A27 The Age-Informative Value of the Pubic Symphysis Compared to Other Skeletal Traits in a Chilean Sample Using Transition Analysis

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Learning Overview: After attending this presentation, attendees will have a more nuanced understanding of the informative value of pubic symphysis trait variants for adult age-at-death estimation and a visual appreciation of the potential of combining different traits in the skeleton using transition analysis.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing a new perspective on historical assumptions regarding the age-informative value of the pubic symphysis, a better understanding of the age-related changes of the evaluated trait variants, and their potential combination. This presentation also opens questions regarding the evaluation of skeletal traits as components or phases. More than any single result, this work offers additional evidence that new approaches for the identification and evaluation of age-informative traits beyond the traditional areas is needed.

This work proposes that the age-related informative value of the pubic symphysis—historically considered one of the most informative and reliable age indicators in the skeleton—has been overvalued compared to information found elsewhere in the skeleton. This research supports the idea that morphological changes of the pubic symphysis are insufficient to provide enough information to estimate age at death for middle-aged and older adults.

Pubic symphysis age-estimation methods that evaluate phases (combined traits) and report descriptive statistics are among the most used by forensic anthropologists despite documented biological and statistical issues. To evaluate the informative value of the pubic symphysis, its phases and traits were compared to the newly proposed Transition Analysis 3 (TA3) traits distributed throughout the skeleton.[1] The statistical approach of transition analysis has the potential to combine the information from multiple traits without forcing them to follow a pattern such as pre-determined phases, allowing each to inform different parts of the lifespan.[2] In this study, the collective age-informative value of the traits was assessed by visualizing the distribution of their transition curves throughout the adult lifespan.

Suchey-Brooks and Hartnett pubic symphysis phases and TA3 traits, including a small number from the pubic symphysis, were evaluated in a sample of 309 individuals from the Santiago Subactual Osteology Collection, a Chilean collection composed of unclaimed individuals who died during the second half of the 20th century.[3,4] Transition curves were generated for each documented transition with a pooled male and female sample and overlapped to facilitate visualization.

Considering only data from the pubic symphysis, both the TA3 traits and phases from the Suchey-Brooks and Hartnett methods were found to be only informative for a limited length of the lifespan. The highest age-informative value was concentrated in the first half of the lifespan as originally recognized by Todd and sparsely informative for the second half. Hartnett's phase VII predictably informed older ages; however, separated into components, its traits were not as informative as when grouped. TA3 traits from other areas of the skeleton inform of a larger portion of the lifespan than the pubic symphysis and do so more robustly. This improved age-informative value is due not only to TA3 traits outnumbering the evaluated pubic symphysis traits, but mainly because the traits from other areas of the skeleton provide information for different ages at death that are more widely distributed along the lifespan. Although still valuable for age estimation, the pubic symphysis does not seem to provide enough age-related information in adulthood to reduce the infamously large estimated age ranges of phase methods.

Reference(s):

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3. Brooks, S., and J.M. Suchey. 1990. Skeletal Age Determination Based on the Os Pubis: A Comparison of the Acsádi-Nemeskéri and Suchey-Brooks Methods. *Human Evolution* 5 (3): 227–38. https://doi.org/10.1007/BF02437238.
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