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Artificial cranial modification northwest of the Black Sea in the Bronze Age: a case study from Ciulnița, Romania

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Abstract

This article presents a case of artificial cranial modification discovered in a Middle Bronze Age grave in the Ciulnița locality of Romania. The skeletal remains from Grave 38 in Mound II belonged to an adult male and indicated a circular/annular or fronto-sincipito-occipital type of artificial cranial modification, depending upon the classification used. The dating of this individual provides an opportunity to discuss the steppe impact along the Lower Danube, including the custom of cranial modification, beyond the Yamnaya migration of the 3rd millennium BC, a period intensively researched in the past decade, extending to the 2nd millennium BC, a period currently understudied.

Keywords: artificial cranial modification, burial mound, Middle Bronze Age, Lower Danube, North Pontic steppe

21.1 The practice of artificial cranial modification

Throughout history, human societies have engaged in a multitude of body modification practices, some more subtle, others more visible and some even extreme. Among them, artificial cranial modification (or deformation) stands as one of the most aggressive and controversial body modification practices. It is achieved through an invasive and irreversible method, performed *intravitam* by applying long-lasting pressure to an infant's skull, resulting in the permanent and visible alteration and remodelling of the normal shape of the skull or head (Dingwall 1931: 1–15). This practice, sometimes highly selective and at other times a common custom or habit, has been found on all continents inhabited by human societies, during all periods, in numerous temporally separated populations with different cultural characteristics and in various ecological environments. Furthermore, various motivations, ranging from social status distinction, cosmological grounds, body aesthetics and the expression of ethnicity, have prompted the practice (Dingwall 1931; Torres-Rouff & Yablonsky 2005; Mirițoiu 2005: 44; Tiesler 2014).

In contrast to Asia where the practice has been reported continuously during all eras, on the European continent, especially in the Lower Danube Basin, artificial cranial modification appeared with the arrival of the first migrating groups from the Eurasian steppes during the Early Bronze Age, then, later, in Antiquity, brought once again by other migrating communities from the East. This article presents the case of an artificial modification to the skull of an individual found in Grave 38, discovered in a burial mound in the Ciulnița locality, Ialomița County, Romania. Below, we discuss the morphometric changes associated with artificial cranial modification, the presence of this practice within the wider context of southeastern Europe and the North Pontic steppe during the Bronze Age and the implications of this discovery for the steppe impact along the Lower Danube during the 2nd millennium BC.

21.2 The case study: Grave 38 from Mound II in Ciulnița, Ialomița County, Romania

21.2.1 The archaeological context

In 1994 and 1995, archaeologists from the Ialomița County Museum carried out salvage excavations of two burial mounds located in the village of Ciulnița, Ialomița County, in southern Romania (Fig. 1). The site was used as a source of soil for the *Transeuropa N–S* road, leading to considerable destruction of the mounds prior to the beginning of the archaeological research. Only 20–25% of the mantle of Mound II was preserved, while the mantle of Mound III was completely destroyed (Renț a 2016: 85).

The archaeological data have been published extensively in a monograph (Renț a 2016), but only recently have the human osteological remains, located in the collection of the 'Olga Necrasov' Centre of Anthropology in Iași, been subjected to bioanthropological analyses. Furthermore, in order to obtain detailed information about the chronological sequence in which the two mounds were raised and/or used, six samples of human bones were radiocarbon dated. The results indicate that the burials took place in several stages, between the late 4th millennium BC and the 1st millennium AD. These new investigations along with the existing archaeological documentation enabled a re-evaluation of these discoveries (Preda-Bălănică et al. 2023).

Grave 38 (Renț a 2016: 90, Fig. 184:1–2) was uncovered along the southwestern periphery of Mound II, partially under another grave (Grave 37). The grave pit had an irregular shape, oriented in a north–south direction, with the dimensions of 1.45 × 1.25 m, and its bottom reached the yellow soil layer of the terrace. At the bottom of the pit, the skeleton of an adult individual was found in a tightly crouched position on the right side, oriented in an east–west direction. The arms were bent at the elbows and the hands were positioned towards the shoulders, while the lower limbs were tightly bent in

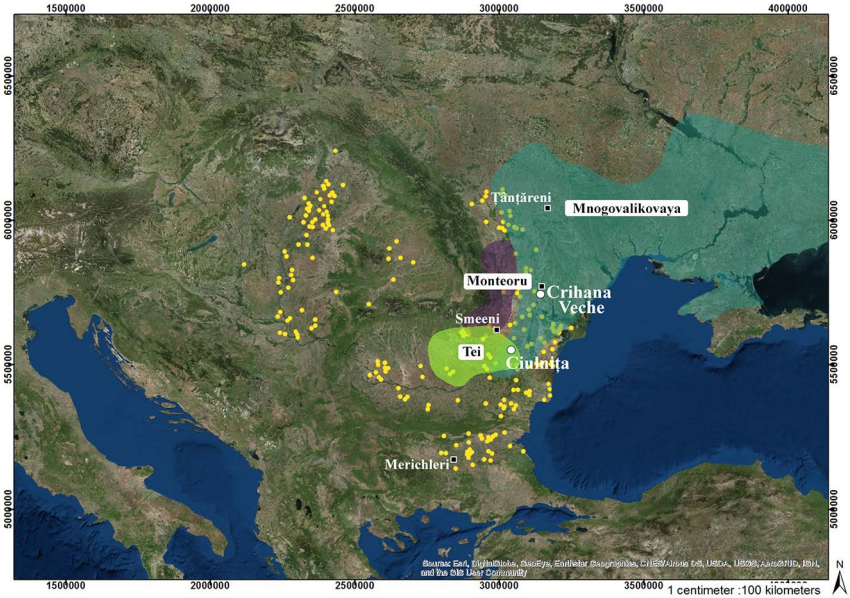
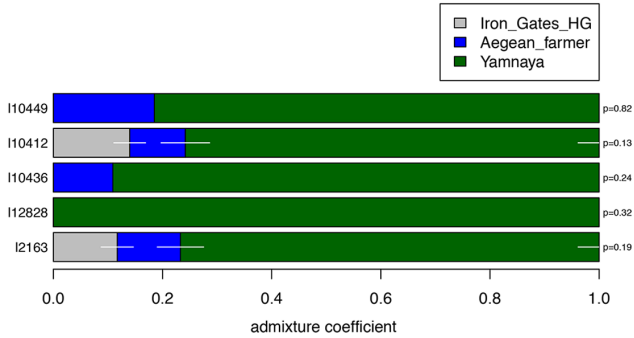


Figure 1. Map of the Monteoru, Tei and Monogovalikovaya cultural areas. Yellow dots mark the burial mounds excavated, dated to the Bronze Age; white circles indicate individuals with artificial cranial modifications; black squares show individuals for whom aDNA analyses were available.

such a way that the knees were close to the arms (Fig. 2:2). No grave goods accompanied the individual (Renț a 2016: 90). However, among the human skeletal remains, an incomplete rib was identified, most likely from an adult Ovis/Capra, which could be the remnant of an animal offering placed in the burial pit. Ochre was identified discretely and evenly distributed on all skeletal elements, more intensely on the mandible, frontal and cervical vertebrae as well as on the hand and foot bones. The ^{14}C date obtained indicates the remains date to 3439±25 BP (BRAMS-5811; 1877–1636 calBC; Preda-Bălănică et al. 2023).[1]

[1] All dates are calibrated with OxCal 4.4 (Bronk Ramsey 2009) using IntCal 2020 (Reimer et al. 2020) and given with 95.4% probability.


Iron_Gates_HG
Aegean_farmer
Yamnaya
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I10412
I10436
I12828
I2163
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p=0.24
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0.4
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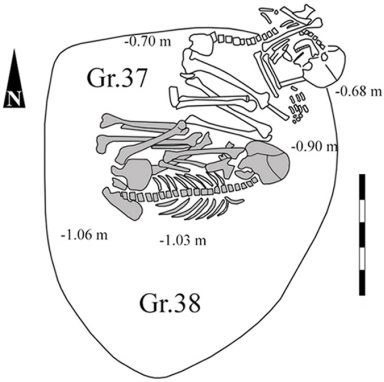
1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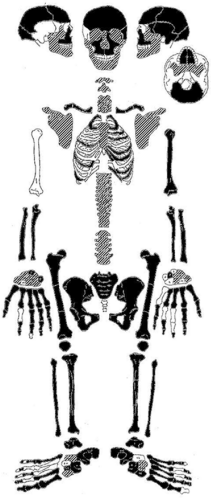

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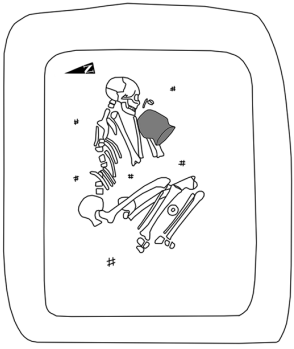
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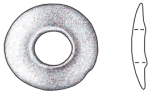
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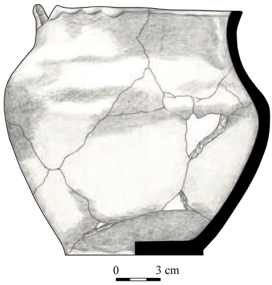
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21.2.2 Biomorphometric data

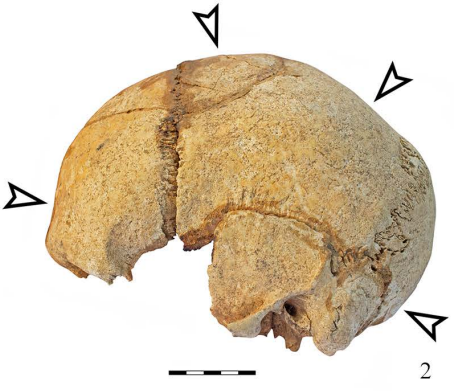
Morphometric analysis was performed in accordance with Martin (1928), Ubelaker (1979) and Buikstra and Ubelaker (1994). We adhered to Barnes (1994; 2012), Aufderheide and Rodriguez-Martin (1998), Ortner (2003) and Waldron (2009) in recording abnormalities and pathologies.

The skeleton discovered in Grave 38 comes from a male individual (anthropological sex), with a biological age-at-death of 40–50 years (middle to old adult). The skeleton is well-represented and satisfactorily preserved (Fig. 2:3). The morphometric characteristics express an Europoid phenotype (Fig. 3:1–4), with an ovoid-shaped, very long, very narrow and very high neurocranium. The frontal and occipital areas have a moderate to large width and height, the latter exceptionally curved. In addition, the zygomatics are high, while the mandible is gracile. Furthermore, the postcranial skeleton is quite gracile for a male. The skeletal stature is large to very large, at approximately 174 cm (Trotter 1970).

At the time of death, the individual's dental health was poor. On the lower dental arch, four teeth were lost *antemortem* (both I_1 and M_1 and M_2 on the right side). Almost all of the teeth have supragingival calculus on the enamel (vestibular and lingual), which is more prevalent on the molars. Such a pathological dental picture suggests a mixed diet – tooth decay and caries indicate a preference for foods rich in carbohydrates, and the calculus is indicative of animal-origin foods (meat, milk and derivatives). More specific data will be provided in the results from the stable-isotope analyses, which are currently underway.

◄ Figure 2. 1 – admixture analysis and modelling of individuals mentioned in the text (courtesy of Y. Diekmann); 2 – drawing of Grave 38 from Ciulnița (redrawn after Renț a 2016: Fig. 184:1–2); 3 – representation of skeletal human remains from Grave 38 from Ciulnița; 4 – drawing of Grave 13 from Mound 12 in Crihana Veche; and 5–6 – grave goods (redrawn after Ciobanu et al. 2019: Fig. 8–9).

1



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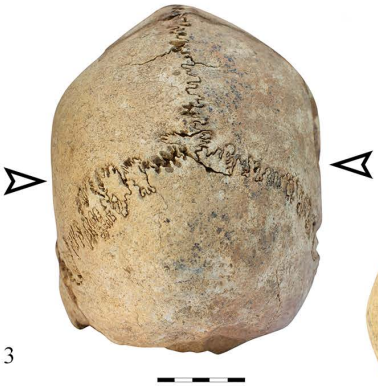

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The skeletal changes, some of which appear degenerative, confirm the middle to old adult age of this individual: pronounced wear of the dental crowns (physiological, of an attrition type associated with occupational, abrasion type); ossified costal cartilages (on both ends, sternal and costal); and the presence of osteoarthritis on numerous joint surfaces, more severely on the knee (tibio-femoral and patello-femoral) and on elements of the spine (especially in the lumbar segment).

In terms of the occupational profile, we mention the highly pronounced muscle insertions on the bones of the girdles and limbs, with slight enthesopathic changes or reactions. The diaphyses of the femurs are antetorsioned.

Two non-metric traits were identified, included by some authors from the group of musculoskeletal stress markers. These include the supratrochlear humeral aperture and the additional femoral trochanter, which along with pronounced muscle insertions and enthesopathic changes suggest muskulo-skeletal overload. This translates into physical exertion using the upper limbs and a terrestrial hypermobility. In terms of taphonomic observations, the diaphyses of the right ulna and radius show pronounced exfoliation (subaerial weathering).

21.2.3 The artificial cranial modification of the individual in Grave 38

Artificial cranial modifications have been classified differently over time depending upon several variables. Unanimously accepted and widely used is the classification based on morphological–instrumental and explanatory criteria

◄ Figure 3. The skull of the individual from Grave 38 in Ciulnița seen from the 1 – frontal; 2 – lateral; 3 – occipital; and 4– vertical views (authors' photo); the skull of the individual from Grave 13 from Mound 12 in Crihana Veche seen from the 5– frontal; and 6 – lateral views (after Ciobanu et al. 2018: Fig. 3).

indicating the causes and intensity of alterations to the normal anatomical shape of the skull. This classification system consists of two large groups: tabular deformations and annular/circular deformations, each further divided into the oblique and erect subtypes (Imbelloni 1933; 1934).

Another classification is based on morphological observations of numerous skulls from statistically representative skeletal series from the North Pontic area. This classification proposes four types of modifications, each associated with a device or method: occipital (most often unintentional), fronto-occipital (forces applied from two directions to the frontal and to the occipital regions), parietal (forces applied only to the parietals) and circular (forces distributed equally around the skull), each with several variants (Žirov 1940).

Cephalic/head or corporal/body devices were used to alter or modify the shape of a newborn's head. Simple cephalic devices are typically made of liana shoots, leather strips or cloth bandages. Complex devices are made of textile or leather bandages and wooden boards or cotton balls interposed between bandages or between ligatures. In addition, corporal devices are created from wooden boards and strips of cloth (Imbelloni 1934: 81). One common idea among specialists is that, when applying the deforming device to the newborn's head, each cultural group is guided by its own social and aesthetic norms.

The individual buried in Grave 38 shows special morphometric changes – that is, an artificial cranial modification obtained through a cephalic/head device. The analysis of the architectural changes to the cranium relied on a combination of morphological (anatomical and descriptive) and biometric (measurable) methods (Dingwall 1931: 297–302; Imbelloni 1934; Žirov 1940). Although the modification is not pronounced, all elements of the neurocranium (Fig. 3:1–4) as well as the temporal bones were affected. Specifically, the sagittal curve of the neurocranium is moderately distorted. The frontal region, viewed from the *norma lateralis*, is flattened in the supraorbital area, highlighting the eminences of the forehead bone. Moreover, the transition from the frontal to the parietals is through a weak central eminence located pre-bregmatic and post-bregmatic, called the *burelét* or *bourrelet*. On the parietals, immediately post-bregmatic/post-coronal, there is a slight de-

pression, called a *gouttière*, and another such depression on the pre-lambdic area. The transition from the parietals to the occipital is quite steep, achieved by a pre-lambdic depression. The occipital is quite convex in the upper half and extremely flattened in the area of the insertion of the nuchal muscles.

The sagittal median line, that of the metopic (on the frontal) and sagittal (between the parietals) sutures, is quite angled. There are also changes visible on the sides of the skull, on the parietals and especially on the temporals in the supra-mastoid areas.

The frontal bone displays a persistent frontal suture (metopism; Fig. 3:1) and, on the lambdoid suture, there are many additional small ossicles (Fig. 3:3). Both these traits represent parts of a group of discrete, nonmetric traits frequently associated with changes to the shape of the skull. The cranial deformation appears to be a circular/annular type, a slight to moderate variant (according to Imbelloni 1933) or a fronto-sincipito-occipital type (according to Žirov 1940). The viscerocranium does not appear to have dimensional modifications.

The procedure, certainly artificial and intentional, led to an obvious morphological alteration to the neurocranial bones detectable with the naked eye. Most likely, this alteration was achieved by symmetrical circular compression using flexible elastic bands or belts, called *ribbons*, applied to the head immediately following birth.

21.3. Artificial cranial modification during the Bronze Age in southeastern and eastern Europe

At the beginning of the Bronze Age, artificially modified skulls were rarely found in the Lower Danube Basin. The presence of this custom gradually increased in the Middle Bronze Age, then disappeared during the Late Bronze Age (or at the end of the Early Iron Age in some regions), only to become

common much later during Antiquity when it can almost be described as a 'mass' phenomenon among some migratory populations.

During the Early Bronze Age, most skeletons with artificial cranial modifications were discovered in the Volga Basin (Ginzburg 1959: 525–540), the Don Basin (Dobrovolskaya 2006), the North Caucasian steppes (Torres-Rouff & Yablonsky 2005) and in the Dnieper Basin (Kruts 1984: 97), primarily attributed to Yamnaya communities (c 3100–2500 BC). About 18 cases of artificial cranial modification are mentioned from sites in the Lower Danube region, with 17 in Bulgaria in the mounds of Belogradets, Plachi dol, Zheglartsi, Poruchik Geshanovo and Mogila (Yordanov & Dimitrova 1989; Iliev & Bakărdžiev 2020: 15, 80, 129, Taf. 5:4–5). Only one example was found in Romania, in Grave 16 in the Smeeni mound, dating from 4142±30 BP (DeA-7737; 2875–2622 calBC; Frînculeasa et al. 2017: 61–62, 191–194; Frînculeasa et al. 2023). Thus, head or skull modification has been found in the region since the beginning of the Bronze Age, and was apparently brought to the northwestern Pontic area, including to the territory of Romania and Bulgaria, by the Yamnaya steppe groups or communities.

In the steppe, the practice was much more frequently reported from sites dating to the Middle Bronze Age belonging to the Katakombnaya (Catacomb culture) groups (c 2600–2200 BC), especially when compared with cases attributed to the Yamnaya (Kruts 1984: 97). According to some authors, this custom was widely practiced in the western area of the Katakombnaya communities. In some regions, up to 60% of individuals display artificially modified skulls (Shepel 1985: 15). The practice also appears in reports from later periods among the Mnogovalikovaya (Multi-cordoned Ware culture) groups (c 2200–1800 BC; Kruts 1984: 97). Most artificially modified skulls in the Middle Bronze Age come from the area between the Volga River, the Ural Mountains and the Don Basin. The custom was not previously documented from Middle Bronze Age sites in the Lower Danube Basin, located at the western end of both Katakombnaya and Mnogovalikovaya distribution areas.

Among the numerous types of intentional cranial modifications, circular/annular and fronto-occipital have been identified in the Middle Bronze Age,

most frequently present *in tandem* in various communities. In the northwestern Caspian area, for example, the oldest type of deformation in the Bronze Age is the occipito-parietal. Here, we refer to skeletons from graves attributed to the Yamnaya or Katakombnaya communities or to Yamnaya–Katakombnaya mixed burial features. Subsequently, this method of cranial modification underwent some transformations shifting towards the fronto-parietal area (Kazarnitsky et al. 2021: 315).

Artificial cranial modification was not common in the Late Bronze Age (Shepel 1985: 15). The only known case was found in a funerary feature attributed to the Srubnaya culture (Samara Oblast, Neftegorsk District, Barinovka I site, Mound 2, Grave 36). According to Khokhlov (2002: 137), in this case the deformation may have been unintentional and associated with a random, accidental event.

Thus, wearing a different head shape as a practice gradually spread across the steppe during the Bronze Age and acquired over time, at least in some population groups, a mnemonic character, being a custom passed down from one generation to another. The practice was possibly used to express belonging to a certain group, to venerate cultural leaders or founders or to ensure a connection with ancestors and the past (Torres-Rouff & Yablonsky 2005; Mednikova 2006: 225). Another characteristic of the practice worth mentioning is that during the Bronze Age deformed skulls predominated in adult males and in subadults which were also likely males (Khokhlov 2006: 55; Mednikova 2006: 216).

21.4 Grave 38 from Mound II in Ciulnița in the wider southeastern European context

The dating of Grave 38 from Mound II in Ciulnița to the first half of the 2nd millennium BC provides us with an opportunity to address two research topics which currently remain understudied. The first relates to the persistence of

the custom of burying the dead in mounds during the Middle and beginning of the Late Bronze Age north and south of the Lower Danube. The second relates to the practice of artificial cranial modification during this timeframe and in this context.

Archaeological evidence that mounds continued to be used as burial grounds after the dissolution of the Yamnaya phenomenon has remained rather scarce and inconclusive for quite some time. The challenges to identifying graves dating to the second half of the 3rd and the first half of the 2nd millennia BC stemmed from a lack of stratigraphic information and ^{14}C dates, a difficulty in recognising characteristics of burial rituals with chronological relevance and the absence of grave goods. However, Middle Bronze Age graves have been documented in recent years, both north and south of the Danube, with an increasing number of absolute dates to support this age determination. Such examples consist of graves in Smeeni (Frînculeasa et al. 2017), Medgidia (Trautmann et al. 2023), and now also Ciulnița in Romania, as well as Merichleri (Iliev 2018), Malomirovo (Alexandrov & Włordarczak 2022) and Vetrino (Alexandrov et al. 2021) in Bulgaria, amongst others (Alexandrov 2020; Frînculeasa 2020).

The combined stratigraphic information, ^{14}C dates and detailed documentation of the burial rituals attest to secondary graves typically dug into the southern areas of already existing mounds, with individuals usually lying in oval pits, in a crouched posture lying on their side, sometimes quite tightly contracted, perhaps representing a distinctive characteristic of this period (Frînculeasa et al. 2017: 154; Alexandrov 2020: 155–156; Frînculeasa 2020: 138). Currently, the small number of dates does not allow us to analyse Middle and potential Late Bronze Age graves separately. Therefore, information regarding burial practices from these various phases could be further nuanced in the future. However, some of the graves contain pots typical for local cultures, thus allowing for more precise dating. For instance, pots in the Tei and Monteoru ceramic style were found in graves under burial mounds, although these communities normally bury their dead in flat graves, either in small groups or larger cemeteries (Motzoi-Chicideanu 2011: 369, 441; Frînculeasa

2020). Researchers have interpreted such features either as belonging to the respective communities or the importation of pots from the local cultural environment into the graves of individuals originating from the North Pontic steppe as possibly connected, for example, to Mnogovalikovaya groups (Sava 1992; Frînculeasa 2020: 129–130, 138). We noted a certain resemblance to the Mnogovalikovaya burial practices of the Dniester-Prut region, since those are also normally secondary graves in already existing mounds, and in oval pits in which the dead are buried crouched on their side, typically with pottery and bone buckles as grave goods (Sava 1992; Litvinenko 2011: 118–122).

Recent aDNA analyses have provided additional data to solve this puzzle. Although the number of samples remains exceedingly small, preliminary results attest to the presence of steppe ancestry in individuals buried in Middle Bronze Age graves in mounds located north and south of the Danube (Lazaridis et al. 2022: main text and supplementary material) (Fig. 2:1)[2]. Thus, the young adult man from Grave 25 in Smeeni (I12828), dating from the turn of the 3rd and 2nd millennia BC, 3651±28 BP (DeA-14448; 2135–1941 calBC), had high levels of steppe ancestry (Frînculeasa 2020: Table 2; Lazaridis et al. 2022: SM 248). Another individual from a mound in Merichleri, in Grave 5 (I2163), 3400±30 BP (Beta-432796; 1866–1615 calBC) and a contemporary of Grave 38 from Ciulnița, also shows a significant degree of steppe ancestry (Mathieson et al. 2018: Ext. Data Fig. 2; Lazaridis et al. 2022: Data S4). Not surprisingly, this is also the case for several individuals assigned to the Mnogovalikovaya culture discovered in the Republic of Moldova, given its position in the western region of the steppe: Grave 1 from Țânțăreni (I10449), Grave 2 from Mound 5A from Crihana Veche (I10412) and Grave 13 from Mound 12/*Movila Gologan* also from Crihana Veche (I10436) (Fig. 2:1).

The latter is particularly interesting for this discussion, since it represents the closest analogy in time and space to the practice of artificial cranial modification also found in Grave 38 from Ciulnița. The adult male skeleton from Grave 13 from Mound 12 in Crihana Veche displayed highlighted eminences of the frontal bone, and two depressions on the parietals: one in the post-bregmatic area and another one in the pre-lambdic area, accounting for a slight

[2] We retrieved the genomes for these individuals from the Allen Ancient DNA Resource, version 50.0 (https://reich.hms.harvard.edu/allen-ancient-dna-resource-aadrdownloadable-genotypes-present-day-and-ancient-dna-data, read December 2022).

parieto-occipital artificial modification (Ciobanu et al. 2018: 90–91, 190) (Fig. 3:5–6). This individual was buried according to the ritual typical for the Mnogovalikovaya communities, lying crouched on their side and accompanied by a pot and a bone buckle (Ciobanu et al. 2018: 91) (Fig. 2:4–6). The ^{14}C date situates it as from the beginning of the 2nd millennium BC, 3575±20 BP (PSUAMS-4355; 2010–1883 calBC).

Grave 38 from Ciulnița dates to the border between the Middle and the Late Bronze Ages, slightly later than the absolute interval established for the Mnogovalikovaya culture by V. Trifonov (2001), 2200–1800 BC. However, we must take into account the dating of the Mnogovalikovaya culture between the Prut and Dniester Rivers advanced by E. Sava based on contact with the Monteoru culture. Specifically, E. Sava (1992: 220) suggested a time frame contemporary with the Ic3–Ia and partially with the IIa phases of the Monteoru culture, implying a slightly later end date, since the *Ic3 package* dates to 2200–1800 BC and the Ia–IIa phases date to 1800–1700 BC (Motzoi-Chicideanu & Şandor-Chicideanu 2015: Table 6). Given the limited data available, the lack of isotope and aDNA analyses, we are reluctant to assign Grave 38 from Ciulnița to a particular group or community. However, the burial ritual and the artificial cranial modification in particular point to steppe practices, perhaps the latest preservation of traditions with origins in the Mnogovalikovaya area if we take into account that artificial cranial modifications disappear during the Late Bronze Age. It is also possible that this discovery is for the moment isolated in the region west of the Prut River as a consequence of the gap in research described above and not a reflection of reality.

The impact of the steppe on the Lower Danube region following the dissolution of the Yamnaya phenomenon becomes increasingly visible in the archaeological record as research progresses. It follows a several millennia old path connecting the North Pontic steppe on the one side and the Lower Danube, the Carpathian Basin and the Balkans on the other, a path which was particularly active during the second half of the 5th millennium BC, the last third of the 4th millennium and the first half of the 3rd millennium BC

(Preda-Bălănică 2021). How this interaction specifically unfolded during the second half of the 3rd and the first half of the 2nd millennia BC continues to raise questions. Moreover, if it once again involved the mobility of individuals or groups from the steppe, processes of admixture and cultural transmission, and if and how Middle Bronze Age societies north and south of the Lower Danube were transformed as a consequence currently remain practically uncharted territories and tasks for future research.

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