Annotated bibliography on sex estimation strategies

Annotated Bibliography: Season 7, Episode 1:“ The Memories in the Shallow Grave”

References

Krishan, K., Chatterjee, P., Kanchan, T., Kaur, S., Baryah, N., & Singh, R. (2016). A review of sex estimation techniques during examination of skeletal remains in forensic anthropology casework. *Forensic Science International* , (261), 165. e1-165. e8. https://doi. org/10. 1016/j. forsciint. 2016. 02. 007

Krishan et al. addresses the many different methods used to determine sex in forensic anthropology. Sex identification is important in forensic work because it plays a vital role in identifying the unknown skeletal remains in question, while also providing information in ancestry, age, osteometry, and pathology. Each of these characteristics forms a biological assessment and helps with figuring out the motive and other significant information of a crime. In this article, the methods focused on were morphological, metric, molecular, radiographic, computed tomography (CT) and magnetic resonance imaging (MRI), geometric morphometric, and diagnose sexuelle probabiliste. The first step in finding which method to use includes the completeness (intact or fragmentary) of the skeletal remains and if there has been any other damage, such as thermal alterations. The morphological method is viewed as more acceptable for adult remains compared to subadults, which is due to the development in juveniles not being complete. The metric method focuses on statistical and proportion results based on male versus female skeleton measurements taken from different areas of the skeleton (cranial/ postcranial). The analysis of these measurements enables results to be interpreted easier, but tend to be less reliable due to

the lack of sex differences. The radiographic method of sex estimation was determined to be credible in its results, after analyzing the skeletons of different age groups in different conditions. Although a more expensive approach, CT and MRI scans were determined to be highly accurate and less invasive to an individual. As a newer method, geometric morphometry allows for the analysis of landmarks throughout the skeleton to aid in sex estimation that would in other methods be ignored. Finally, the diagnoses sexuelle probabiliste method focuses on the pelvis and proves to be extremely accurate and many times preferred in forensic anthropology casework. Overall, there are several ways to determine the sex of unknown remains in the field of forensic anthropology and depending on the specific case and funds available, a forensic anthropologist can choose their preferred method with regards to credibility.

Memarian, A., Aghakhani, K., Mehrpisheh, S., & Fares, F. (2017, February 16). Gender determination from diagnostic factors on anteroposterior pelvic radiographs. Retrieved fromhttps://www. sciencedirect. com/science/article/pii/S1726490116302532

Memarian et al. performed a study that focused on the radiographic methodology to look at the pelvis of known males and females. When applicable, radiography can accurately assist forensic anthropologists in sex estimation. To ensure an appropriate sample size, Memarian et al took radiographs from a total of 200 individuals (100 female and 100 male). Each of the individuals selected to participate in the study were chosen by a radiology physician at the Rasoul Akram Hospital. It is also important to note that individuals under the age of 18 were excluded from this study.

Radiographs were taken from multiple views and angles, then measured to determine any significant differences in female versus male pelvic bones. Some of the significant findings included the size of the subpubic angle was higher in women versus men and the length of the pubis, ischium, and ischiopubic index between males and females. Throughout this study, the mean of the pubic angle, length of the symphysis pubis, width of the pubis body, minimum width of the pubic superior ramus, and ratio of the length of the symphysis pubis to the minimum length of the pubic superior ramus were all noted and analyzed to determine the differences in males and females. Overall, it was concluded that these measurements taken from the radiographs did lead to a differentiation between female and male pelvises. A trait that was also found to be significant along with sex, is the ethnicity and location of the sample group being analyzed. However, further research needs to be taken into account to accurately express the relationship between female versus male pelvises and how it relates to an individual's ancestry. Additionally, this study aims to provide an alternative method to examine the pelvis when only radiographs are present. When intact pelvic bones are available for metric analysis, the methods of radiography and metric’s should be used in conjunction with each other.

Small, C., Schepartz, L., Hemingway, J., & Brits, D. (2018). Three-dimensionally derived interlandmark distances for sex estimation in intact and fragmentary crania. *Forensic Science International* , (287), 127–135. https://doi-org. ezproxy. fgcu. edu/10. 1016/j. forsciint. 2018. 02. 012

In this article, Small et al. recognizes and offers a solution to finding fragmentary crania remains during a forensic anthropology field recovery.

Oftentimes taphonomic events such as weathering and animal scavenging can fragment the human skeleton. In an effort to provide support in identifying fragmented skeletal remains, anthropologists have used particular osteometric landmarks to determine first what the bone in questions was and whether it was from a male or female individual. A total of 227 South African crania of European descent were analyzed using discriminant function analysis by taking traditional caliper measurements. Small et al suggests that using a more traditional technique (caliper measurements) but tailoring the landmarks recorded to best reflect the most common cranial fragments found, provides forensic anthropologists with updated and re-assessed data from past methods. Overall, through metric data collection, Small et al was able to determine measurements that can be used as a baseline to determine the sex of an unknown piece of skeletal crania.

Peckmann, R. T., Logar, C., & Meek, S. (2016). Sex Estimation from the Scapula in a Contemporary Chilean Population. *Journal of Science and Justice,* (56), 357-363. doi: https://www. sciencedirect. com/science/article/abs/pii/S1355030616300284

Peckmann et al provide a unique perspective on sex estimation using variables from the scapula. Due to the muscles that provide protection for the scapula, it is often found undamaged and in good condition during forensic skeletal recoveries, making it a great variable for metric data. Peckmann et al uses a sample population of 114 individuals that were indigenous Guatemalan, contemporary Mexican, and contemporary Chilean to conduct their research. The two main metric measurements used included

the length of the glenoid cavity (LGC) and the breadth of the glenoid cavity (BGC). During the conclusion of their research, Peckmann et al compared their findings to additional populations including Greek and White Americans.

Commentary References

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