H42 The Postmortem Fate of Anthropometric Measurements: Taphonomic Alteration of Landmarks in Buried Skeletal Remains

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After attending this presentation, attendees will understand how skeletal remains recovered from burials present taphonomic alterations which affect the availability of anthropometric measures differently than anatomical collection's samples.

This presentation will impact the forensic science community by suggesting what measurements are more frequently preserved in buried skeletal remains and so are more useful to create applicable discriminate functions for anthropometric evaluations.

The analysis has been conducted on a sample of 644 historical buried skeletons of adults (376 males; 268 females) from Italy. All the individuals were buried supine in earthy pits or large stone coffins; the context did not show any peculiar environmental condition that could influence the bone preservation or incremental lack of any specific anatomical region.

Due to its complexity, the skull was divided in seven different regions: basis; neurocranium; calva; splanchnocranium; orbital region; nasal region; palate; and, mandible. This division is based on anatomy of performing measurements for each specific area. Long bones and scapula are studied without specific internal divisions. A selection of 120 measurements, classified by a new coding system, has been sorted according Martin-Saller standards.1,2

A preliminary analysis demonstrated that a complete skull, in which all measurements (57) can be collected, represents less than 1% of the whole sample, while every single area appears more frequently accessible for anthropometric purposes: basis 25%; calva 23%; orbital region 17%; nasal region 18%; palate 19%; and, mandible 14%.3 The combination of several areas leads to worse results: neurocranium 8% and splanchnocranium 7%. These data do not seem to be predictable and do not subordinate to any specific taphonomic law.

The analysis of the preservation of every single cranial measurement demonstrates that a third of them can be read in more than 50% of the whole sample, while only nine are readable in less than 25% of the cases. The more preserved measurements are the mandibular ones, where six out of ten are readable in more than 50% of the samples and only one is readable in 31%. The worst preserved landmarks are in the nasal area, where two measurements are readable in 33% of the cases and the other only in 22% (nasal-malar cord) and 16% (nasal-malar breath).

A new more extensive study on post-cranial long bones detected a uniform trend where the metaphyseal landmarks are the most frequently traced (usually 80%), followed by epiphyseal ones (average 50%). More affected by diagenetic phenomena are the lengths that are often bordered by landmarks placed on fragile epiphysis and processes. A relevant trend detected shows a differential measurement preservation for gender and laterality: male and right side samples indeed seem more undamaged, presumably in relation to their increased resistance resulting from sexual and functional characteristics.

Particularly dramatic is the condition of the scapula's body conservation (measures a readable average in less than 5% of the cases), probably due to its remarkably thin and fragile structure. Also the anatomical position of this bone can increase its taphonomic destruction: in a supine body, it could be more subjected to diagenetic phenomena due to stagnation in moisture and decomposition fluids. The better results observed in the glenoid cavity (preserved on average in 75% of the cases), morphologically and topographically without the issues illustrated for the scapular body, confirm this assumption.

This presentation will illustrate how the cranial measures can seldom be used for statistical analyses due to poor taphonomic resistance of their landmarks; considering the predominance of some single measurements or small cranial zones, a specific strategy for each anatomical unit or individual measurement is suggested. According to their frequency, the postcranial measurements (particularly midshaft diameters and circumferences) are more appropriate to create usable discriminant functions for biological profile analysis.

References:

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Anthropometry, Statistical Analysis, Taphonomy

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