



A8 An Examination of Pelvic Scarring as a Determinant of Sex

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Learning Overview: The goals of this presentation are for attendees to: (1) develop a better understanding of the factors influencing pelvic bone scarring; and (2) recognize the value of peri-auricular scarring in determining the sex of the decedent.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing a statistically rigorous study of pelvic scarring using a large modern skeletal sample, helping to resolve the contradictory findings of prior research.

The following null hypotheses are tested: the preauricular sulcus, interosseous groove, pubic tubercle, and retroauricular surface do not covary with (1) parity, (2) sex, (3) age, or (4) body size.

Previous studies have obtained contradictory results regarding the association between pelvic scars and childbirth; most employed weak experimental designs, making it difficult to separate the factors that influence the formation of scarring. The first installment of the current study (presented at the American Academy of Forensic Sciences annual meeting in 2018) examined the relationship between parity and dorsal pubic pitting and found that the sex of the decedent is the primary determinant of pitting, while parity has a significant but low-level influence. The second part of this study examines four other pelvic scars, none of which displayed any relationship to parity in the original study. This study builds on prior research by using a large modern sample with known parity status, combining traditional qualitative scoring with quantitative measurements and using powerful Analysis of Covariance (ANCOVA) -family tests to separate the different influences of parity, sex, age at death, and body size. Consequently, more effective predictive models can be generated for use in forensic anthropological investigations.

The same sample of skeletons used in the previous study was assessed for the presence and degree of pelvic scarring. A total of 530 identified, primarily Euro-American individuals was drawn from the Texas State University Donated Skeletal Collection, the Maxwell Museum Documented Skeletal Collection, and the William M. Bass Donated Skeletal Collection. Sex, age at death, and ancestry were recorded for all specimens, and all females have self-reported parity status. Coxa height was used as an indicator of overall body size. The presence and severity of the preauricular sulcus and the interosseous groove were scored and the width, depth, and length of preauricular pits were also measured with sliding calipers. The type of preauricular sulcus and interosseous groove present (“groove of pregnancy” or “groove of ligament”) was also recorded. The height of the pubic tubercle was measured using a contour gauge and sliding calipers, and retroauricular surface rugosity was scored ordinally. Binary logistic or ordinal regression was used to analyze the categorical non-metric pelvic traits, and ANCOVA was used to analyze the continuous metric pelvic traits.

Results indicate that the presence of the preauricular sulcus and interosseous groove are strongly determined by sex and can serve as effective sex indicators. Females are more than twice as likely to present a preauricular sulcus (85%) or an interosseous groove (65%) than males (39% and 20%, respectively). Additionally, older individuals are more likely to display a preauricular sulcus than younger individuals. The type of preauricular sulcus is also affected by sex and age: females and older individuals are more likely to present a “groove of pregnancy” than males and younger individuals. Preauricular sulcus measurements are also affected by sex and age, with all dimensions being larger in females and male sulci becoming wider with age. However, in all tests, sex is by far the primary determinant of preauricular sulcus presence, type, and size, with age having only a minor influence. The type of interosseous groove does not differ by sex, suggesting that the distinction for this feature is morphologically irrelevant and/or it is too variable to be practically useful.

The height of the pubic tubercle is only affected by body/pelvic size in both sexes and thus cannot be used to determine the sex of unidentified individuals. The retroauricular surface increases in rugosity with age and body size and is more rugose in females, but age is the most significant determinant.

In sum, these results illustrate that the peri-auricular pelvic scars are useful primarily for determining sex, with the effects of other variables being minor or non-existent. The pubic tubercle and retroauricular area reflect increasing body size or age; none of the features examined here are influenced by childbirth.

Forensic Anthropology, Pelvic Scarring, Sexual Dimorphism