

ANALYSIS OF POSSIBLE ANATOMICAL ORDER IN MICROEXCAVATED BRONZE-AGE FUNERARY MATERIAL FROM HUNGARY



Alana Acuff¹, Jamie Ullinger², László Paja³

¹College of Charleston, U.S.; ²Quinnipiac University, U.S.; ³University of Szeged, Hungary



RESEARCH QUESTION & BACKGROUND

The Bronze Age Körös Off-Tell Archaeology (BAKOTA) project has been pursuing excavations at Békés-Jégvermi kert (Békés 103) in the Körös region of southeastern Hungary since 2011. Békés 103 is a Bronze Age cemetery (2450-1200 cal BCE) which bears ceramic evidence of the confluence of the Ottományi and Maros cultures. These excavations comprise one portion of the BAKOTA project, which encompasses both Békés 101 and 103 and has so far uncovered 69 graves, the majority of which are cremation urns; several inhumations and scattered cremations have also been discovered within the context of the cemetery (Duffy *et al.* 2014). The Bronze Age in Hungary (c. 2700-750 BCE) saw an explosion of burial techniques, significantly the normalization of cemeteries as well as the increased presence of cremation as a means of depositing of the dead. The schema of interspersed inhumations with both scattered cremations and cremation urn burials was a frequent element of cemeteries in the Carpathian Basin in the Bronze Age, albeit with ratios of the two categories varying between sites (Duffy *et al.* 2014). The present study discusses the analysis of one such Middle Bronze Age cremation urn, Human Burial 54 (HB 54), from Békés 103 under the hypothesis that the internal stratigraphy of the cemetery's urns might reflect the order of deposition for the cremated osseous materials, herein referred to as cremains, in their original funerary context. Based on a preliminary analysis (Paja *et al.* 2014), we hypothesized that there would be a concentration of cranial elements within upper levels of the urn, whereas postcranial elements would be concentrated within lower levels.

Due to their highly fragmentary nature and the immense degree of damage associated with treatment by fire, cremains are a frequently untapped resource in archaeological investigations. However, the analysis of cremains may yield insight into the heat and duration of the fire, treatment of the cremains before and after placement on the funeral pyre, and final or secondary deposition (i.e. in a cremation urn). Strategic positioning of unprocessed remains upon the funeral pyre in a crouched or sitting position has been documented in the cremation urn burials of contemporaneous cultures inhabiting the Great Hungarian Plain; this was decipherable in light of the differential burning exhibited by the remains, which purports that some areas were more protected from the ravages of fire, as provided by a protracted position (Buikstra and Swegle 1989, Sørensen and Rebay-Salisbury 2008).

MATERIALS & METHODS

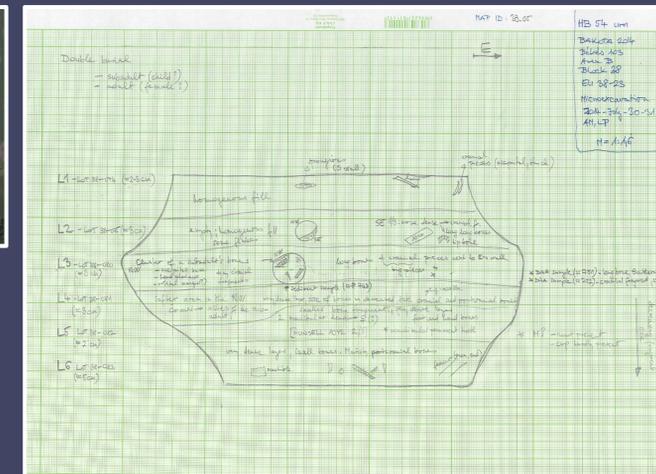
The present study was conducted in a tripartite system, considering along with the regional anatomical association of each identifiable specimen the extent of modification from the effects of fire within the main categories of color variance and degree of surficial and morphological change (i.e. fracture patterning and warping) (Capece *et al.* 2016). Many of the cremation urns of Békés 103, including HB 54, have been systematically analyzed by means of computed tomography and microexcavation; these processes allow for the examination of the inner stratigraphy of each urn and the cremains interred therein. Computed tomography was utilized as the images produced allow investigators to isolate and identify horizontal clusters of fragments. Microexcavation techniques then set arbitrary levels within the urn by which the fill is removed; a scale profile sketch is drawn to illustrate the location of each layer including details regarding fill color and recognizable bone fragments. Preliminary analysis during the microexcavation of HB 54 revealed the presence of an adult male, based on classical anthropological methods (Buikstra and Ubelaker 1994, Lipták 1980).

The cremains gathered from each level of HB 54, as delineated in microexcavation, were examined in acute detail by the present analysis which aimed to determine the relative anatomical association of each fragment within the context of the urn's internal stratigraphy. There were no contaminants (e.g. charcoal from the pyre) included in the fill of the urn. The fragments were first separated into categories according to size: hypermicro (0-5 mm), meso (6-10 mm), macro (11-50 mm), and hypermacro (50+ mm) (Nemeskéri – Harsányi 1968). Secondly, each fragment was described and further categorized by anatomical region where possible. The anatomical categories included "skull" (e.g. calvarium, mandible, and facial bones), "spine and trunk" (e.g. vertebrae, ribs, sternum, clavicles, sacrum), "upper extremities" (e.g. scapulae, radii, ulnae, manus), "lower extremities" (e.g. os coxae, femurs, patellas, tibiae, fibulae, pedes); the "undetermined" category encompassed all those fragments which, due to size or the absence of identifiable features, could not be categorized as cranial or postcranial. Anatomical association was determined based on morphometric qualities and internal organization, with particular emphasis on cross-section shape regarding long bones.

Graphs displaying the distribution of osseous materials from HB 54, categorized by regional anatomical association

Middle: juxtaposed percentages of cremains by region, within each level

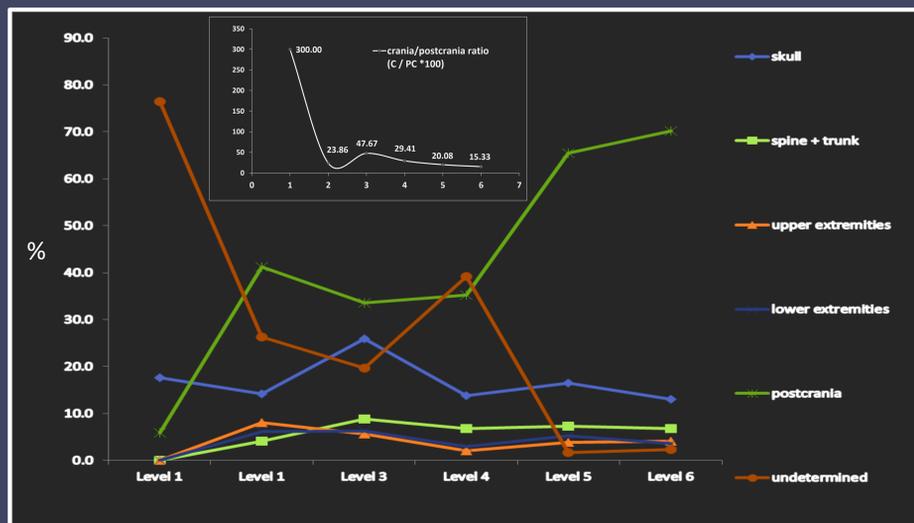
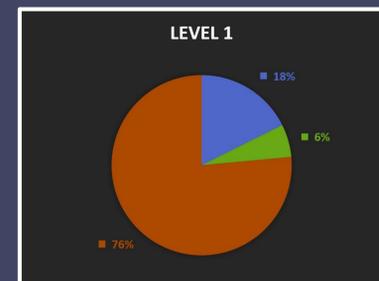
Below: regional anatomical association percentages represented within each level



Above, left: Map detail of Békés-Jégvermi kert (Békés 103)
Above, right: Scaled profile illustration of HB 54 during microexcavation



Above: An example of the stages of microexcavation from HB 54
Right: Cremation urn from HB 54, reconstructed by László Gucci



	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
skull	n 3 % 17.6	n 21 % 14.2	n 41 % 25.9	n 55 % 13.8	n 157 % 16.4	n 44 % 13.0
spine + trunk	0 0.0	6 4.1	14 8.9	27 6.8	70 7.3	23 6.8
upper extremities	0 0.0	12 8.1	9 5.7	8 2.0	37 3.9	14 4.1
lower extremities	0 0.0	9 6.1	10 6.3	12 3.0	50 5.2	12 3.5
postcranial	1 5.9	61 41.2	53 33.5	140 35.2	625 65.4	238 70.2
undetermined	13 76.5	39 26.4	31 19.6	156 39.2	16 1.7	8 2.4
total	17 100.0	148 100	158 100.0	398 100.0	955 100.0	339 100.0



RESULTS & DISCUSSION

The appearance of cranial fragments did slightly decrease from Level 1 to Level 6. The increase of postcranial elements is significantly more characteristic toward Level 6. Of note, cranial fragments decrease in both size and frequency in descending levels. The shape of the urn itself may have influenced the distribution of the cremains as they settled. This phenomenon is illustrated by Level 1, which contained fewer remains in relation to the contents of subsequent layers, albeit including more sizable and intact fragments (i.e. large occipital fragments). Furthermore, Level 3 is a clear outlier of the above pattern as it exhibited a greater proportion of cranial to postcranial elements than seen in other layers; this, too, could be interpreted as a consequence of the urn's shape as this level fell in the "belly" of the vessel, which ostensibly could accommodate more fragments. There was no distinct patterning regarding the categories of "trunk and spine", "upper extremities", or "lower extremities". Due to the highly fragmentary nature of the cremains (totaling approximately 5200 fragments, excluding innumerable fragments from the "hypermicro" size category (0-5mm)) as well as the small sample size of the study, an indisputably positive correlation of lower registers of the urns with lower anatomical aspects and vice versa cannot be purported. The attributes of a single occipital bone fragment found in Level 1 are morphometrically distinct from the majority of the cremains; on this basis, we cannot exclude the possibility of the presence of a second individual. In the case of two individuals, results presented here could be more skewed.

A large percentage of the cremains fell within the undetermined category, primarily due to size but also owing to the absence of distinguishable morphometric qualities. It is also very likely that the inclusion of two individuals within the same urn may have skewed the results. Although a distinct possibility of post-depositional disturbance of the cremains within the urns of Békés 103 exists as a result of such factors as continued rigorous agricultural activity at the site and the effects of gravity, the urn demarcated as HB 54 was relatively intact at the time of excavation.

The results of this analysis do not fully substantiate our initial hypothesis that the distribution of the cremains would follow the general pattern of cranial elements concentrated to the upper levels and the postcranial elements, correspondingly, to the lower levels. What can be inferred with certainty, however, is that the cultures who buried their dead within the cemetery handled the remains with particular attention, further supported by the fact that the fill within the urns was sterile. Further analyses of the materials from Békés 103, as well as the implementation of the techniques used in this analysis at other sites, are warranted.

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REFERENCES

Buikstra, J.E., and M. Swegle
1989 Bone modification due to burning: experimental evidence. *Bone modification*: 247-258.

Buikstra, J.E. and D.H. Ubelaker
1994 *Standards for Data Collection from Human Skeletal Remains*.

Duffy, P., Parditka, G., Giblin, J. Paja, L., and B. Salisbury
2014 Discovering mortuary practices in the Körös River Basin, Hungary. *Hungarian Archaeology E-Journal*.

Lipták, P.
1980 Embertan és emberszarmazástan. Tankönyvkiadó, Budapest.

Paja, L., Giblin, J.L., Parditka, G., and P.R. Duffy
2014 Cremations in contexts: the micro-stratigraphic investigation of population and practice at the Middle Bronze Age cemetery of Békés Jégvermi-kert, Hungary. *Society for American Archaeology*. Austin, USA.

Sørensen, M.L.S. and K. Rebay-Salisbury
2008 Landscapes of the Body: Burials of the Middle Bronze Age in Hungary. *European Journal of Archaeology* 11: 49.