buckberry and Chamberlain.[3,4] Therefore, others attempting to replicate this research will be able to reliably assess these areas. Time was designated at the beginning of the second and third days to employ the test-retest method to calculate the intra-observer error rate and ensure reliability of these assessments.

In this study, a statistical comparison was made between females who have given birth and those who have not to determine whether this process affects the rate of degeneration of the areas of interest of the pelvis. A transition analysis, also known as a cumulative probit analysis, was conducted on the data in order to establish the age-at-transition distributions between the stages of each age-estimation method. The results were then compared between the males and the parous and nulliparous female groups. The purpose for this comparison is to observe whether the age-at-transition distributions differ between sexes and/or the two groups, with the focus being on whether the parous group illustrates a difference in rate of degeneration, or transition to subsequent observable stages, when compared to the nulliparous group.

The study contained 434 individuals (males: 234/females: 200/parous: 157/nulliparous: 43). The data was entered into the statistical software program R version 3.0.2. The transition analysis produced significantly different results between parous and nulliparous females using the pubic symphysis but not when using the auricular surface. The current research suggests that parturition affects the pubic symphysis and not the auricular surface when determining age-at-death. Moreover, the male group and the nulliparous female group transition around the same age, while the parous females transition at an earlier age. The applicability of taking parturition into consideration when assessing the age of females for use in human identification in modern forensic cases will be discussed.

References:

1. Berg GE. Pubic Bone Age Estimation in Adult Women. *J Forensic Sci* 2008:53 (3): 569-577.
2. Brooks ST, Suchey JM. Skeletal Age Determination Based on the Os Pubis: A Comparison of the Ascadi-Nemeskeri and Suchey-Brooks Methods. *Human Evol* 1990: 5:227-238.
3. Buckberry JL, Chamberlain AT. Age Estimation From the Auricular Surface of the Ilium: A Revised Method. Am *J Phys Anthropol* 2002: 119: 231-239.
4. Meindl RS, Lovejoy CO. Age Changes in the Pelvis: Implications for Paleodemography. In: Iscan MY, editor. Age Markers in the Human Skeleton. Springfield: Charles C. Thomas, 1989:137-168.
5. Resnick D, Niwayama G. *Diagnosis of bone and joint disorders*. 2nd ed. Philidelphia: W.B. Saunders Company, 1998.
6. Suchey J, Katz D. Applications of the pubic age determination in a forensic setting. In: Reichs K, editor. Forensic osteology: advances in the identification of human remains. Springfield: Charles C. Thomas, 1998: 204-236.
7. Buikstra JE, Ubelaker DH. Standards For Data Collection From Human Skeletal Remains. Arkansas Archeological Survey Research Series No. 44, 1994.

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