Spatial Analysis and Sampling Techniques of Cremated Remains from Bronze Age Cremation Urns in Southeast Hungary

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Introduction and Background: In the past, cremated human remains have posed a number of problems for biological anthropologists because the application of heat induces changes that warp and fracture bones, often beyond the point of recognition. Over time, however, researchers have begun to explore the value of cremated remains, and studies are able to yield more useful data than previously expected. Gonçalves and Pires (2016) conducted a literature review of publications from the past two decades and discovered color description, skeletal completeness, minimum number of individuals, age-at-death, and sex of the individuals were reported by nearly all researchers. Beyond that, there seems to be less agreement on the utility of other analysis methods of cremated remains.

Methods: Previously, each burial had been microexcavated across levels. Urns were excavated starting at the top and descending towards the base, with a new level approximately every 2 to 4 cm, depending on the volume of material. Within each level, diagnostic elements were identified and segregated from the rest of the fragments in each level. From there, two sampling methods were employed in order to compare results. The first method involved a random 20% sample from each level, and the second involved the entire contents of each level. The 20% sampling technique was derived from Bontrager and Nawrocki (2006). However, in this study, the contents of each level were evenly distributed across a 20 x 25 cm grid, and one 5 x 5 cm square was randomly selected in each row for analysis. Across each level for both sampling methods, fragments were classified as cranial-postcranial, or indeterminate and the total weights of the cranial and postcranial elements were recorded, including the diagnostic elements in their respective categories. The percentages of cranial and postcranial elements were calculated by dividing the weight of each by the combined weight of cranial and postcranial elements. For all three burials, both sampling methods were applied in order to test if the 20% sample adequately represented a burial urn.

Results: Of the three burials, only the 100% sample of HB 54 demonstrates a statistically significant correlation between cranial and postcranial elements using a Pearson Correlation (r = 0.924, p = 0.003). The 100% sample of HB 54 reveals a strong positive correlation between cranial and postcranial elements. The 20% sample for the same burial also demonstrates a strong positive correlation (r = 0.854), however, it is not statistically significant (p = 0.076). Furthermore, both samples from HB 46 and HB 47 do not display a significant trend. The 20% sample of HB 47 approaches a significant positive correlation (r = 0.829, p = 0.003), however, the 100% sample does not (r = 0.668, p = 0.218). The 20% sample from HB 46 is the only data set to reveal a negative correlation between cranial and postcranial elements (r = -0.267), but is weak and not statistically significant (p = 0.810). In contrast, the 100% sample from HB 46 exhibits a positive correlation (r = 0.619), but it is not statistically significant (p = 0.575).

Discussion and Conclusions: This exploratory study aims to examine anatomic representation through the relationship between cranial and postcranial elements within microexcavated levels of three burial urns. Additionally, this study employed two sampling methods to see if a 20% sample accurately represents the entire burial urn. Based on the graph of HB 54 below, it seems as though the 20% sample is an accurate representation. Results from the second half of this preliminary study indicate that there is no trend in the spatial distribution of remains in the burial urns recovered from the Békés 103 site. This study was launched on the premise that the postcranial proportions would vary across levels. More specifically, it was believed that progressing down microstratigraphic levels within an urn would reveal a decrease in cranial elements and corresponding increase in postcranial elements. To the contrary, the only statistically significant result from this study (100% sample from HB 54) illustrates a strong positive correlation, indicating that as postcranial weight increases there is a corresponding increase in cranial weight. Therefore, the weight of cranial and postcranial elements both increase across the volume of fragments throughout the burial. Although it is important to note, however, that a single fragment from an infant was found in HB 54, which introduces a second individual that may affect the distribution of remains in the urn. Considering only one of the six data sets demonstrates a significant mass of both cranial and postcranial elements seemingly increases through descending levels, it does not appear that the remains were placed systematically in the urn. They were simply gathered from the pyre and deposited in the urn. Nonetheless, the sample size is small and more rigorous analysis of further burials is required to definitively establish a deposition pattern of remains into burial urns at the Békés 103 site.

References:


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