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Burials and human osteological remains from the Bronze Age acropolis of Aghios Ioannis in northeastern Kopais, Boeotia, Greece: Preliminary results of the bioarchaeological analysis

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ABSTRACT

This paper reports on the MH II/III Burial Cluster II excavated at the MH acropolis of Aghios Ioannis in Boeotia, Greece. The burial ground comprises various funerary structures (tumulus, rectangular enclosure, cist graves) and provides evidence on primary and secondary mortuary treatment. The analysis is based on the remains of 22 individuals and explores issues of health and mortuary practices. The contextual approach of the human osteological remains reveals variations in the treatment at death of different age groups and evidence of differences in mortuary practices according to biological sex and everyday life; results add further to the discussion on the renegotiated individual and collective identities in the mortuary sphere at this formative period for the subsequent Mycenaean era in Boeotia and Mainland Greece.

1. Introduction

During the Middle Helladic period, Boeotia found itself in the center of dynamic developments which took place in Mainland Greece and marked the emergence of complex forms of social organization and of elaborate cultural processes. The rise of strategic fortified sites (e.g. Thebes, Orchomenos) and their associated communities around Lake Kopais demonstrates an emerging settlement hierarchy and a gradual centralization of power toward the end of that period. Central to understanding these changes are first the chronological sequence and the socio-economic relationships of these strongholds in relation to the drainage of all or parts of Lake Kopais, and second the role of Gla as a control center of the overall drainage and crop-storage system (Iakovidis, 1989, 1998; see also Kountouri: 28-32, 2019; Kountouri, forthcoming a). In order to better understand the socio-political changes and the transformations that occurred in these settlements' hinterlands in the northeastern Kopaic plain during that period, an archaeological survey program was carried out on the rocky hillocks of Aghios Ioannis (which is the focus of this paper) and Aghia Marina-Pyrghos in the northeastern basin of the former Lake Kopais. Visible from spreads of surface sherds (Fossey, 1988: 284) and equipped with strong Late Helladic fortifications, both sites lie close to the large sinkholes in the northeast inlet of the lake, through which the flow of the rivers filling the lake was controlled and flooding was moderated (Knauss, 1987; Knauss et al., 1984; Kountouri et al., 2006: 557–564; Kountouri et al., 2013a, 2013b; Kountouri, forthcoming b). Moreover, evidence for the Mycenaean presence at both sites sheds more light on the Middle Helladic and Mycenaean background to these settlements that developed on the north edge of what was formerly Lake Kopais (Kountouri and Lane, forthcoming).

Aghios Ioannis (Fig. 1) is a small, rocky elevation with a total surface of approximately 14.16 ha; it measures 360 m long and is 55 m to160m wide. The hill's upper surface is characterized by a mild slope from south to north and from east to west, with three rectangular natural terraces at the middle, the south-west and the north of the hill. Its maximum height above sea level is 116 m, but is only a mere 20 m above the surrounding

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lowlands. It lies close to the sea (7 km south-west of Larymna), as well as on one of the natural land routes connecting the sea-ways of the Aegean with the large Kopaic plain. This nodal position is even more reinforced by its direct proximity to the Varia sinkhole, which is one of the many karstic trenches that were integrated, as drainage points, in the broad land improvement work during the Mycenaean period.

The excavation produced evidence of habitation and funerary remains of various phases of construction. More specifically, the earliest phase of habitation is located at the middle and north plateau (sector 1) (Fig. 2) and can be dated to the MH II/III period; it revealed evidence of buildings of rectangular shape with stone wall foundations, clay floors and a mud-brick superstructure. The contemporary burial ground was situated 200 m away from the settlement, on the north and north-west part of the hill (sector 2). It includes low circular tumuli and rectangular enclosures located on terraces that follow the inclination of the north-west hillslope. They comprise groupings of cist-built graves of similar construction but variable orientation; six of these graves were excavated (Burial Cluster II) (Fig. 3). The next occupation phase dates to the MH III/LH I period. The settlement is moved or expanded southwards (sector 4) and the burial space is relocated onto the middle plateau (Burial Cluster I), over the MH II/III habitation level; a group of six cists graves were excavated, two of which had evidence of illegal excavation. Human osteological remains were unearthed from a total of ten cist graves and few deposits of bones found outside graves in both plateaus.

This paper focuses on the earliest, MH II/III burials unearthed in 2017 in Burial Cluster II. The aim is to explore changing attitudes in mortuary practices during a period when kinship and descent acquired new significance (as is evidenced by the multiple use of graves), age and gender relations were redefined, and sex and age divisions became more pronounced and asymmetrical (Voutsaki, 1998, 2004, 2010; Moutafi and Voutsaki, 2016). For the purposes of the present paper, the burial space and the funerary structures will be briefly described and some parallels from Mainland Greece will be provided. Then, bio-archaeological analysis will address issues of taphonomy, mortuary practices as well as health and everyday life with the aim to investigate individual profiles and grave-specific osteobiographies for this funerary assemblage. A broader comparison with contemporaneous burial evidence from Mainland Greece is beyond the scope of this contribution. In this paper, we present first and still preliminary results whereas a final comprehensive analyses will be combined with the examination of the human osteological remains from Burial Cluster I (MH III/LHI) and also integrate the results of further analytical studies.

2. Materials and methods

The MH II/III sample includes human osteological remains unearthed in six graves and one deposit of bones outside Grave 3. Graves included in the Burial Cluster II belong to the stone-lined cist type of rectangular shape, cut into the bedrock. Grave 1 occupied the center of the cluster. Graves 3, 5 (the only one covered with slabs) and 6 were surrounded by a rectangular stone enclosure that occupied the western most area of the excavated funerary space. The enclosure was built of large limestone boulders planted upright in the ground; its western flank seems to have slipped down the hillside. The only comparable case of a rectangular enclosure dated to the LH I period that contains cist-built graves is found at the Mycenaean acropolis of Eleon at 14 km east of Thebes (Burke et al., 2017: 7; 2020: 451–453). Finally, Graves 2 and 4 were surrounded by a small, low circular tumulus, comprising the southernmost burial group of Cluster II discovered to date at Aghios Ioannis. It was made of large blocks of limestone set in a circular arrangement on the solid ground, stood between 0.30 and 0.65 m above the rocky surface and its diameter was 4.50 m. Tumuli are considered to be an important link in the gradual transition from burials within habitation areas to formal extramural cemeteries that took place in the 2nd millennium BC (Papadimitriou, 2016: 337). Tumuli predominate in the Peloponnese (Voutsaki et al., 2012: 447-448) with the majority of cases found in Messenia (Boyd, 2002: 122, 156, 172) and the Argolid (Voutsaki et al. 2006: 70–6; 2009: 179–188; Voutsaki et al., 2012), but also occur in Androna in Fthiotis, near Glyfa (Papakonstantinou, 1999).

The space between the graves was covered with middle (0.15x0.30 m) and large (0.30x0.55 m) sized stone slabs. The graves were constructed in rectangular pits cut in the bedrock with limestone slabs vertically placed on each side. The floor of Grave 1 was covered by small pebbles. Some graves were furnished with pottery (drinking vessels and table ware including *kantharoi*, angular cups and a jug with cutaway

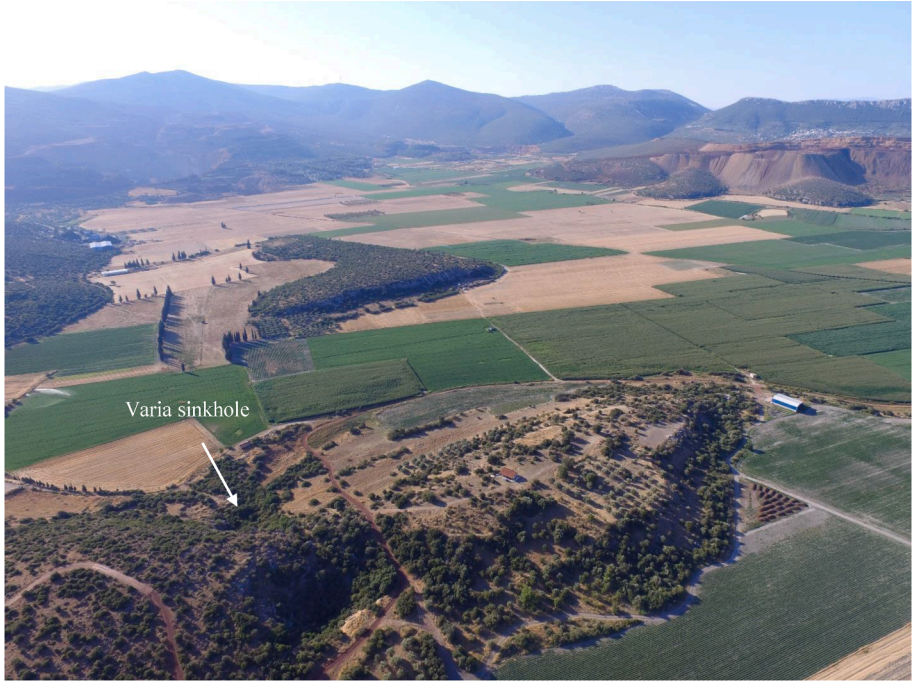


Fig. 1. The hill of Aghios Ioannis. View from the north-west. At the background the Kopaic plain.

Fig. 2. (left) Topographic plan of Aghios Ioannis hill showing the division of the citadel into sectors 1 to 4 (modified with English labels after © 2018 MYNEKO Archaeological Research Project); (right) aerial view with location of burial clusters and residential areas.

Fig. 3. Aerial view of the Burial Cluster II at the northern plateau of the hill. Graves 3, 5, 6 were surrounded by a rectangular enclosure and Graves 2 and 4 were covered by a low tumulus.

neck) and small objects such as loom weights and obsidian blades (Table 3). The majority of fine ware consists of grey Minyan-type pottery that has parallels in the 'yellow phase' of Orchomenos and in phase 6 of Pefkakia (Maran: 85, 1992; Sarri, 2010: Tab.4: 8, 223.).

Human osteological remains were examined macroscopically in the laboratory. A hard compact clayey sediment covered more than half of the preserved surface of many bones, suggesting intensive post-depositional disturbance and a homogenous environment of

decomposition. Bone completeness, calculated after the method outlined by Buikstra and Ubelaker (1994), was poor (<25%) for 22.6% adult and 33.6% subadult elements, partial (25–75%) for 46.2% adult and 58.2% subadult elements, and complete (>75%) for 31.2% adult and 8.2% subadult elements. The surface condition (Brickley and McKinley, 2004: 16) was good (weathering grade 3) for 60.4% of studied bones, moderate (weathering grade 4) for 20.5% and poor (weathering grade 5) for 19.1% of them. This paper does not include a detailed analysis of the degree of fragmentation; it is observed, though, that the majority of the remains were highly fragmented except the small bones of hand and foot, which were often found intact. The lack of systematic recording of the exact position of bone elements in the field, including commingled remains and recognizable anatomical articulations, did not allow the re-association of bones belonging to the same individual during the subsequent analysis and limited considerably the reconstruction and interpretation of the formation process of these contexts. In order to homogenize our results, we applied an element by element inventory for the entire sample (commingled contexts, single burials and fairly complete skeletons) using a single database; we did not, however, analyze the site as a single context but we treated the remains according to the funerary context they came from.

Sorting of remains from commingled assemblages was undertaken following the procedure described by Lambacher et al. (2016). The fragments were first segregated by element type and when possible by side and age category (adult/subadult); then, fragments that belonged to the same element were joined. Age-at-death (Brooks and Suchey, 1990; Lovejoy et al., 1985) and sex (Milner, 1992; Phenice, 1969; Walker, 2005) assessments were carried out in cases where adult coxal bones were preserved. Similarly, age-at-death was estimated for subadult remains in cases where diaphyseal length and epiphyseal union (Schaefer et al., 2009) as well as dental arcades and loose teeth (Moorrees et al., 1963; Ubelaker, 1989) were collected. Then, each identified element was entered separately in the database and was inventoried according to the segment-based method codified by Buikstra and Ubelaker (1994). Based on this inventory, the Minimum Number of Elements (MNE) was estimated by identifying the most abundant segment of an element.

Limb long bone and cranial fragments that could not be attributed to specific elements were inventoried by groups but they were not used for the calculation of the Minimum Number of Individuals (MNI). Similarly, fragmented bones and elements for which side could not be determined, such as rib fragments (3rd-12th ribs), phalanges and vertebrae, except atlas and axis, various post cranial and unidentifiable elements were clustered and inventoried in the same database; these bones were included in the final MNI estimates in cases where they indicated different skeletal maturation. Skeletal and dental palaeopathological conditions were also recorded by element following the standards outlined in Buikstra and Ubelaker (1994).

Because the commingled funerary contexts analyzed here represent small-scale incidents (Byrd and Adams, 2009) and the possibility for double counting individuals was minimal, bone elements were also sorted by using visual pair-matching complemented by symmetry and age (Duday, 1987). Comparisons of articulated bone portions were not attempted because of poor preservation of joints. The MNI estimates for each element were established by adding the number of pairs to the unpaired MNE count from each side; based on these estimates, the MNI for each funerary context, using different elements, is provided. The MNI for the entire sample is the summation of the MNI for each context. Taking into account the degree of commingling in the assemblage, the possibility of having the elements of one individual scattered in different contexts cannot be excluded. However, the fragmentation did not allow to re-associate remains from various contexts that could belong to the same individual. Finally, the Bone Representation Index (BRI) (Bello et al., 2006) that expresses the ratio between the number of observed bones and the theoretical total number of skeletal elements according to the MNI of the entire sample was used. When possible, bone assemblages were assigned in types of disposal and specific secondary acts following the classification outlined in Moutafi and Voutsaki (2016).

The age categories used for the classification of adult and subadult remains were: infant (0–3 years), child (3–12 years), adolescent (12–20 years), young adult (20–35 years), middle adult (35–50 years) and old adult (50+ years) (after Buikstra and Ubelaker, 1994). Stature estimation was not possible due to the lack of complete adult long bones. Frequencies of pathological lesions, dental and skeletal nonmetric traits were calculated on the number of observable elements and they were presented in true prevalence rates (TPR % or number of the elements exhibiting the condition (n) divided by the number of elements examined (N) $\times$ 100).

3. Results and discussion

3.1. Taphonomic and mortuary analysis

The MNI for the entire sample is 22, including 13 adults and 9 subadults. Among the subadults, two perinates, four infants, one child and two adolescents were found, with most of deaths occurring before the age of three. Death at an early age, typical of the high infant mortality for a preindustrial and pre-vaccination period, is generally attributed to a set of environmental circumstances including infections, injuries, unhygienic living conditions, malnutrition and weaning-related complications. The presence of very young individuals is also attested in other sites such as Proskynas (Papathanasiou et al., 2009: table 13.1), Asine (Ingvarsson-Sundström et al., 2013: 153), Kouphovouno (Lagia and Cavanagh, 2010: 337-338) and Mygdalia (Papazoglou-Manioudaki et al., 2019: 200). The adult sample includes four males, four females and five individuals of indeterminate sex; two young and three middle-aged adults were identified. The conjoined examination of age-at-death and sex showed the presence of two middle-aged males as well as one middle-aged and one young female. A 1:1 sex ratio, with very slight variations, has also been observed for several burial grounds in southern and northern Greece, such as the Argos ‘tumuli’ (Voutsaki et al., 2009: 183) and Asine (Voutsaki et al., 2012: 457, Fig. 4) in the Peloponnese, Marathon in Attica (Pantelidou-Gofa et al., 2015: 49-54) and Pigi Athinas in Pieria (Tritsaroli, 2017).

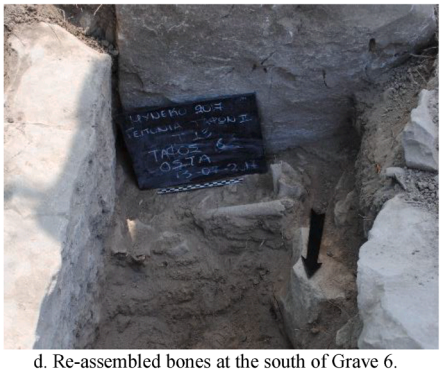
Results on the MNE and MNI estimates are presented in Table 1 and BRI values for the entire sample are included in Table 2. An association between the highest MNI and BRI values is observed for the skulls, femora, tibiae, upper limbs and the pelves suggesting over-representation of prominent bones. It is noteworthy that half of the individuals were identified by other robust (clavicle, fibula) but also by more fragile (scapulae) bones that are not much less preserved. On the other hand, we observe an inconsistency between the MNI and BRI values for other fragile bones, such as ribs and hand/foot since these bones exhibit low representation values but often half of the individuals of the entire sample were estimated from them (e.g. metacarpals, tali and metatarsals).

The MNI in the graves ranges from 1 to 8 (Table 2). Three graves (Grave 3, 4 and 5) included a primary burial (Table 3). Scanty and various skeletal remains of one or two individuals of different age categories, represented by either dense or fragile elements, were identified during the laboratory analysis in addition to the burials described during the excavation; the graves containing such elements are Grave 1 (perinatal mandible) and Grave 3 (clavicle and few ribs of an adolescent) (Table 3). Very few bone elements suggesting the presence of a poorly represented second (5th metacarpal and tibia of an adult) and third individual (infant femur) were also identified in Grave 6. The above cases do not show a patterned presence of specific bones, indicating that their existence in the graves (with all of them lacking covering slabs) was accidental rather than the result of an intentional secondary manipulation (for example the cleaning of the grave from preceding burials to accommodate new ones). For these reasons, the distribution and co-occurrence of adult and subadult remains in the graves, particularly in cases where these are represented by very few bones

a. Re-assembled bones of an adult collected at the north of Grave 1.

b. Skeleton of the perinate from Grave 5.

c. Primary burial of the female in Grave 3 in left flexed posture.



d. Re-assembled bones at the south of Grave 6.

e. Bone deposit outside Grave 3 (north side); the bones have initially been interpreted as belonging to fauna.

f. Infant skeleton from Grave 4.

Fig. 4. Field photos for Graves 1 (photo 4a), 3 (photo 4c), 6 (photo 4d) and the deposit of bones outside Grave 3 (photo 4e); human osteological remains from Graves 5 (photo 4b) and 4 (photo 4f).

Table 1
MNE and MNI for adults and subadults across graves and the entire Burial Cluster II (ad = adults, sub = subadults); the table includes single, paired (R/L), unpaired (R, L) and elements for which side could not be determined but with maturation/age differences (un) (mc = metacarpal, mt = metatarsal).

	Grave 1		Grave 2		Grave 3		Grave 4	Grave 5	Grave 6		Bone deposit outside grave 3	
MNI (Elements)	ad	sub	ad	sub	ad	sub	sub	sub	ad	sub	ad	MNI
crania	1	1	6	1	1		2	1	1		3	17
mandibles	1	2[1]	6		1		1				2	13
clavicles	1(R/L)	1(R/L)	1(R/L) + 3R		1(R/L)	1(L)	1(L)	1(L)			1(R/L)	11
scapulae	1(R/L)	1(R)	3(R/L) + 1L		1(R/L)		1(L)		1(L)		2(R/L)	11
sterna									1		1	2
humeri	1(R/L)	1(R/L)	5(R/L) + 1R	1(R/L)	1(R/L)		1(R/L)	1(un)	1(R/L)		1(R/L) + 1R + 1L	16
radii	1(R/L)	1(R/L)	4(R/L)		1(L)		1(R/L), 1L	1(R)			1(R/L) + 1L	12
ulnae	1(R/L)	1(R/L)	2(R/L) + 4L	1(R/L)	1(R/L)		1(R/L)	1(R)			2(R/L)	14
carpals			1(R)									1
metacarpals	1(R 2nd mc, 4th L mc)	1 (un)	2(R 5th mc)	2(un, maturation differences)[2]	1(L 1st mc)				2(1R, 1L asymmetrical 5th mc)		2(R/L 2nd mc)	11
ribs	1(L 1st)		2(R/L 1st)	1(un 1st)	1(L 1st, 12th)	1 (un)	1(R/L 1st) + 1 (un)	1(un)	1(L)		1(R/L) + 1R	12
1st cervical vertebrae	1		2		1							4
2nd cervical vertebrae	1				1		1		1		2	6
sacra	1		2		1						2	6
pelves	1(R/L)	1(R)	5(R/L)	1(R/L)	1(R/L)		1(R/L)		1(L)		2(R/L)	13
femora	1(R/L)	1 (un)	4(R/L) + 2R	2(1R, 1L, maturation differences)[2]	1(R/L)		1(L/R) + 1L	1(L)	1(L)	1 (L)	2(R/L)	18
patellae	1(L)		2(R/L)	1(un)	1(R/L)						1(R/L) + 2R	8
tibiae	1(R/L)	1(R/L)	3(R/L) + 1L		1(R/L)		1(R/L)	1(R/L)	2(L)		2(R/L)	13
fibulae	1(R/L)		2(R/L) + 1L		1(R/L)		1(R/L)		1(L)		1(L)	8
tali	1(R)	1(R)	1(R/L) + 4R		1(R/L)						1(R/L) + 1L	10
calcanei	1(L)		1(R/L) + 3L		1(R/L)				1(R)		1(L)	8
tarsals	1(L)		2 (L navicular)		1(R/L)						1(R/L) + 1L (navicular)	6
metatarsals	1(R/L)	1 (un)	3(L 4th mt)		1(R/L)				1(L)		2(R/L 1st mt)	9
MNI for adults and subadults	1	2	6	2	1	1	2	1	2	1	3	22
Total MNI	3	8	2	2	1	3	3					

[1] adolescent and perinate; [2]child and infant.

understood as accidental finds, should be interpreted with caution in the analysis of mortuary practices.

Several modes of burial (primary and secondary) and body disposal were recognized in the assemblage. Grave 1, with dimensions 0.75x1.40 m and a depth of 0.65 m, contained the re-assembled bones of a middle-aged male (north of the grave) (Fig. 4a) and an adolescent (south of the grave), as well as the left half of a perinatal mandible; two shells were also collected but it was not possible to establish an association with the re-assembled bones. As evidenced by the archaeological documentation, in both groups of re-assembled bones the skull of the deceased was placed on top of the rearranged post-cranial elements. During laboratory analysis, all major elements, small-sized bones, such as carpals, hand and foot phalanges and fragile ones, such as scapulae and ribs, of these two individuals are represented, suggesting that these skeletons were retained fairly complete inside the grave where they initially decomposed. No further information is provided for the presence of any anatomical articulations for the post-cranial elements of these individuals. According to the archaeological hypothesis, the remaining space above the groups of re-assembled bones was empty, probably showing the intention of the living of performing a new burial. As mentioned above, the presence of the perinatal mandibular fragment was likely accidental and no further interpretation can be provided.

Graves 3, 5, 6 and the deposit of bones outside Grave 3 lay within the stone enclosure. Grave 5 is the only one in the sample that was used for the single, primary inhumation of a perinate (Fig. 4b). The burial was unfurnished and the grave was the only one found covered with slabs, thus composing a closed and undisturbed environment of decomposition. Sterna, patellae and the bones of hands and feet were absent suggesting natural taphonomic loss for most of them. The female burial in Grave 3 (Fig. 4c) was also unfurnished. The skeleton was found in a left flexed posture with the hand of the left upper limb lying under the skull and the right upper limb flexed with the hand at the level of the left upper limb's elbow. Fragments of a clavicle and ribs belonging to an adolescent from Grave 3 were also identified in the laboratory; as previously mentioned, their presence should be considered accidental rather than an indication for the existence of an earlier burial within the tomb. The adult burial from Grave 3 suggests variations in body disposal based on biological sex; comparable evidence from primary inhumations

Table 2
Bone representation for Burial Cluster II.

Bone	BRI (based on MNI of 22)
crania	77.3
mandibles	59.1
clavicles	31.8
scapulae	40.9
sterna	9.1
humeri	61.4
radii	47.7
ulnae	52.3
carpals	0.9
metacarpals	20.0
hand phalanges	9.6
ribs	19.1
1st cervical vertebrae	18.2
2nd cervical vertebrae	27.3
cervical vertebrae	32.7
thoracic vertebrae	15.2
lumbar vertebrae	23.6
sacra	27.3
pelves	52.3
femora	56.8
patellae	27.3
tibiae	52.3
fibulae	29.5
tali	29.5
calcanei	22.7
tarsals	13.2
metatarsals	15.5
foot phalanges	3.4

from MH sites in Greece confirms the preference for the left flexed position for females (Ruppenstein, 2010; Tritsaroli, 2017; Voutsaki et al., 2013, 135). Finally, Grave 6 was initially described as containing the re-assembled (Fig. 4d) bones of a young adult (cranium, spine, humeri, sternum, ribs, hand and foot bones, as well as left scapula, coxal bone and lower limbs). Post-excavation analysis revealed the left tibia and a metacarpal of a second adult as well as an infant femur, interpreted as accidental finds.

The assembled bones found outside the north (small) side of Grave 3 (Fig. 4e) include the remains of three adults (one male, one female and one of unknown sex). Two of them appear well preserved with all anatomical parts represented although bone completeness was moderate. The third adult is represented by very few bones (occipital fragment, right patella and left humeral shaft). There is no indication that Grave 3 was the original place of burial for the individuals that compose this deposit (or at least for the two of them) nor do they appear to go with any of the individuals from the excavated graves of the cluster. In conclusion, the bone deposit outside Grave 3 represents all bone elements and anatomical parts of two individuals and indicates that two fairly complete skeletons, originating from some part of the cemetery, were intentionally retained in a commingled assemblage. No further explanation can be inferred for the representation of the third adult by very few bones other than possibly the random selection of bone elements from elsewhere in the burial ground or even as the result of cross contamination between various funerary contexts.

Large cist Grave 4 was enclosed in the tumulus. The grave, which also lacked cover stones, held the remains of two infants and a jug with cutaway neck. One infant was in primary position and its skeleton was well preserved (Fig. 4f). The second infant, identified in the laboratory, was represented by cranial fragments, one rib fragment, and the shafts of a left radius and a left femur. Bearing in mind that both individuals belong to the same age category and that most of the remains of the second infant are prominent bones, it cannot be inferred if these were accidental finds or the result of intentional secondary treatment.

The second grave of the tumulus was Grave 2. The majority of the artefacts collected in Burial Cluster II were found in this grave (Table 3). The grave was small in size (1.40x1.05 m) and contained the densely packed and mingled fragmented remains of at least eight individuals, six of whom were adults and two were subadults. No particular arrangement of the bones was recorded and it was not possible to attribute the artefacts found in the grave (see Table 3) to specific bone elements. Adult skulls, scapulae, pelves and long bones were well represented in Grave 2, over 50% (Fig. 5). On the contrary, small-sized bones, such as carpals, hand and foot phalanges, and fragile bones such as ribs and most

Table 3
MNI, type of disposal, age and sex categories, artefacts and additional bone elements found in each funerary context.

Funerary contexts and location		MNI	Type of disposal	Age and sex categories	Artefacts	Additional bone elements identified in the laboratory
Grave 1	Center of Burial Cluster II	3	Secondary treatment • re-assembled bones of two individuals • retention of fairly complete skeletons	middle-aged maleadolescent	two shells	perinate (mandibular fragment)
Grave 2	Tumulus	8	Secondary treatment • patterned presence of prominent bones • bone selection	6 adults, of whom 2 males and 2 females2 subadults (infant and child)	*kantharos,* two angular cups, two loom weights, four obsidian blades	
Grave 3	Rectangular enclosure	2	Primary burial	middle-aged woman	none	adolescent (clavicle, ribs)
Grave 4	Tumulus	2	Primary burial	infant	one jug with cutaway neck	infant (cranium, long bones and ribs)
Grave 5	Rectangular enclosure	1	Primary burial	perinate	none	
Grave 6	Rectangular enclosure	3	Secondary treatment • re-assembled bones of one individual • retention of fairly complete skeleton	young adult	one obsidian blade	adult (tibia, 5th metacarpal) infant (femur)
Bone deposit outside Grave 3	Rectangular enclosure	3	Secondary treatment • re-assembled bones of two individuals • retention of two fairly complete skeletons in a commingled assemblage random or cross contamination	one middle-aged maleone young female one adult	none	
Total		22				

of vertebral elements were poorly represented. The overrepresentation of the skull and dense bones contrary to small and fragile elements in an otherwise poorly represented assemblage in a small funerary structure cannot be attributed solely to natural taphonomic loss and is consistent with bone selection.

The representation of the two subadults in Grave 2 was even poorer (Fig. 5). Subadults were not only missing small-sized and fragile bones, which is consistent with greater intrinsic bias in subadult bone representation and preservation (Bello and Andrews, 2006; Bello et al., 2006), but they were also missing the mandibles and larger bones such as radii, tibiae and fibulae. The child (the only one in this MH sample) was represented by the cranium, shafts of humeri, ulnae, the left femur, parts of both coxal bones, a second metacarpal, two cervical vertebrae and a patella, while the infant was represented by a second metatarsal and a right femoral shaft, suggesting inconsistent representation across the different parts of the skeletons. No matching was found between the infant femur found in Grave 2 and that collected from Grave 6. Finally, we compared the preservation of the bones between the child in Grave 2 and the infant in Grave 4; although it is attested in the literature that the state of preservation of osseous remains increases proportionally with the individual age (Bello and Andrews, 2006), this does not seem to be the case for the child in Grave 2 when compared to the infant in Grave 4 (Fig. 4f). The poor representation of the child in Grave 2, contrary to the well preserved infant held in the primary inhumation of Grave 4, is largely indicative of secondary human interference for the former.

To conclude, Grave 2, like most graves in Burial Cluster II, lacked capstones thus increasing the opportunity for the interference of various taphonomic processes in the preservation of bone elements. Nevertheless, the obvious differences between Grave 2 and the other funerary contexts with regard to the quantity and representation of the bones, along with the great number of artefacts, when combined with the size of the grave, should not be exclusively ascribed to taphonomic processes nor to recovery biases. When considering the small size of Grave 2, we hypothesize that it was initially used for the inhumation of the child (and probably an infant), and as such resembles the composition of Grave 4, enclosed also in the tumulus. On the other hand, the evidence of the adults indicates that the grave was transformed into an 'ossuary' at a later point, in which the disarticulated skeletal remains of six adult individuals (with a preference for the skulls and the limbs) were deposited. The number of funerary episodes and time span of the usage of Grave 2 for secondary burials remains unclear. The skeletal preservation indicates that the decomposition of the adult individuals and the subsequent fragmentation of their bones did not take place in Grave 2, but at a different and unknown place. As such, whereas we do not exclude additional impact of taphonomic processes, the evidence points to human interference and to selected skeletal remains having been deposited here in a secondary context. This practice may also have caused the loss of several subadult bones upon modification of their primary burials. Similar cases of burial contexts (that have been interpreted as 'ossuaries') are reported from elsewhere in MH Greece (see analysis and references in Cavanagh et al.: 216-217, 2016; Lagia et al.: 188, 200, 2016). Remarkable similarities, in terms of grave size, number of individuals and offerings, are also found between Grave 2 analyzed here and Tomb 11 from Eleon dated to LH 1. Regardless its small size, the latter has been interpreted as ossuary and, like Grave 2, contained the largest number of individuals and grave goods in the site (Burke et al., 2020: 451, 459).

In sum, both sexes and all age classes are included in Burial Cluster II; however, the treatment at death shows different patterns for males and females as well as for adults and subadults, a pattern that has to be confirmed by future excavations. Males and females were held in secondary contexts but only one female was found in a primary burial. Infants and children were included in primary (Grave 4 and 5) and commingled assemblages (Grave 2) but the re-arrangement of subadult remains in secondary contexts is attested for an adolescent (Grave 1). On the other hand, burial location and grave architecture show that subadult burials were equally located in prominent places as those of adults with the central graves of the stone enclosure and the tumulus containing the primary burial of a woman and an infant, respectively. Finally, it seems that grave size was not always proportional to the height of the individuals, nor linked to their age; this is particularly observed in large Grave 4 and small Grave 5, both of which included the primary burials of very young subadults.

Age and sex-based differentiations in the treatment at death are observed for several contemporary assemblages in Mainland Greece. At Aghios Vasileios, subadults are underrepresented when compared to adults. Among subadults, infants and children under five years were generally excluded from commingled secondary assemblages (although few exceptions are noticed) while older children were commonly found in various types of secondary deposits (Moutafi and Voutsaki, 2016: 788). At Kirrha, infants and children were buried in diverse modes (primary and secondary burials) in MH houses and 'appear to claim their own area' (Lagia et al., 2016: 198) since they were particularly concentrated at the East Sector of the site. A similar distinction was also

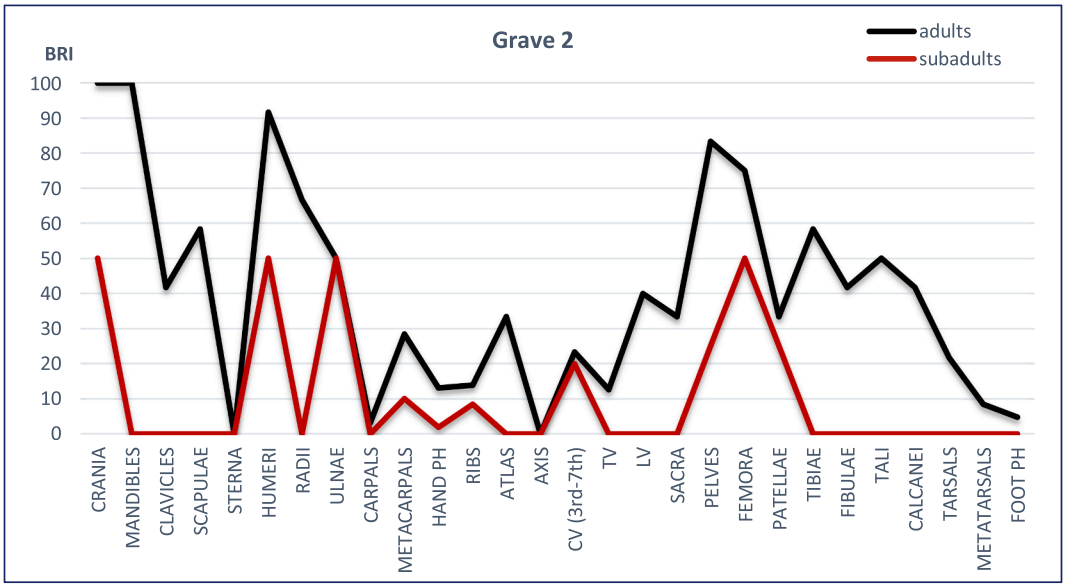


Fig. 5. BRI by age group for Grave 2 (CV = cervical vertebrae, TV = thoracic vertebrae, LV = lumbar vertebrae).

observed for the infants/children concentrated in the west sector of the East cemetery of Thebes (Aravantinos and Psaraki, 2010: 381). The under-representation of infants and children in the 'tumuli' of Argos suggests that these had 'no, or restricted access' to them (Voutsaki et al., 2009: 181). Finally, at the more northerly and distant sites of Valtos and Pigi Athinas at Southern Pieria the central figures of MBA/LBA tumuli were females and males, respectively (Tritsaroli, 2010: 192-193, 2017: 248–250) and subadults were excluded.

3.2. Paleopathological analysis

Dental pathologies were recorded for adults (four adolescent teeth and alveoli were not affected). A total of 16 adult dental arcades (six maxillae and 10 mandibles) and eight loose teeth were analyzed. Teeth and arcades represent the four adults from Graves 1, 3 and the deposit of bones outside Grave 3; in addition, two maxillae, six mandibles (two of which without preserved teeth) and the eight loose teeth were found in Grave 2. The highest frequency is observed for periodontal disease 63.1% (53 out of 84 alveoli), which is expressed by horizontal bone loss. Teeth are affected by calculus at 19.4% (12 out of 62) and the lowest frequencies are recorded for caries at 10.5% (8 out of 76) and AMTL at 6.8% (12 out of 177); all pathologies are mildly expressed. When entire skeletons are available for analysis, it is noted that six out of eight carious teeth belong to the middle-aged male from the primary burial in Grave 1. Calculus affected the teeth of one young adult, one middle-aged female and one adult. All cases of AMTL were recorded on the mandibles from Grave 2. Finally, the middle-aged female of the primary burial from Grave 3 displayed evidence of dental trauma consisting of enamel chipping on the maxillary incisors and the upper right canine; similar cases were also found at Pigi Athinas (Tritsaroli, 2017: 246), while the presence of increased dental wear with important loss of crown height observed in Kouphovouno is suggestive of the non-masticatory use of anterior teeth (Lagia and Cavanagh, 2010: 341).

The recording of cranial porosities was considerably hindered by the sedimentation that often covered the entire surface of the cranial vault. The only observable orbits were those of the woman from Grave 3 and they did not show evidence of cribra orbitalia. Porotic hyperostosis was recorded on two out of three individuals with observable cranial remains; in both cases the lesions are expressed by mild porosity on the parietals and the occipital. Non-specific periosteal lesions for adults were found on two out of four observable tibial shafts and on one out of three observable fibular shafts both from the young adults. All these cranial and long bone periosteal lesions were shared by the young adult in Grave 6 and two out of three adults in the bone deposit outside Grave 3. Finally, linear enamel hypoplasia (LEH) frequency was 10.3% (6 out of 58 observable teeth); the lesion affected only the teeth of the middle-aged female skeleton in Grave 3.

Osteoarthritis (OA) occurred on the articular surfaces of major joints of the skeletons. One observable humeral head and the articular surface of seven clavicles did not display any lesions. OA was noted on the glenoid fossae of one left and one right scapula, both belonging to the middle-aged female of Grave 3; the lesions were expressed as marginal osteophytes and porosity. The distal ends of three humeri (out of seven observed) collected in Grave 2 exhibited slight porosity, while the distal end of a left radius (female in Grave 3 and in a total of five radii observed in the entire sample) showed minor porosity and marginal osteophytes. Two out of six pelves displayed minor osteoarthritic lesions in the acetabulum; one such case was found for the middle-aged female from Grave 3 and was coupled with similar lesions on the femoral head and both ankles; the second case was observed on the young adult in Grave 6. Vertebral osteoarthritis was noted for two thoracic and three lumbar bodies and one sacrum, as well as on the apophyseal facets of the thoracic vertebrae, most of them belonging to the middle-aged women of Grave 3. Squatting facets were found bilaterally on the tibiae and tali of the middle-aged female from Grave 3. No abnormalities of shape or form nor traumatic injuries have been observed in the sample. Finally, non-metric dental traits include two cases of Carabelli's cusp on the upper first permanent molars (out of six upper, first molars observed) of the middle-aged male from Grave 1; the same individual displayed *vastus notch* on the right patella (out of 11 adult patellae). Bearing in mind the limitations imposed by the small sample size and the overall poor skeletal preservation, it seems that the people recovered from the MH II/III burials of Aghios Ioannis experienced some physiological and physical stress (e.g. healed anemic conditions, LEH, OA, activity markers) but at this stage of the analysis it is unwise to make more general assumptions.

The lesions observed at Aghios Ioannis are commonly found in other MH assemblages (Ingvarsson-Sundström et al., 2013; Lagia and Cavanagh, 2010; Papathanasiou et al., 2009; Triantaphyllou et al., 2008; Tritsaroli, 2010, 2017; Voutsaki et al., 2009, 2013), but further investigation is needed to explore inter-site variations in everyday life and diet. Of particular interest though is the female primary flexed burial in Grave 3. She was inhumed on her left side in the central cist grave of the stone enclosure. She is the only individual with dental enamel hypoplasia, indicative of growth disruption (Bereczki et al., 2018). Dental trauma recorded on anterior teeth suggests the extra-masticatory use of teeth in food preparation activities (examples of similar cases can be found in Lagia and Cavanagh: 341, 2010; Tritsaroli: 246, 2017). In addition, extensive OA on the limbs and the spine reveal heavy workload and squatting facets on tibiae and tali suggest habitual squatting as part of her daily living (for example for food preparation tasks or occupational activities). All the above provide some evidence of sex-based variations in mortuary practices and everyday life.

4. Conclusions

The burials and human osteological remains unearthed so far from the excavated Burial Cluster II at the northern plateau on the acropolis of Aghios Ioannis represent a small group of 22 individuals. The presence of perinates and infants shows inclusion in the burial ground and equal mortuary treatment of all the members of the community, albeit with funerary variability too. The burials that came to light in the rectangular enclosure do not show important differences in mortuary treatment when compared to those from tumuli; it could be assumed that the observed variations in funerary architecture are simply linked to the space that was available to the inhabitants of the acropolis, while the hypothesis that this variation reflects a traditional, local practice cannot be excluded. Despite the social belonging of the deceased expressed by the burying community through the grouping of graves (some of them containing more than one individual) in the stone enclosure and the tumulus, increased emphasis on differentiation is seen in the treatment at death of age groups as well as evidence on sex-based variations in mortuary practices and everyday life. Preliminary bioarchaeological results for Burial Cluster II add further to the discussion on the changing and renegotiated individual and collective identities in the mortuary sphere and social landscape at this formative period for Boeotia and Mainland Greece.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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