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Zagreb, 3rd – 4th December 2020

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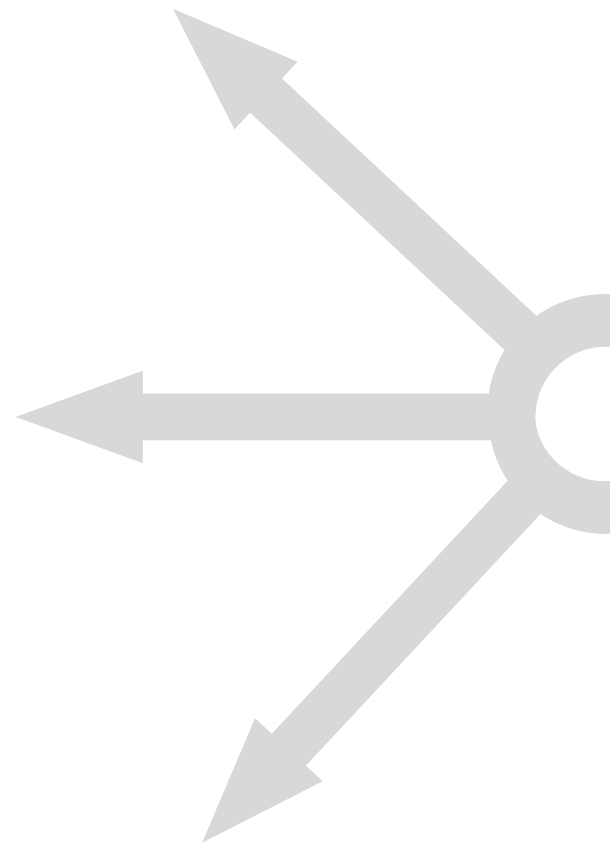
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The Late Neolithic human burials from Kotlina – Szuzai Hegy, Baranja: the first results of the anthropological analysis

Mario Novak, Dragana Rajković

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Human burials with skeletal remains of four individuals were discovered during the systematic archaeological excavation conducted between 2018 and 2021 at Kotlina - Szuzai Hegy site. Movable archaeological finds and direct radiocarbon dates show that the site can be attributed to the Lengyel culture.

The skeletons were laid in shallow pits, in the contracted position, only 30 cm below the surface, which contributed to their bad preservation. Conventional bioarchaeological analysis revealed the sex and age-at-death of the studied individuals as well their health status. Their demographic profile was somewhat unusual: Grave 1 (G 1) contained the remains of a young female (17-22 years) while the other three burials contained the remains of subadults (Grave 2 an adolescent 11-13 years old; Grave 4 a small child 2-3 years old; Grave 5 an infant 6-9 months old). The samples from all four skeletons were taken for the purposes of ancient DNA and stable isotope analyses that will tell us more about the ancestry, kinship and diet of these individuals. The burials show evidence of complex funerary practice: ceramic vessels, polished stone tools, and mollusc shell bead. The human remains from Kotlina provide an excellent opportunity to reconstruct the biological profiles of the studied individuals, while recovered grave-goods allow a comprehensive archaeological analysis of mortuary practices in this Late Neolithic community, but also the analysis of the long-distance networks and exchange activities.

Keywords: Neolithic, Baranja, burials, Lengyel culture, human remains, grave-goods

Introduction

Systematic archaeological excavation of the site of Kotlina, situated in the Baranja region, in eastern Croatia, was initiated in 2018 and is still ongoing (Fig.1). The project “Kotlina, the prehistoric site” encompassed a non-invasive field survey and the excavations of two trenches. During that time the area of

130 m² was excavated, revealing different archaeological structures: graves, post holes, and rubbish pits¹. Archaeological finds belong to the classical phase of the Lengyel

¹ Archaeological excavations are led by the Archaeological Museum Osijek.



Figure 1. The location of the site of Kotlina and the location of Szuzai Hegy (1:10000) (made by: M. Maderić)

cattle bone, provided the date 4681-4492 cal BCE.³ Four other direct radiocarbon dates have been obtained from human bone samples from graves 1, 2, 4 and 5 and all four provide very similar dates (Table 1, Fig. 17).

The Lengyel culture was very widely distributed in central Europe in the first half of the fifth millennium cal BC. At its great extent, its settlements are found in western and north-east Hungary, south-west Slovakia, eastern Austria and Czech Republic. Its distribution reached Slovenia and Croatia in the south, and Poland in the north (Osztás et al. 2013: 180). The existing radiocarbon dates from Lengyel context suggest duration of approximately more than half a millennium, estimated roughly as falling between 4900 and 4300 cal BC. Some estimates place the culture's end at the turn of the 4th millennium (Bánffy 1997: 7; Bickle 2014: 78). Based on pottery four main phases have been identified: Protolengyel, Lengyel I, II and III. The earliest formations of this archaeological culture are found in the northern Croatia and Slovenia (Bickle 2014: 75-76). On its primary territory, the Lengyel culture emerged on the basis of the early Sopot culture south of the Balaton Lake, and the Želiezovce group north of it. Protolengyel groups (Sopot-Bicske, Bíňa-Bicske, Lužianky, Sé) are formed in this area and the early classical Lengyel culture emerged on the same ter-

Site	Lab number	Sample	C 14-Age (BP)	Calibrated Age
Kotlina	Beta-494071	Cattle bone/ SU 8	5770 +/- 30 BP	4709-4542 cal BC
Kotlina	Beta-548562	Cattle bone/ SU 15	5730 +/- 30 BP	4681-4492 cal BC
Kotlina	DeA-28493	Human bone-Grave 1	5792 +/- 30 BP	4720-4550 cal BC
Kotlina	DeA-31813	Human bone-Grave 2	5804 +/- 32 BP	4780-4540 cal BC
Kotlina	DeA-31814	Human bone-Grave 4	5796 +/- 34 BP	4730-4540 cal BC
Kotlina	DeA-31815	Human bone-Grave 5	5881 +/- 37 BP	4850-4620 cal BC

Table 1. Table 1. Dates of the Lengyel culture from the Kotlina-Suzai Hegy site:

culture. Absolute dates were obtained from six samples. The first sample that was taken from a cattle bone from excavation pit 8 places this site to the period of 4709-4542 cal BCE.² The second sample, also obtained from a

territory (Lengyel IA). From there it spread through Austria and Moravia towards the north and west. During this early phase, it spread from western Hungary to eastern Austria. During the IB phase, the Lengyel culture moved

² 6652-6494 cal BP (Beta-494071).

³ 6573-6445 cal BP (Beta 548562).

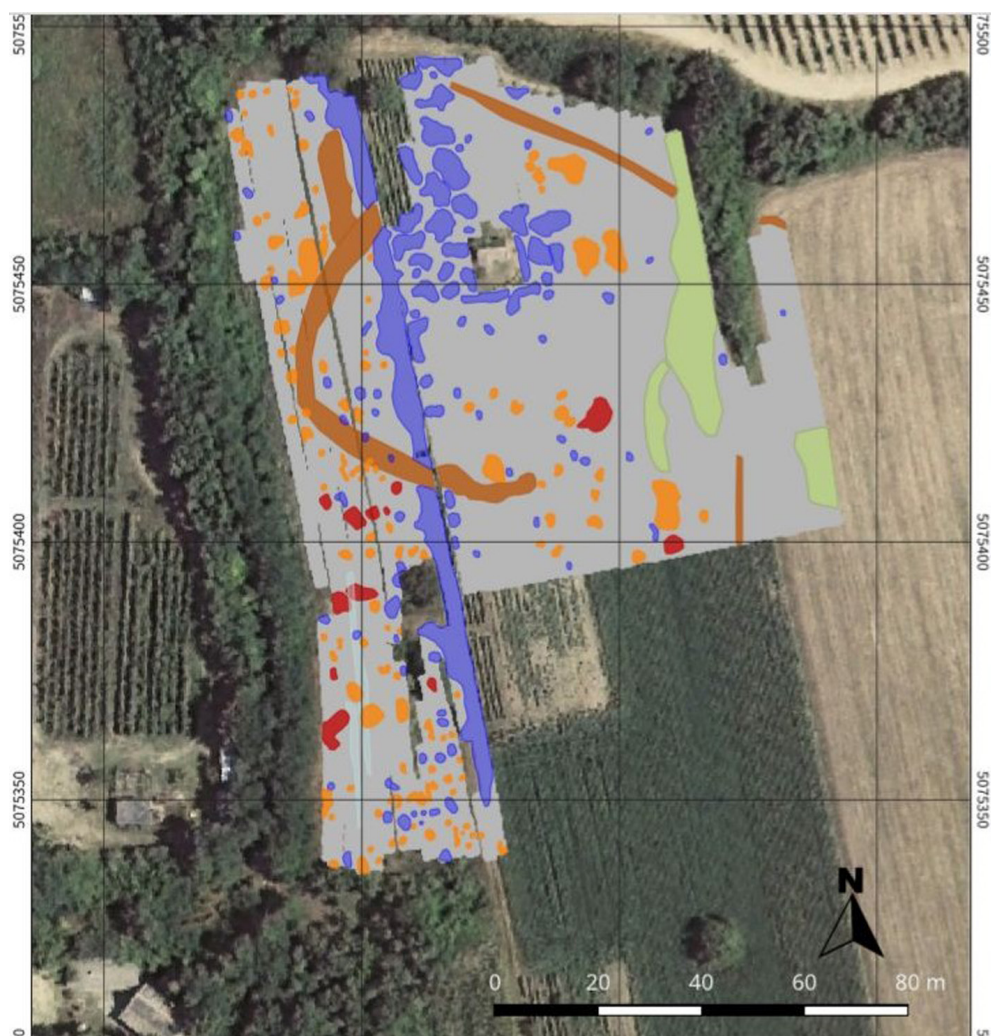


Figure 2. Magnetic measurements and archaeological interpretation (made by: Eastern Atlas GmbH & Co. KG); Figure 2_2 Interpretation of the data

Interpretation of the magnetic data

Archaeological structures	Modern and geomorphological structures
Pit filling, cultural layer	Geomorphological structure
Ditch filling	Modern ferromagnetic object
Fireplace, furnace burnt material	Agricultural structure

further to southern Moravia into the vicinity of Brno. In the Lengyel II stage, it appeared in Central Moravia and Upper Silesia. During the Lengyel III stage, it reached Little Poland replacing there the Malice culture. The Lengyel culture reached its maximum spread within the Epilengyel/ Lengyel IV stage with autonomous regional groups (Pavúk 2007: 11). During the classical phase, the Lengyel culture was also present in the area north of the Drava River in Baranja, eastern Croatia (Los 2020; Rajković et al. *in press*).

Materials and Methods

The systematic archaeological excavations at the location of Szuzai Hegy were carried out in two phases, the first one (carried out in 2018 and 2019) included a magnetic field survey while the second phase included the actual field excavations (started in 2018, on-going) (Fig. 2). During the excavation different archaeological structures were recovered: post holes (parts of habitation units), rubbish pits, and four graves (burials) (Graves 1, 2, 4 and 5)⁴ (Fig. 3). It should be noted that the burials

⁴ Grave 3 was labelled on the basis of the outline of the pit. However, during the excavation of the feature it was concluded that there is no actual grave, only the pit, without any finds.

Figure 3. The position of graves 1, 2, 4, 5. (Made by: M. Maderić)



occurred at a very shallow depth, just below the surface; they were without visible grave-pits, and were recovered only because of careful search. The graves were not visible at all because the colour of their fill was exactly the same as the topsoil, and only skeletal remains and grave-goods indicated the position of graves 1, 2 and 4. The deceased were laid in a contracted position on their left side (graves 1 and 2), and skeleton of the grave 5 was laid on the right side. The form of grave 1 was oval-shaped pit, and in other cases, the shape of pit was not detectable. The overall level of furnishing of the burials is also highly variable: graves 1 and 2 include pots (2-4) and bone/stone tools while graves 4 and 5 do not contain any grave-goods.

The skeletal remains were analysed at the Centre for Applied Bioanthropology of the Institute for Anthropological Research in Zagreb, Croatia. The sex (where possible) and the age-at-death of the analysed individuals were established using methods described by Buikstra and Ubelaker (1994), and Kales (2020). The stature estimation was calculated for an adult individual by using formulae proposed by Trotter (1970). All individuals were analysed for the possible presence of various pathological changes usually seen in archaeological samples. All observed conditions were documented according to cri-

teria described by Ortner (2003), and Aufderheide and Rodríguez-Martín (1998). The samples from all four individuals were taken for ancient DNA as well as carbon and nitrogen stable isotope analysis.

Results

Grave 1 (Figs 4, 5) was recovered during the 2020 excavation campaign. It was discovered to the east of the posts of the above-ground structure, only 30 cm below the present-day surface, on the border between the humus layer and layer of the Unit 45.⁵ The burial pit contained the skeletal remains of one individual placed in the contracted position, on its left side, oriented to the east-west, facing south. The arms were flexed at elbows, placed along the torso, hands were next to the head, while the legs were bent at the knees. Within the grave, four items were discovered: one ceramic vessel placed near the head (PN 108) (Fig. 6), one vessel below the skull (PN 112), one vessel near the legs (PN 109), and decorative elements on the cranium (PN 105) (Figs 14,

⁵ Unit 45 is described as a archaeological layer under the humus, which consists a brownish soil with archaeological structures and material.



Figure 4. Grave 1. (Photo by: D. Rajković).

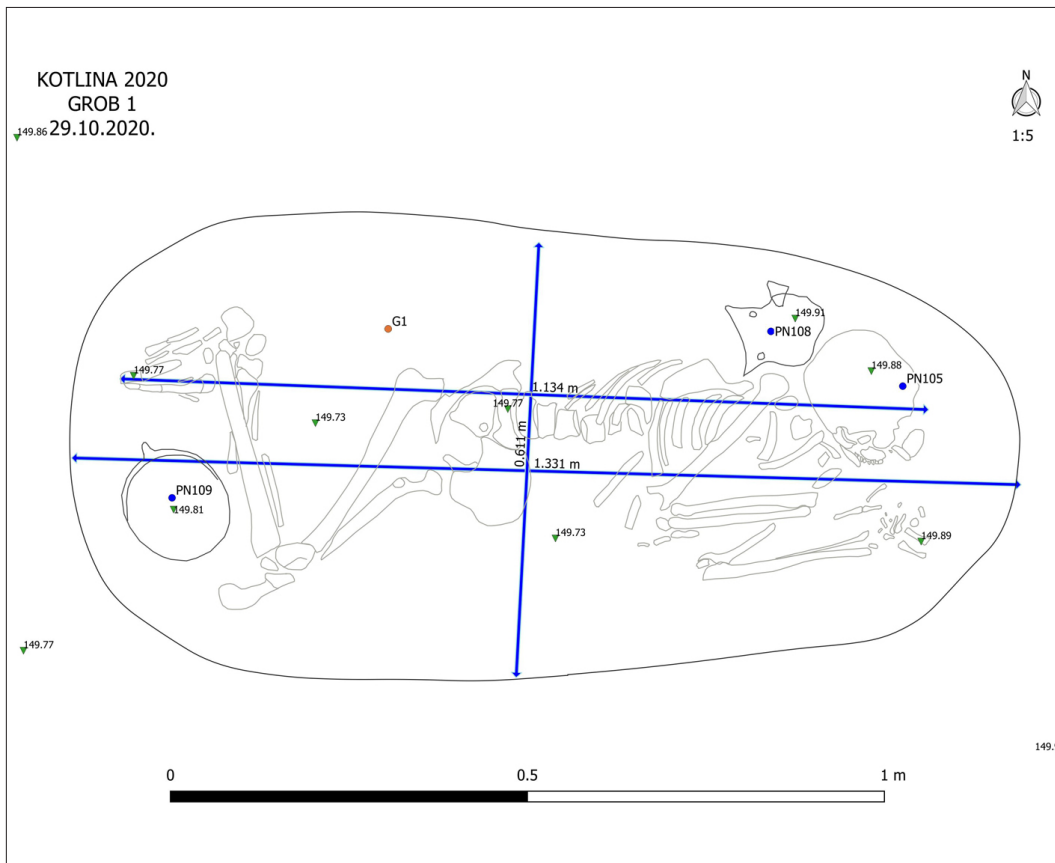


Figure 5. Grave 1. (Made by: M. Maderić).

Figure 6. Grave 1.
(detail of grave pot
PN 108). (Photo by:
D. Rajković).



Figure 7. Grave
2 (Photo by: D.
Rajković).



15). Additionally, one bead made from *Spondylus* shell was discovered later, within the skull (PN 127). We may assume this bead was part of a large ornament, but due to taphonomic reasons (in particular soil erosion, since the grave was discovered close to the present-day surface layer) only this one bead was recovered. Grave 1

contained the remains of a young female (17-22 years of age). Based on the maximum length of the right humerus (280 mm) the stature of this individual was about 156.7 cm. Linear enamel hypoplasia was observed on all present anterior teeth.

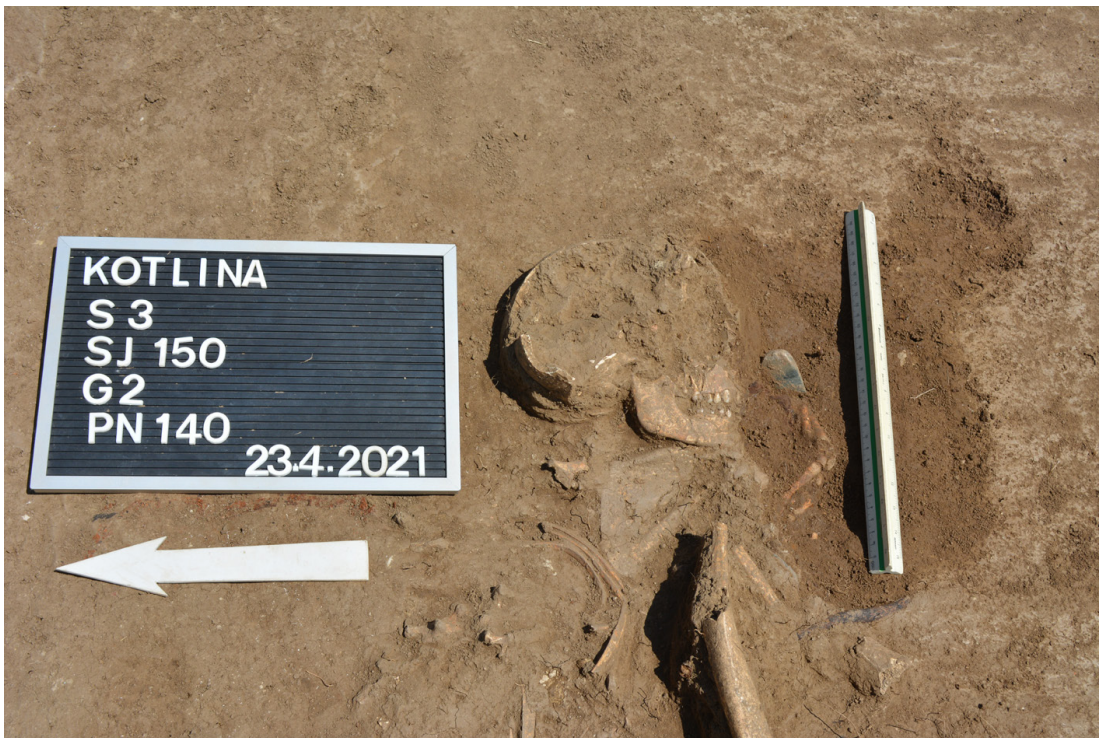


Figure 8. Grave 2.
(Photo by:
D. Rajković).

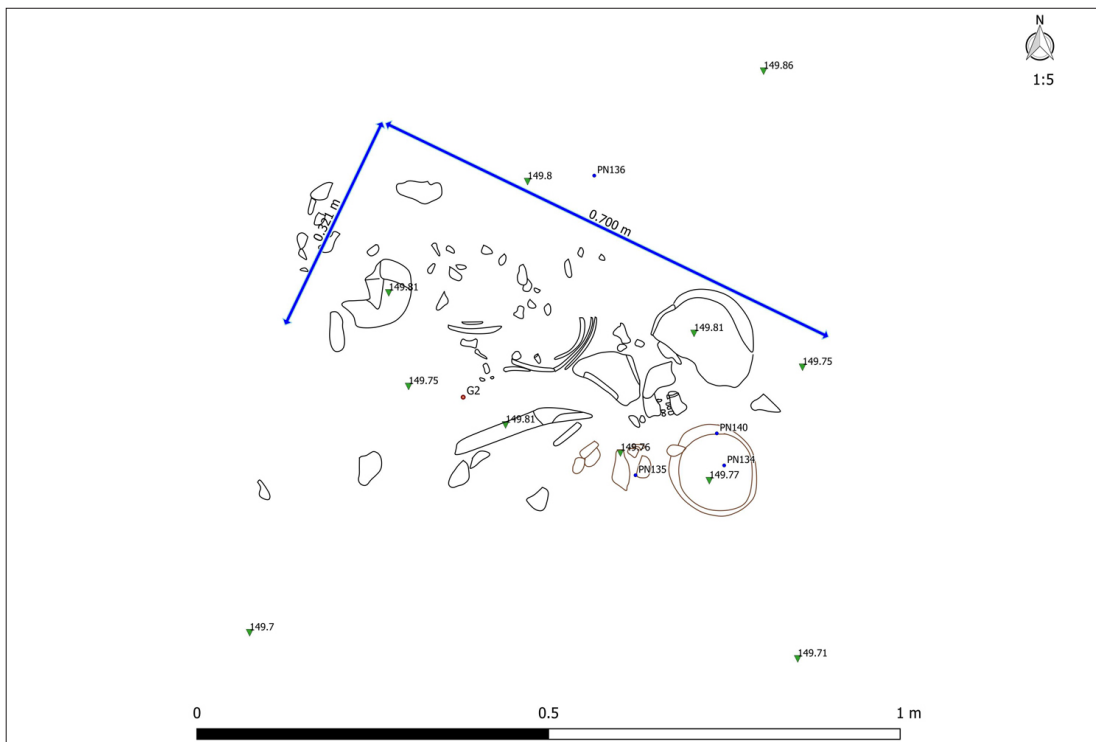


Figure 9. Grave 2.
(Made by:
M. Maderić).

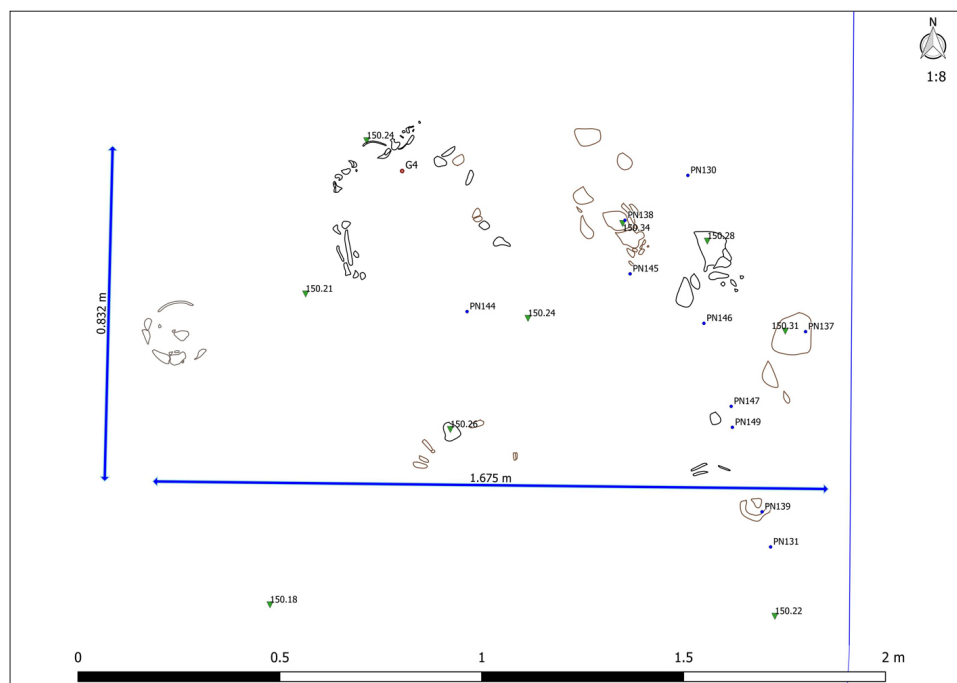
Grave 2 (Figs 7, 8, 9) was discovered in the southern part of trench 2. The cranium is well-preserved and laid on the left side, facing south. The arms were flexed at the elbows, and the hands were placed next to the face. Of the other bones, the ribs and pelvis have been preserved, the hand bones are quite damaged and frag-

mented while the legs are completely missing. Next to the head, there were two ceramic vessels (PN 134, 135), very damaged, and a trace of pottery in the ground (PN 136). A greenish stone adze (PN 140) was subsequently spotted below the vessel (PN 135), in front of the face (Figs 8, 16). During the anthropological analysis an ani-

Figure 10. Grave 4.
(Photo by: D. Rajković).



Figure 11. Grave 4.
(Made by: M. Mađerić).



mal bone (perforated rib) was found (PN 217) (Fig. 16). Due to the damage, it is difficult to determine the typological affiliation. Grave 2 contained the remains of an adolescent (11-13 years of age) whose sex could not be

estimated with certainty. Linear enamel hypoplasia was observed on all present anterior teeth.⁶ Microdontia is present on the right maxillary I2.⁷

⁶ Linear enamel hypoplasia occurs in a form of transversal lines on the surface of tooth crowns. Such deformities are defects in dental development (White and Folkens 2005) and as such are good indicators of subadult stress (long-term metabolic stress, and/or a stressful event that caused it) (Aufderheide and Rodriguez-Martin 1998).

⁷ The common definition of microdontia is when teeth are smaller than normal. This condition is associated with a number of congenital morbid conditions, including heart disease, Down's syndrome, and cleft palate. Often the shape in microdontia will be abnormal as well (Ortner 2003).



Figure 12. Grave 5.
(Photo by: D. Rajković).

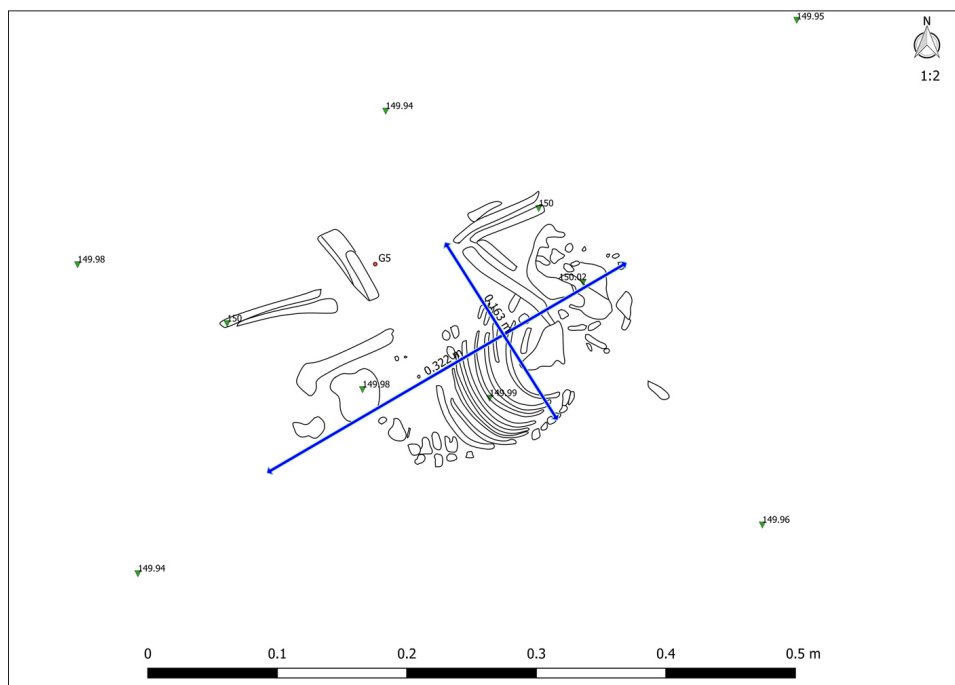


Figure 13. Grave 5.
(Made by: M. Mađerić).

Grave 4 (Figs 10, 11) contained dislocated bones of a very young individual, and only the bones of the skull, ribs and legs were collected. Additionally, the burial of this individual was placed into the fill of a pit (SU 164/165) and contains debris from the settlement (pottery fragments). Grave 4 contained the remains of a small child (2-3 years of age).

Grave 5 (Figs 12, 13) contained a partially preserved skeleton of a small child, laid on the right side, and oriented northeast-southwest. The hands were placed next to the skull, and the legs were bent at the knees. The skull is very badly preserved, probably laid on the right side. The grave did not contain any archaeological finds. Grave 5 contained the remains of an infant (6-9 months of age).

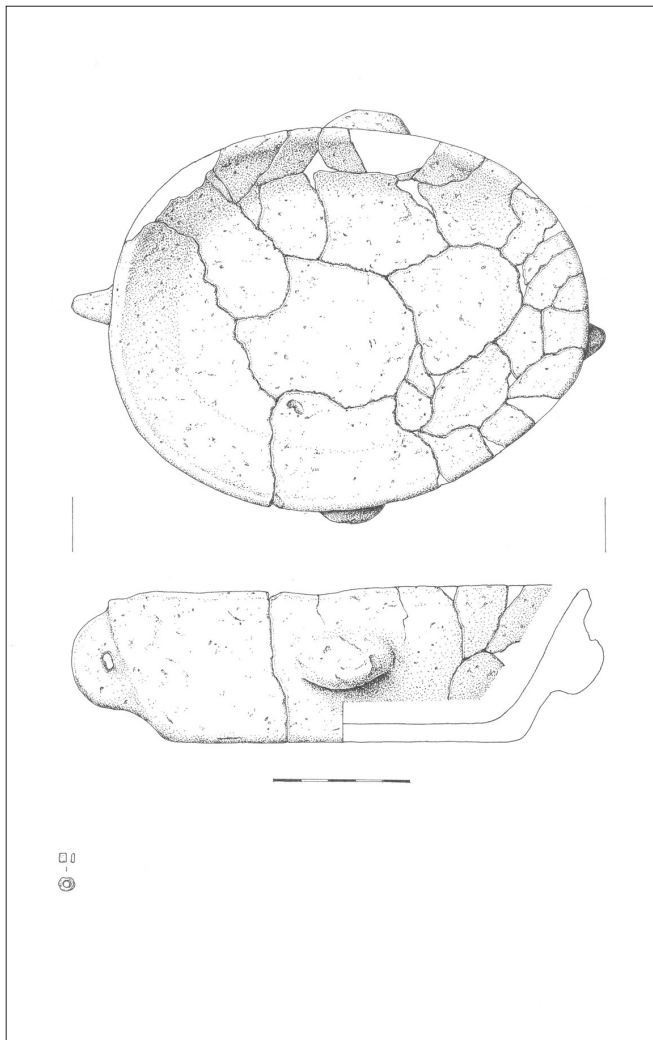


Figure 14. Grave 1 - Illustration of the grave-goods - bowl (PN 109) and *Spondylus* bead (PN 127). (Drawing by: M. Marijanović).

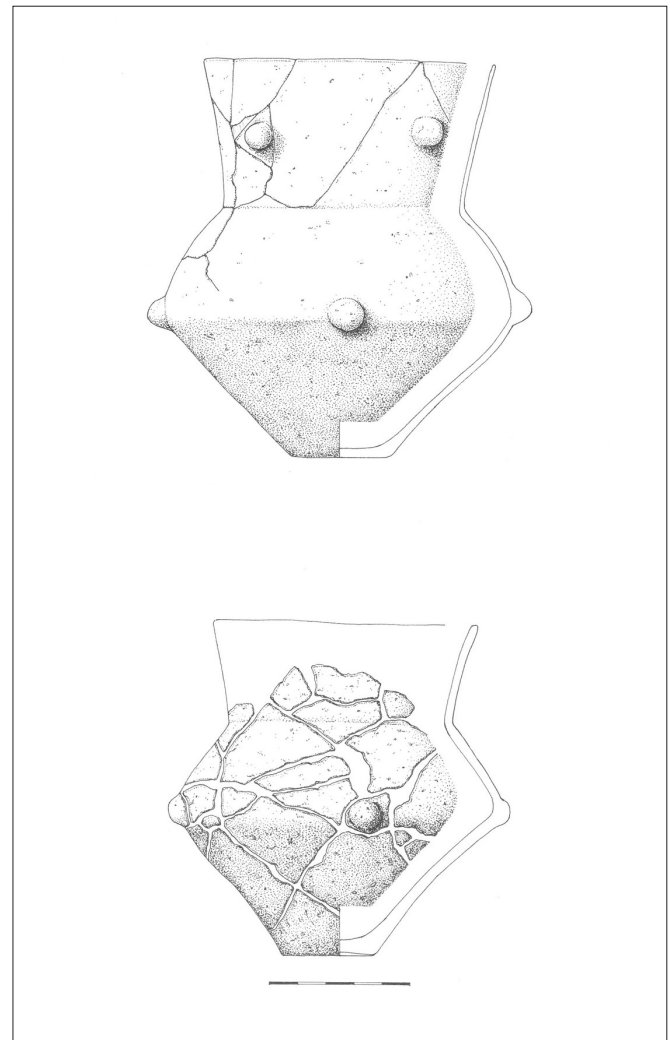


Figure 15. Grave 1 - Illustration of grave-goods (vessel PN 108 and vessel 112). (Drawing by: M. Marijanović).

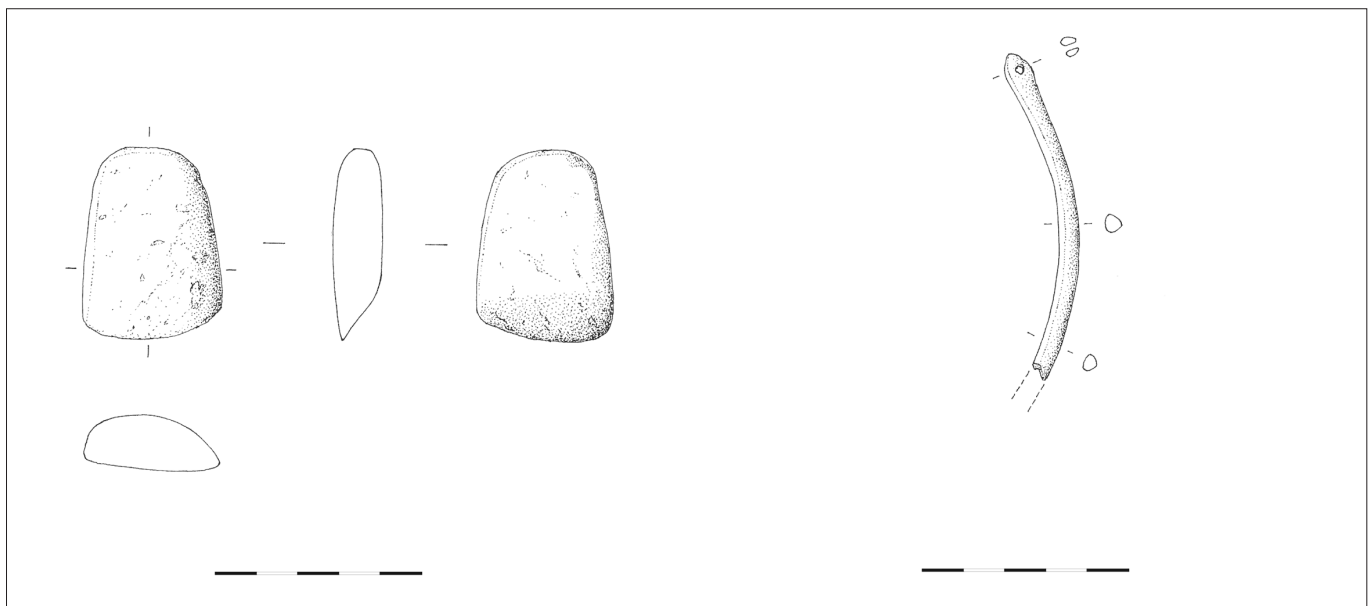


Figure 16. Grave 2 - Illustration of grave-goods - adze (PN 140) and perforated bone (PN 217). (Drawing by: M. Marijanović).

Discussion

According to the position of the recovered graves at the site of Kotlina, it seems that there was no difference between the space for the dead and the space for the living. The graves were positioned individually within the settlement, east of the post holes. The burial of a young adult female (G1) and the burial of an adolescent (G2) contained numerous grave-goods, while the graves of small children (G4 and G5) did not contain any grave-goods. The objects found in the burials are subdivided into two main groups. Some of them are pieces of attire on the cranium (bead made from *Spondylus* shell, decorative elements, perforated rib) and others were placed into the burials as a grave-goods (working tools, ceramic findings). The pottery types are fairly varied in shape and size and do not differ markedly from the ceramic material of other south-eastern Transdanubian Lengyel burials (Osztás et al. 2013: 186-187).

In eastern Transdanubia which represents the eastern area of the Lengyel culture, many burials were found, mostly in smaller or larger groupings, within the perimeter or close to the settlement (Regenye et al. 2016: 7). For example, at the site of Alsónyék - Bátaszék graves containing the remains of over 2000 individuals were discovered (Osztás et al. 2012; 2013). Analogies between Kotlina and Alsónyék may be noted in chronology, in terms of the treatment of the body (contracted position, orientation), as well as in the presence and choice of burial equipment. For example, polished stone tools are present and in seem to be a characteristic of grave goods in male burials (Zalai-Gaál et al. 2011: 71). *Spondylus* shell bead found in Grave 1 can be observed as a prestige item. Among the graves of the Lengyel culture in general, pieces of attire and jewellery made of *Spondylus* shell tend to be more common in the burials of women, but may be found in the burials of both genders (Anders and Nagy 2007: 84). The perforated rib from Grave 2 can be observed as a personal ornament. A characteristic feature of the Lengyel culture burials is that they usually contained ceramic vessel that were associated with some kind of a ritual (Regenye et al. 2016: 11). Usually between one and three pots were placed in the graves, and this practice is also seen at the Kotlina site.

It is interesting to note that at the site of Beli Manastir - Popova zemlja (excavated in 2014/2015, located about 15 km from Kotlina), several graves associated with the Lengyel culture community were recovered (among a total of 36 inhumation burials). Similarities are visible

in the absolute dates of these two localities and in the grave-goods, where ceramic vessels are placed next to the body (Los 2020: 96, fig. 8.).

When talking about the demography and health of the recovered individuals from Kotlina one can notice that out of the four skeletons, only one belonged to an adult (although very young) and the other three skeletons belonged to subadults (one adolescent and two small children). Obviously, this is not a representative demographic profile for the whole community from Kotlina because the analysed sample is very small and erratic. Nevertheless, such sex and age distribution (however small and subject to errors) might indicate a high subadult mortality and a relatively short life-span that was characteristic for most Neolithic/Eneolithic communities from the region. For example, at the already mentioned Beli Manastir - Popova zemlja site more than one third of all studied individuals were subadults (especially those below five years of age) (Novak et al. 2018) and most of the adults belonged to the youngest adult age group (18-35 years). An almost identical situation was also registered at the catastrophic skeletal assemblage from Potočani (Eneolithic Lasinja culture) representing the victims of a massacre (Janković and Novak 2018; Janković et al. 2021) where half of the individuals were children under the 18 years of age and most of the adults belonged to the youngest age group. Also, the reconstructed height of a young female from G1 of about 157 cm might seem very low by modern standards, but similar heights were recorded for most females from the nearby site of Beli Manastir - Popova zemlja (average height of 156 cm) (Novak et al. 2018; Jovanović et al. 2021). Due to the fact that most of the skeletons from Kotlina were either partially preserved and/or dislocated (in other words, poorly preserved) only two pathological conditions were recorded. Linear enamel hypoplasia is present in all anterior teeth of the young female from Grave 2 suggesting systematic physiological stress during early childhood. Obviously, the individual in question managed to recover from this episode of stress and lived to the young adulthood. Unfortunately, we cannot tell what the cause of death of this individual was and if the causative agent of linear enamel hypoplasia had any (non-direct) relations to her premature death. Otherwise, linear enamel hypoplasia is a frequent occurrence in prehistoric communities. For example, at Beli Manastir three individuals were affected by this condition (Novak et al. 2018; Jovanović et al. 2021), while in Potočani numerous individuals showed signs of enamel hypoplasia in their permanent dentition (Janković and Novak 2018), again suggesting systemat-

ic and frequent episodes of physiological stress during childhood. And finally, microdontia of the right maxillary second incisor recorded in a skeleton of an adolescent from G2 represents a unique case in prehistoric assemblages from continental Croatia. So far, at least to our knowledge, such a case has not been reported. Unfortunately, at the moment we cannot tell with certainty what could have caused such a change in the dentition of this individual.

Conclusion

The excavation results at the site Kotlina - Szuzai Hegy show that it is an exceptionally interesting and rich site of the classical phase of Lengyel culture in the region of Baranja. The most significant finds at the site are human remains from four burials placed near the post holes of above ground object.

The demographic profile of the studied individuals is somewhat unusual – a young female and three subadults – suggesting high subadult mortality and a relatively

short life-span in this community. Also, linear enamel hypoplasia was registered in one skeleton suggesting systematic physiological stress. The samples from all four skeletons were taken for the purposes of ancient DNA and stable isotope analyses that will tell us more on the ancestry, kinship and diet of these individuals.

The site is located in a region where different cultural elements of the Sopot and Vinča cultures are mixed and represent a very important element in cultural and chronological relations. Recent studies demonstrated that the southern borders of the Lengyel culture need to be pushed further, since several sites were discovered in the Baranja region that display differences in the material culture and burial rites in comparison to those encountered within the Sopot culture.

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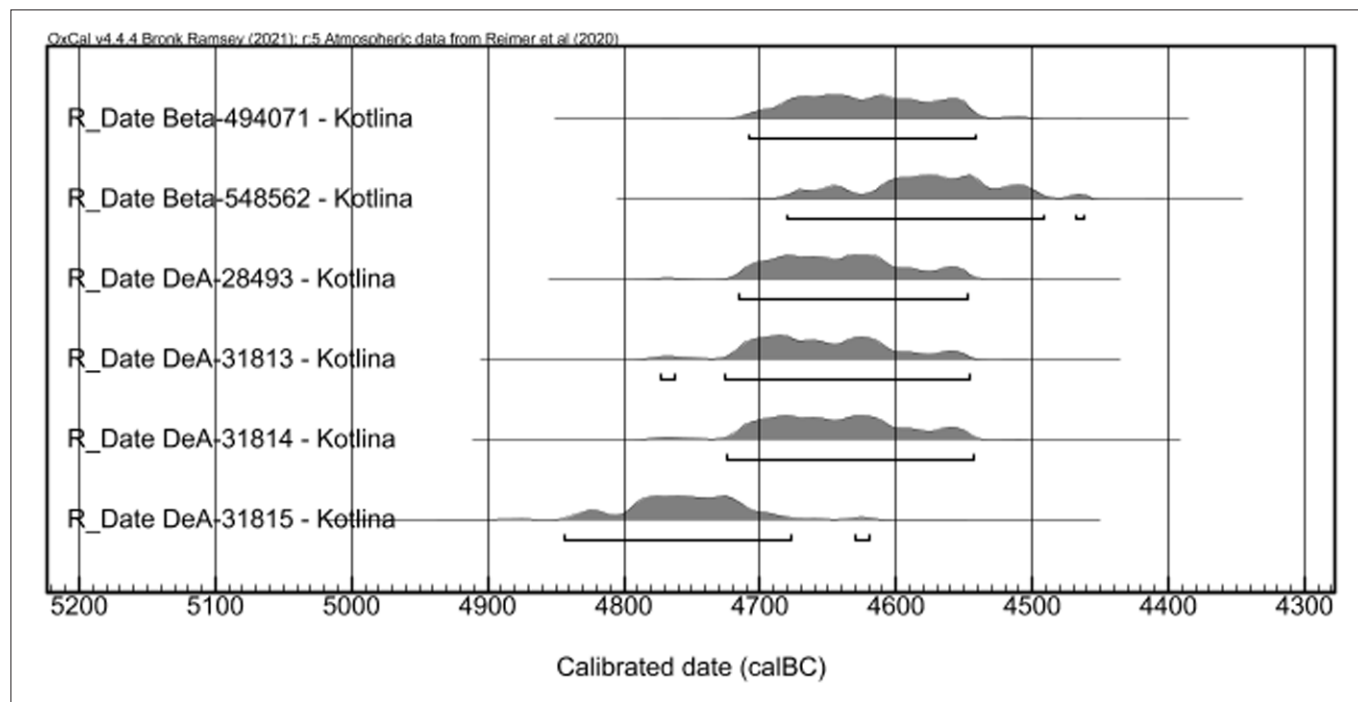


Figure 17. Time range of calibrated radiocarbon dates for the Kotlina- Szuzai Hegy site (program OxCal v.4.4.4).

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