Short anthropological report on the Bronze Age cemetery from Hăpria

Mihai CONSTANTINESCU*
Jenna WATSON**
Thomas A. CRIST***

Abstract: *Archaeological excavations carried out during 1998-2000 in the village of Hăpria, County of Alba, brought to light in the point called Capul Dosului, 18 graves associated with the Livezile cultural group dating back to the Early Bronze Age (ca. 2700-2400 BC). The analysis of the skeletons from these graves identified remains from 27 individuals. Most of the skeletons were poorly preserved having the bone surface eroded due to exposure to humidity and root growth. Some of the graves had only fragments of skulls present and others had scattered human bones from two or three individuals among the bones of the skeleton interred as cadaver in the grave. Skeletal analysis indicates that the individuals ranged in age from infants to adults in their 50s. Of the 27 skeletons analyzed, ten were male, five were female and twelve were undetermined. The demography of the cemetery, stature and pathological changes were compared mainly with the cemetery from Ampoița-Peret, the only cemetery belonging to Livezile group with an anthropological analysis.*

Rezumat: *Cercetările arheologice sistematice realizate între 1998-2000, în satul Hăpria, județul Alba, în punctul Capul Dosului, au dus la descoperirea a 18 morminte atribuite grupului cultural Livezile, datat în Bronzul Timpuriu (cca 2700-2400 BC). Analiza antropologică a osemintelor din cele 18 morminte a identificat resturi osteologice de la 27 de indivizi. Cea mai mare parte a scheletelor erau slab conservate, având suprafața oaselor erodată în principal datorită expunerii la umiditate și a acțiunii rădăcinilor. Unele schelete erau reprezentate doar de fragmente de craniu sau oase umane disparate, provenind de la alți doi sau trei indivizi în afara scheletului depus sub formă de cadavru în respectivul mormânt. Analiza a dus la identificarea unor indivizi cu vârste la deces cuprinse în intervalul infans până la adulți de 50 de ani. Din cele 27 de schelete analizate, 10 erau bărbați, cinci femei, iar pentru 12 nu a putut fi determinat sexul. Datele demografice, staturile și elementele de patologie identificate au fost comparate cu cimitirul de la Ampoița-Peret, singurul cimitir aparținând grupului Livezile, analizat antropologic.*

Keywords: *Early Bronze Age, Livezile group, Hăpria, demography, paleopathology.*

Cuvinte cheie*: Bronz Timpuriu, grupul Livezile, Hăpria, demografie, paleopatologie.*

◈ Introduction

The Livezile group (ca. 2700-2400 BC) inhabited the Apuseni Mountains in the Early Bronze Age where their subsistence strategies were dominated by cattle and sheep breeding and the mountain environment (H. Ciugudean 1996, p. 47; C. Gerling, H. Ciugudean 2013, p. 184). There are 21 burial sites assigned to the Livezile group, usually found as small groups of barrow

* "Francisc I. Rainer" Institute of Anthropology, No. 8 Eroii Sanitari Avenue, district 5, PO Box 35, 050474, Bucharest, Romania; mihaic2005@yahoo.com.
** Jenna Watson, University of Tennessee, Knoxville, USA; jwatso58@vols.utk.edu.
*** Thomas Crist, Utica College, Utica, NY, USA; tcrist@utica.edu.

graves (usually comprising less than 10 interments) made out of successive rows of stones covered with earth found in the proximity of the settlements or above older settlements. The deceased individuals typically were laid on the surface in supine positions with flexed legs or crouched positions on their sides, often with remains of hearths, charcoal, adobe, ceramic fragments and animal bones scattered at the base of the tumulus or between the stones (C. Gerling, H. Ciugudean 2013, p. 185-186). Disarticulated skeletons, interpreted as skeletons for which "*excarnation before interment seems likely*," are a common presence in primary and secondary burials, or at the periphery of the mounds (C. Gerling, H. Ciugudean 2013, p. 186). These barrows were interpreted as collective funeral structures that marked the prestige of the families or clans buried there (I. Motzoi-Chicideanu 2011, p. 305-315). Until now, only the 48 skeletons from the Livezile site of Ampoița *Peret* have been anthropologically analyzed (M. Perianu 1989, p. 3-11; M. Perianu 1990, p. 241-247).

Archaeological excavations between 1998-2000 on the hilly plateau of *Capul Dosului* in the village of Hăpria, County Alba, revealed 18 inhumation graves with skeletons placed in crouched positions not in the flat graves characteristic of the Livezile group but in shallow pits (with depths between 0.15-0.55 m) without stone structures. These individuals were oriented towards the south, southwest, and the west (H. Ciugudean 1999, p. 52; H. Ciugudean 2000, p. 42; H. Ciugudean 2001, p. 97-98).

The human remains from Hăpria were analyzed in 2012 at the Francisc I. Rainer Anthropological Institute in Bucharest and the preliminary results presented a year later (J. Watson *et alii* 2013). Although representing a small sample size, the primary goal of this research was to record data from this skeletal sample as a basis for future comparative studies with other Bronze Age populations, and to get a glimpse of the demography and health status of a mountain population about which little is known.

◈ Methods

For consistency, the skeletons were organized in the laboratory according to the original labels from the 1998-2000 excavations found in their bags. These designations were used in this study to describe each of the individuals because there were several cases of commingling of the skeletal remains. The burial designations, however, were renumbered in a new order in the archaeological report on the project (H. Ciugudean 1999, p. 52; H. Ciugudean 2000, p. 42; H. Ciugudean 2001, p. 97-98); these are reconciled in tabel 1.

Human remains from 16 of the 18 graves were available for analysis[1]. Except for the archaeological reports, no other information was available about the graves (e.g. photographs, descriptions, plans of the graves available, etc.). During the laboratory analysis, the minimum number of individuals (MNI) from each grave was determined and each individual labeled as Skeleton A, B or C. These were distinguished using the color, dimensions, and siding of the bones; the best preserved skeleton in each commingled grave was labeled "Skeleton A."

[1] Graves 9/1999 (H. Ciugudean 2000, p. 42) and 17/2000 (H. Ciugudean 2001, p. 97-98) were not transferred to the "Francisc I. Rainer" Institute.

Original labeling	Published labeling	Sex	Age (yrs.)	Taphonomy	Other inventory
Gr. 1/98 Sk. A	**Gr. 1/1´/98**	Male	25-30	Post-mortem breakage; root growth	19 pieces of ceramic
Gr. 1/98 Sk. B	**Gr. 1/1A/98**	Undet.	8-10	Post-mortem breakage; root growth; limestone over the long bones	
Gr. 1/98 Sk. C	**Gr. 1/98**	Undet.	8-10	Post-mortem breakage; root growth	
Gr. 2/98 Sk. A	**Gr. 2/98**	Undet.	13-16	Post-mortem breakage; root growth	-
Gr. 2/98 Sk. B	**Gr. 2/98**	Undet.	1-3	-	-
Gr. 3'/98	**Gr. 3/3'/98**	Male	20-40	Root growth	Epiphysis of an animal bone
Gr. 3/98	**Gr. 3/3A/98**	Male	30-40	Post-mortem breakage; root growth	
Gr. 3A/98	**Gr. 3/MSB-M3C/98**	Undet.	30-50	Post-mortem breakage; root growth	-
Gr. 3B/98	**Gr. 3/MSB-M3C/98**	Undet.	40-50	Post-mortem breakage; root growth	-
Gr. 4/98	**Gr. 4/98**	Undet.	24-35	Post-mortem breakage; root growth	-
Gr. 2/99 Sk. A	**Gr. 5/99**	Male	20-32	Breakage during excavation; root growth	Two ceramic fragments and one snail shell
Gr. 2/99 Sk. B	**Gr. 5/99**	Female?	20-40	Breakage during excavation; root growth	
Gr. 3/99 Sk. A	**Gr. 6/99**	Female?	20-40	Root growth	-
Gr. 3/99 Sk. B	**Gr. 6/99**	Undet.	0.5-1.5	Post-mortem breakage; root growth	-
Gr. 4/99 Sk. A	**Gr. 7/99**	Male	25-30	Post-mortem breakage; root growth; bleached from sun exposure	-
Gr. 4/99 Sk. B	**Gr. 7/99**	Undet.	5-7	Post-mortem breakage; bleached from sun exposure	-
Gr. 5/7-99 Sk. A	**Gr. 8/99**	Male	40-50	Post-mortem breakage; root growth	-
Gr. 5/7-99 Sk. B	**Gr. 8/99**	Undet.	20-50	Post-mortem breakage; root growth	-
Gr. 5/3-99 Sk. C	**Gr. 8/99**	Male?	30-40	Post-mortem breakage; root growth	-
Gr. 1/00	**Gr. 10/00**	Undet.	4-7	Post-mortem breakage; root growth	-
Gr. 2/00	**Gr. 11/00**	Female	25-35	Breakage during excavation; root growth	-
Gr. 3/00	**Gr. 12/00**	Female	30-40	Root growth; limestone over the long bones	5 pieces of pottery; 5 pieces of animal bone; one snail shell
Gr. 4/00	**Gr. 13/00**	Male	40-50	Root growth; limestone over the long bones	-
Gr. 5/00	**Gr. 14/00**	Male	30-35	Post-mortem breakage; root growth; limestone over the long bones	Fragment of an animal mandible
Gr. 6/00	**Gr. 15/00**	Undet.	4-7	-	-
Gr. 7/00	**Gr. 16/00**	Male	30-40	Post-mortem breakage; root growth; limestone over the long bones	Diaphysis of an animal bone
Gr. 9/00	**Gr. 18/00**	Female	30-35	Post-mortem breakage; root growth;	Fragment of shell

Tab. 1. Labeling of grave/skeletons, sex, age, taphonomic changes and grave inventories identified during the analysis.
Numerotarea mormintelor/scheletelor, sexul, vârsta, schimbările tafonomice și inventarul mormintelor identificat în cursul analizei.

The remains were assessed for degree of preservation by recording the level of completeness of each individual, the percentage of damage each bone sustained due to soil conditions (B. Connell, P. Rauxloh 2003, p. 2; B. Connell 2008, p. 9), the erosion and fragmentation of the bones (R.H. Steckel *et alii* 2006, p. 19) and for taphonomic changes including evidence of animal gnawing and root infiltration (A.L. Stodder 2008, p. 71-114).

Sex estimation was based on cranial features and os coxae morphology (J.E. Buikstra, D.H. Ubelaker, 1994). Age-at-death was estimated using long bone length (M. Stloukal, H. Hanakova 1978), cranial suture closure, epiphyseal fusion times and the morphology of the auricular surfaces (J.E. Buikstra, D.H. Ubelaker, 1994). When the above-mentioned indicators were missing, age at death was estimated using the degenerative changes of the preserved skeletal segments, osteoarthritis on the margins of the vertebral bodies and articulations (D.H. Ubelaker 1980, p. 60-62, fig. 77, 81) and resorption of the spongy bone from the proximal epiphyses of humerus and femurs (Á.G. Acsádi, J. Nemeskéri 1970, p. 122-135, fig. 20, 22). Metric data were recorded according to the Martin system (G. Bräuer 1988) and the Pearson's method (F.W. Rösing 1988) was used to estimate stature.

The identification and description of pathological conditions of the skeletons relied on Ortner's volume (D.J. Ortner 2003). Dental pathologies such as enamel hypoplasia (R.H. Steckel *et alii* 2006), alveolar bone resorption, dental calculus and the positions of caries (D.R. Brothwell, 1981) were recorded. Cranial lesions including porotic hyperostosis (R.H. Steckel *et alii* 2006, p. 12-14, fig. 8-9), postcranial pathologies such as periostitis and degenerative joint changes (R.H. Steckel *et alii* 2006), and non-metric traits were also scored (J.E. Buikstra, D.H. Ubelaker 1994, p. 85-92).

After the data from the Hăpria skeletons were collected comparative analyses were made using similar data from the cemetery at Ampoița *Peret*, the only other site for which anthropological analysis has been conducted.

◈ Results

Preservation

The remains from Hăpria ranged in quality from good to poor. None of the skeletons were well-preserved: eight were scored as good and the remaining 19 skeletons had poor preservation. All of the skeletons were affected by taphonomic processes (such as root growth, limestone deposition, bleaching from sun exposure; tab. 1) which resulted in all of the skeletons presenting with eroded bone surfaces, some more extreme than others. Also, all of the skeletons exhibited post-mortem breakage due to soil compression, reburial, grave intrusions and shallow burial depth.

The long bones (humerus, radius, ulna, femur, tibia and fibula), the mandibles, and teeth were the best preserved and most complete elements present across all 27 skeletons. Carpals, metacarpals, the crania, vertebrae and innominates were the least represented in the sample due to poor preservation.

Demography

The archaeological reports indicated that only three of the 18 graves at Hăpria included more than one person; two were reported as double graves (Gr. 1/98 and Gr. 3/99) and one as quadruple (Gr. 3/98) (H. Ciugudean 1999, p. 52; 2000, p. 42). The anthropological analysis,

however, showed that seven of the graves actually included human remains from more than one individual, in four of these cases having bones from at least one adult (usually males) and a sub-adult (tab. 2).

A minimum number of 27 skeletons were identified in the 16 analyzed graves, with twice as many males as females. The sex of 12 individuals could not be determined (tab. 1). The high percentage of indeterminate skeletons is a result of either their young ages at death or poor preservation of sexually diagnostic characteristics.

Site	**Hăpria/Ampoița**	**Hăpria/Ampoița**	**Site**	**Hăpria/Ampoița**	**Hăpria/Ampoița**
Sex	**No. of skeletons**	**Prevalence (%)**	**Age group**	**No. of skeletons**	**Prevalence (%)**
Females	5/17	18.52/34.69	Adults	19/29	70.37/61.70
Males	10/8	37.04/16.33	Sub-adults	8/18	29.63/38.30
Undet	12/24	44.44/48.98	-	-	-

Tab. 2. Sex and age groups by number and percentages, from Hăpria and Ampoița *Peret*.
Grupele de sex și vârstă în funcție de număr și procentaj de la Hăpria și Ampoița *Peret*.

Among the sample were seven children six months to 10 years old; one teenager; and 19 adults with ages of death between 20 to 50 years old. Several of the skeletons had very wide age at death ranges due to the poor preservation of the remains.

Stature

The heights of three adult males and three females was estimated, showing an average stature of 163.96 cm for males, and 153.26 cm for females (tab. 3).

Grave no.	**Sex**	**Age**	**Stature**
Gr. 1/98 Sk. A	Male	25-30	164.79±3.3 cm (left femur)
Gr. 5/7-99 Sk. A	Male	40-50	164.63±3.3 cm (right humerus)
Gr. 5/00	Male	30-35	162.46±3.3 cm (right humerus)
Gr. 2/00	Female	25-35	156.48±4.1 cm (right radius)
Gr. 3/00	Female	30-40	153.30±3.3 cm (right femur)
Gr. 9/00	Female	30-35	149.99±3.3 cm (right femur)

Tab. 3. Stature of the skeletons from Hăpria.
Statura scheletelor de la Hăpria.

Dental pathology

In the Hăpria sample, caries (affecting 2.06% of the preserved teeth), teeth lost antemortem (6.03% of the observable sockets), and dental abscesses (1.72% of the observable sockets) (fig. 1/1), were the common dental diseases identified. All these instances of dental lesions were observed on only two male skeletons (Gr. 5/7-99 Sk. A; Gr. 7/00). The one antemortem tooth lost was from a skeleton for which sex could not be determined (Gr. 3 A/98). The caries were both inter-proximal and found on the distal side of the left maxillary first premolar (PM^1) and left second molar (M^2)

from a male individual (Gr. 5/7-99 Sk. A). Two individuals from the same grave had at least two lines of *hypoplasia* on the mandibular canines (Gr. 3 A/98) and maxillary canines (Gr. 3 B/98). Eighty percent of the adults with preserved dental alveoli had alveolar resorption, but none of the preserved teeth presented dental calculus.

1.  2. 

Fig. 1. Hăpria Gr. 5/99 Sk. A: 1. Dental abscess on the root of first right maxillary premolar; Hăpria Gr. 4/00: 2**.** Thoracic vertebra, showing pitting and eburnation on the inferior articular facets and marginal osteophytes on the vertebral body.
Hăpria M. 5/99 Sch. A: 1. Abces dentar la rădăcina primului premolar maxilar; Hăpria M. 4/00: 2**.** Vertebră toracică prezentând porozitate, aspect de fildeș pe fațetele articulare inferioare și osteofite pe marginea corpurilor vertebrale.

Porotic hyperostosis

Only one individual male (Gr. 1/98 Sk. A) shows healed traces of *cribra orbitalia* (10% of the total number of observed skeletal segments) and *cribra cranii* (8.33% of the total number of observed skeletal segments). These cranial lesions reflect nutritional disorders, possibly iron-deficiency anemia.

Degenerative joint disease (DJD)

The most common lesions identified were those associated with joint degeneration, affecting 10 of the 27 individuals (two females and eight males). Only 20 of the 27 individuals, however, presented joint surfaces sufficiently preserved for the analysis of DJD. Of the 10 males, 80% displayed evidence of DJD as compared to only 40% of the females. Of the 10 skeletons exhibiting DJD, seven (70%) were at least 30 years old but no older than 50 years when they died. DJD varied by body location: foot bones (50%), thoracic vertebrae (40%), proximal and distal femora (30%), and proximal ulnae (30%) (fig. 1/2; 2/1).

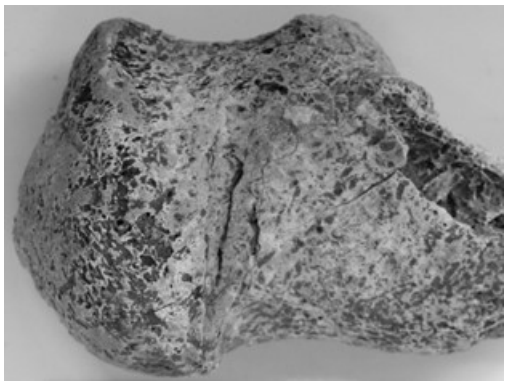
1.  2. 

Fig. 2. Hăpria Gr. 4/00: 1. Left scapula, with marginal osteophytes on the glenoid cavity; Hăpria Gr. 5/00: 2. Cut mark on the left calcaneus.
Hăpria M. 4/00: 1. Omoplatul stâng, cu osteofite pe marginea cavității glenoide; Hăpria M. 5/00: 2. Urma unei tăieturi pe calcaneul stâng.

Schmorl's nodes

These lesions of the vertebral bodies reflect degeneration of the intervertebral discs. Nodes were present on one lumbar and at least two thoracic vertebrae of an adult male from Gr. 1/98 Sk. A. This skeleton was one of the few that had at least some of the vertebral bodies preserved, indicating that, if present, other instances of disc degeneration could not be identified.

Enthesopathy

Enthesophytes are areas of soft tissue ossification where muscles attach to the bones. Only Gr. 3/98, an adult male, shows evidence of enthesophytes. These were located on the tuberosity at the posterior surface of the calcaneus where the Achilles tendon attaches.

Injuries

One male skeleton, Gr. 5/00, displayed a peri- or post-mortem cut mark located on the medial surface of the left calcaneus. The lesion (16x1 mm) was oriented slightly obliquely from superior to inferior and was unhealed. This lesion might be the result of sharp-force trauma that affected the individual's foot but also may have been produced postmortem by the many reburials and disturbed graves in this cemetery (fig. 2/2).

Nonmetric traits

Some traits in the skeleton arise from genetic origins and reflect familial relationships. This analysis included 18 cranial nonmetric features, a total of 17 epigenetic traits being identified (tab. 4). The highest number of observed traits were the supraorbital structures and parietal foramina. The prevalence of these traits is highly affected by the poor preservation of the skeletal remains and the selection bias of bones retrieved during a reburial, greatly limiting their use to identify the presence of family groups in this cemetery.

Cranial trait	No. observed	No. available	Prevalence (%)
1. Metopic suture	8	1	12.50
2. Supraorbital structures	7	4	57.14
3. Infraorbital suture	1	0	0.00
4. Multiple infraorbital foram.	2	0	0.00
5. Zygomatico-facial foram.	2	2	100.00
6. Condilar canal	1	0	0.00
7. Parietal foram.	9	5	55.56
8. Epipteric bone	0	0	0.00
9. Coronal ossicle	10	1	10.00
10. Bregmatic bone	3	0	0.00
11. Sagittal ossicle	6	0	0.00
12. Apical bone	2	0	0.00
13. Lambdoid ossicle	6	2	33.33
14. Inca bone	2	0	0.00
15. Mandibular torus	5	0	0.00
16. Torus maxillaris/palatinus	3	0	0.00
17. Third molar absence	6	1	16.67
18. Shovel shaped incisor	1	1	100.00

Tab. 4. Prevalence of cranial non-metric traits (unpaired and bilateral).
Trăsături non-metrice pe craniu (înregistrate bilateral în funcție de prezența a cel puțin unui indicator pe una din părți).

◈ Discussions

In the two cemeteries attributed to the Livezile group that have been subject to anthropological analyses (Hăpria and Ampoița *Peret*), there are differences in the burial practices expressed by flat graves and the absence of cremated skeletons at Hăpria, while at Ampoița *Peret* there are barrow graves with stone structures. These differences might be related to the geographical locations of the cemeteries (Hăpria is located south of the Mureș Valley) and/or to possible chronological differences between when these cemeteries were used (I. Motzoi-Chicideanu 2011, p. 306-307). While both of them date to ca. 2700-2400 BC, it is currently unclear if they were contemporaneous. Some similarities also appear: the presence of more than one individual in a grave is a common practice for the barrow burials of Livezile group. At both Hăpria and Ampoița *Peret* there are multiple individuals in single graves, constructed by either depositing multiple bodies or reburying previously interred remains. At Ampoița *Peret* there were seven double graves, one triple and one quadruple. With the exception of one cremation grave, most of the multiple graves had skeletons from at least one adult and one sub-adult, usually the adult being a female (M. Perianu 1989, p. 3-11). There is a difference between the two cemeteries in the total number of skeletons per grave, with an average of 1.5 skeletons at Hăpria compared to the 1.29 from Ampoița *Peret*.

Poor preservation and the highly fragmented nature of the skeletal remains are specific features for both Hăpria and Ampoița *Peret* (M. Perianu 1989, p. 3). This is due to a number of

different factors: natural agents from the soil of the mountain area, the shallow depths of the burials, the weight of the stone structures overlaying the skeletons and possible re-openings of the barrow for the deposition of new corpses. The effect of these factors is a likely explanation for the few mounds interpreted as "*symbolic funeral monuments of individuals whose corpse was not available*" (H. Ciugudean 2011, p. 25). Sub-adult burials (whose skeletons do not preserve as well as the adult ones) almost certainly were affected in a way that made it difficult to identify them during the excavations (B.J. Baker *et alii* 2005, p. 11). Also, the presence of overlying skeletons (e.g. Tumulus I grave 2-3 from Ampoița *Peret*) and scattered human remains in different burials can be explained not only by "*excarnation before interment*" (C. Gerling, H. Ciugudean 2013, p. 186), but also by a partial re-opening of the graves and stone structures for the interment of newly deceased individuals in the graves.

In terms of demography, the average ages at death are similar for Hăpria (25.69 years) and Ampoița *Peret* (25.29 years), the differences being in the average ages at death of the two sex groups, males (Hăpria) 34.27 versus 39.62 years (Ampoița *Peret*); females 31.50 (Hăpria) versus 30.06 years (Ampoița *Peret*). When comparing the two cemeteries by sex, there is an interesting bias. The sample from Ampoița *Peret* has almost double the percentage of females compared to Hăpria where the percentages are quite the opposite (tab. 2). By age groups, the percentages are almost the same, Hăpria having more adults and fewer sub-adults buried, compared to Ampoița *Peret*.

Stature estimates also vary by cemetery. Compared to the average statures of the male (167.33 cm) and female samples (159.36 cm) from Ampoița *Peret*, those from Hăpria are much smaller (163.96 cm for males and 153.26 cm for females). These differences could have resulted from population genetics and/or health status but also might be related to the different anthropological methods used for computing the statures and the way these methods were applied at Ampoița *Peret* [2].

In terms of pathological changes that affected the skeletons, for several graves from Ampoița *Peret* caries (3 cases), ante-mortem tooth loss (3 cases) and alveolar resorption (1 case) were the common dental pathologies among both the males and females (which are not described in any greater detail) (M. Perianu 1989, p. 4-11). The presence of osteoarthritis affecting the spine of two males (T1 gr. 2 – about 60 years old and T1 gr. 5 – 45-50 years old) and one young female (T1 gr. 3 – 22-26 years old) is mentioned for Ampoița *Peret*) (M. Perianu 1989, p. 11). In the Hăpria sample, there seems to be a similar trend of dental pathologies except that only males were affected. Two cases of enamel hypoplasia (probably as a result of growth deficiencies) were observed and more alveolar resorption was noted compared to Ampoița *Peret*. There is, however, a difference in lesions associated with joint degeneration between the two samples. The Hăpria remains exhibited a much higher incidence of DJD (affecting mainly the males) and a wider range of skeletal segments when compared to the Ampoița *Peret* individuals. These results may be due to different activity patterns among the individuals from Hăpria but also from how the pathological lesions were recorded at Ampoița *Peret*, since analysis of these remains was focused on the demography and cranial traits of the sample.

[2] For the computation of statures the methods of Breitinger and Bach was used at Ampoița *Peret*, but most of the statures are without decimals and in one case (Tumulus I grave 8) the stature is mentioned as approximate (M. Perianu 1989, p. 4, 6).

◈ Conclusions

Although representing the same cultural group, burials at the two cemeteries share common features but also differences in terms of rites and rituals. The presence of cremated individuals, barrow graves, and stone structures is the common practice at Ampoița *Peret* (and for most cemeteries of the Livezile group) but are absent at the Hăpria cemetery. Multiple burials were recorded at both cemeteries, constructed by either depositing several bodies or reburying previously-interred human remains in the graves. The average total number of skeletons per grave was higher at Hăpria than at Ampoița *Peret*. At both sites the skeletons were buried along similar orientations (I. Motzoi-Chicideanu 2011, p. 313) and mortuary artifacts (pottery, small copper or gold adornments, pendants made of animal bones) were scarce. Many of the graves included fragments of pottery, animal bones, and flint objects from the older settlements, which were located underneath or near the tumuli (H. Ciugudean 1995; 2011, p. 23-27).

The results of the anthropological analysis of the Hăpria population sample suggest a diverse group in terms of age, ranging from infants to adults in their 50s with mean ages of death similar to the ones from the Ampoița *Peret* cemetery. There were also similar patterns in the average numbers of adults and sub-adults recovered from both cemeteries. Interestingly, while the number of indeterminate skeletons was almost the same at both cemeteries, at Hăpria males outnumbered females while at Ampoița *Peret* the opposite was the case. Stature also varied between the two groups, which can be related either to different subsistence strategies and the quality of health of the communities or to the methods used for computing the stature estimates.

The relatively high percentage of individuals presenting with DJD at Hăpria, particularly in the foot bones, proximal and distal femora, and thoracic vertebrae, suggests that these people were physically active, correlating with their known subsistence strategy of cattle and sheep breeding in a rocky, mountainous environment. The higher incidence of DJD in the 10 males (80%) as opposed to 40% in the females suggests that men were involved in more physically demanding types of labor than women. Differences in living conditions for males were also reflected by the higher prevalence of dental pathologies, dietary and developmental conditions, and the presence of enthesopathies and Schmorl's nodes. Similar conclusions are difficult to draw from the sample at Ampoița *Peret*, where only a few cases of pathology were recorded. While limited, the overall skeletal data suggest that living conditions were better for the people buried there, compared to those from Hăpria.

We might speculate that the differences in funeral construction, the higher number of males and adults, lower stature estimates, and higher percentages of osteoarthritis at Hăpria were related to differences in geographical location and chronology between the two cemeteries. For the moment, it is important to recognize that this small sample from the Hăpria cemetery provides only a glimpse of this archeological group's health status and demography but nonetheless offers a basis for future comparative studies with Bronze Age populations from southeastern Europe.

◈ Acknowledgements

This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS-UEFISCDI, project number PNII-ID-PCCE-2011-2-0013.

◈ Bibliography

Á. G. Acsádi, J. Nemeskéri 1970	*History of Human Life Span and Mortality*, Budapest.
B.J. Baker *et alii* 2005	B.J. Baker, T.L. Dupras, M.W. Tocheri, *The osteology of infans and children*, Texas A and M University, Anthropology Series, 12.
G. Bräuer 1988	Osteometrie, in R. Knussman, I. Schwidetzky, H. W. Jurgens, G. Ziegelmayer (eds.), *Anthropologie. Handbuch der vergleichen den Biologie des Menschen*, Band I, Stuttgart - New York, p. 160-232.
D. R. Brothwell 1981	*Digging up bones. The excavation, treatment and study of human skeletal remains*, third edition, Oxford University Press, Oxford.
J.E. Buikstra, D.H Ubelaker. 1994	*Standards for data collection from human skeletal remains*, Arkansas Archaeological Survey Research Series, 44, Fayetteville.
H. Ciugudean 1995	The Later Eneolithic/Early Bronze Age Tumulus-Burials in Central and South-Western Transylvania (I), *Apulum*, 32, p. 13-32.
H. Ciugudean 1996	*Epoca timpurie a bronzului în centrul şi sud-vestul Transilvaniei*, Bibliotheca Thracologica, 16, Bucureşti.
H. Ciugudean 1999	*Cronica. Campania 1998*, Bucureşti, p. 52.
H. Ciugudean 2000	*Cronica. Campania 1999*, Bucureşti, p. 42.
H. Ciugudean 2001	*Cronica. Campania 2000*, Bucureşti, p. 97-98.
H. Ciugudean 2011	Mounds and mountains: burial rituals in the Early Bronze Age Transylvania, in S. Berecki, R.E. Németh, B. Rezi (eds.), *Bronze Age rite and rituals in the Carpathian Basin*, Târgu Mureș, p. 21-57.
B. Connell 2008	Preservation and archaeological data, in N. Powers (ed.), *Human osteology method statement*, Museum of London, Published online March 2008, p. 9-10.
B. Connell, P. Rauxloh 2003	*A rapid method for recording human skeletal data*, http://www.museumoflondon.org.uk/NR/rdonlyres/61CC101E-B351-451B-857B-7A4479E78CC7/0/RapidMethodRecordingManual.pdf

C. Gerling, H. Ciugudean 2013	Insights into the Transylvanian Early Bronze Age Using Strontium and Oxygen Isotope Analyses: A Pilot Study, in V. Heyd, G. Kulcsár, V. Szeverényi (eds.), *Transitions to the Bronze Age. Interregional Interaction and Socio-Cultural Change in the Third Millennium BC Carpathian Basin and Neighboring Regions*, Budapest, p. 181-203.
I. Motzoi-Chicideanu 2011	*Obiceiuri funerare la Dunărea Mijlocie şi Inferioară*, I-II, Bucureşti.
D.J. Ortner 2003	*Identification of pathological conditions in human skeletal remains*, second edition, San Diego.
M. Perianu 1989	La description anthropologique des tombes Coțofeni de la nécropole d´Ampoița (Dép. Alba) (époque du premier bronze), *Annuaire Roumaine d´Anthropologie*, 26, p. 3-11.
M. Perianu 1990	Necropola Bronzului timpuriu de la Ampoița (jud. Alba) – descriere antropologică, *Thraco Dacica*, 11, 1-2, p. 241-247.
N. Powers 2008	Age at death estimation, in N. Powers (ed.), *Human osteology method statement, Museum of London*, Published online March 2008.
F.W. Rösing 1988	Körperhöhenrekonstruction aus Skelettmassen, in R. Knussmann (ed.), *Anthropologie. Handbuch der vergleichenden Biologie des Menschen*, Stuttgart-New York, p. 586-600.
L. Scheuer, S. Black 2004	*The juvenile skeleton*, London-San Diego.
R.H. Steckel *et alii* 2006	R.H. Steckel, C.S. Larsen, P.W. Sciulli, P.L. Walker, *Data Collection Codebook*, The Global History of Health Project.
M. Stloukal, H. Hanakova 1978	Die Länge der Längsknochen altslavischen Bevölkerungen unter besonderer Berücksichtigung von Wachstumsfragen, *Homo*, 26, p. 53-69.
A.L. Stodder 2008	Taphonomy and the nature of archaeological assemblages, in M.A. Katzenberg, S.R. Saunders (eds.), *Biological anthropology of the human skeleton*, second edition, New York, p. 71-114.
D.H. Ubelaker 1980	*Human Skeletal Remains*, Washington.
J.M. Watson *et alii* 2013	J.M. Watson, M. Constantinescu, T. Crist, *The Bronze Age cemetery from Hăpria, Romania*, poster presentation, The 82nd annual meeting of the American Association of Physical Anthropologists, 9-13 April, Knoxville, Tennessee, USA.