

UNLOCKING ANCIENT CRAFTSMANSHIP

The Pear-shaped Pendant or Decorative Pin from the Gbely-Kojatín (Slovakia) Roman Period Burial Ground¹

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Abstract: Pear-shaped pendants/pins and their occurrence in Barbaricum during the Roman Period represent an interesting phenomenon that has received minimal attention in terms of research on the technology of their production. Fragments of a pear-shaped pendant/pin from the burial ground at Gbely-Kojatín (2nd–4th century) were analysed using non-invasive imaging techniques such as pXRF and EDS, as well as 3D digital microscopy, to identify their chemical composition and the technological manufacturing processes. The results indicate the use of electrum as the material for their production and also reveal specific technological steps involved in their manufacturing process, indicating a high level of craftsmanship.

INTRODUCTION

A systematic detector prospection of the Gbely-Kojatín cremation burial ground, dated to the Roman Period (Hladík/Hladíková/Červík 2023), discovered two fragments of a pear-shaped pendant/pin (?) among the metal finds. The burial ground where the fragments were found is tentatively dated, based on partially processed finds, to the 2nd extending into the 4th century. Pear-shaped pendants/pins are artefacts associated with a higher social status in the Roman Period and are most often found in women's graves, indicating their association with the female gender. They were mostly made of precious metals such as gold or silver, or they could be gilded silver (Dragonidesová 2022, with further references). There is also evidence that they were made of electrum (Natuniewicz-Sekuła 2017, 190; Walenta 2009, 216). Finds of pear-shaped pendants have been documented across the broader region of the Barbaricum. They are found in higher concentrations in the region of the southwestern coast of the Baltic Sea and in Scandinavia (Müller 1956, 109–112; Schmidt 2001, 140–142; Schuster 2018, 160–163). A. von Müller (1956; 1957) documented their distribution primarily in Denmark and Bronholm, extending to north-western Germany, the northern part of the central German region, and Poland. The occurrence of pear-shaped pendants from the Roman Period in Slovakia was recently studied by P. Dragonidesová (2022, with further references; Rajtár 2013), who identified a total of six sites with pendants or their fragments. She summarised and updated their occurrence in archaeological contexts, typological classification and dating, her typological classification primarily drawing on the works of A. von Müller (1956; 1957). These sites were supplemented by an unpublished find from Tvrdosovce (Bazovský, *in press*), Rankovce (Gašaj/Rákoš 2015) and the fragments of a pendant/pin from the Gbely-Kojatín burial ground discussed in this article.

The pear-shaped pendants were typically made of two parts forged from sheet metal to achieve their distinctive pear shape, from which they derived their name. Their surface was decorated with braided filigree wires, granulation, or other decorative techniques. The use of fine filigree as a jewellery technique, combined with precious metals, shows the high level of craftsmanship and the high value of the artefact as the fine filigree requires very specific skills and know-how (Liu *et al.* 2022). The tradition of using filigree as a decorative

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Fig. 1. Location of the Gbely-Kojatín burial grounds in the cadastre of the town of Gbely. Legend: 1 – burial ground from the Roman Period; 2 – early medieval burial mounds; 3 – watercourses.

technique dates back to the 3rd millennium BC in Mesopotamia (Duczko 1985, 15). Filigree, as a modern term, encompasses various techniques including wire and tube production, drawing, twisting, beaded, and notched wire manufacture (Schwarcz/Varga 2010, 210). Filigree and granulation techniques were extensively used in jewellery across the Middle East, Egypt, and ancient Greece and Rome, with their production reaching its peak in Etruria (Duczko 1985, 15; Liu *et al.* 2022; Natuniewicz-Sekuła 2017, 190). Filigree became a prominent decorative element among Hellenistic jewellery craftsmen in the 4th century BC. They were primarily based in the Black Sea region and in southern Italy. From there, both their products and know-how spread to Scandinavia, which has a significant concentration of finds, as well as to the region of Poland (Duczko 1985, 15; Müller 1956; Nylén 1968). The pear-shaped pendants and miniature amphorae from the 1st and early 2nd centuries found in the northern Black Sea region exhibit striking similarities in shape (Droberjar 2011, 27).

ARCHAEOLOGICAL CONTEXT

The cremation burial ground from the Roman Period is located on the northern edge of the river terrace of the Morava River, approximately 165 m above sea level. It is located in the cadastre of the town of Gbely, at the confluence of the streams Gbelský and Unínský (Fig. 1; 2). The river terrace in this area gently slopes

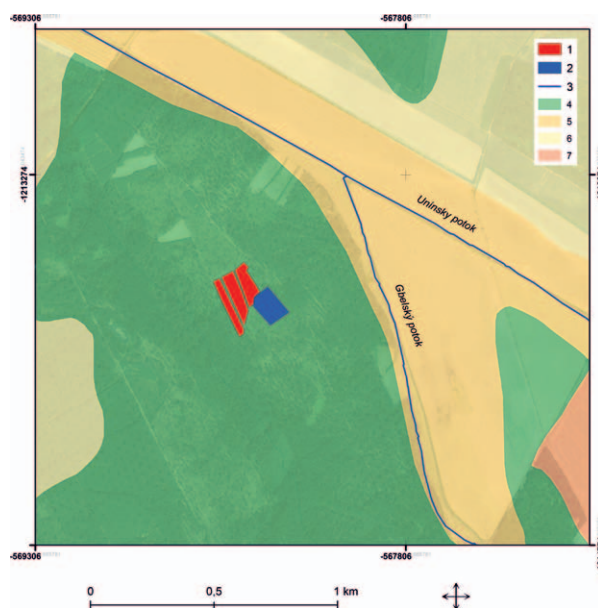


Fig. 2. Location of the Gbely-Kojatín burial grounds on the edge of the river terrace of the River Morava, at the confluence of the streams Unínský and Gbelský. Legend: 1 – burial ground from the Roman period; 2 – early medieval barrow; 3 – watercourses; 4 – aeolian sediments: fine-grained wind-blown sands (non-calcareous, calcareous); 5 – fluvial sediments: lithofacies undivided floodplain clays, or sandy to gravelly clays of valley floodplains and the floodplains of mountain streams; 6 – fluvial sediments: sandy gravels and gravels of lower middle terraces; 7 – proluvial sediments: clayey to sandy-clayey gravels to residual gravels with rock fragments in medium alluvial cones.

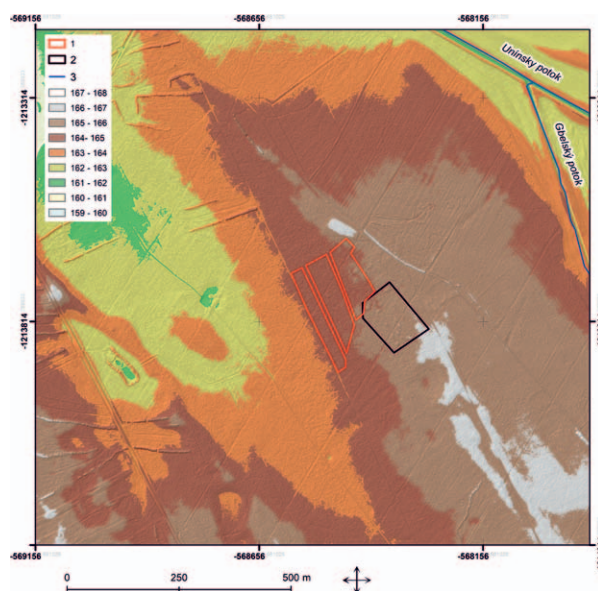


Fig. 3. Hypsometric map of the surroundings of the Gbely-Kojatín burial ground (source of LLS data: ÚGKK SR). Legend: 1 – burial ground from the Roman period; 2 – early medieval burial mounds; 3 – watercourses.



Fig. 4. Aerial view of Roman Period burial ground in 2021, after tree felling and subsequent tree planting (photo by M. Vlach). Delimitation of excavated polygons 1–3.

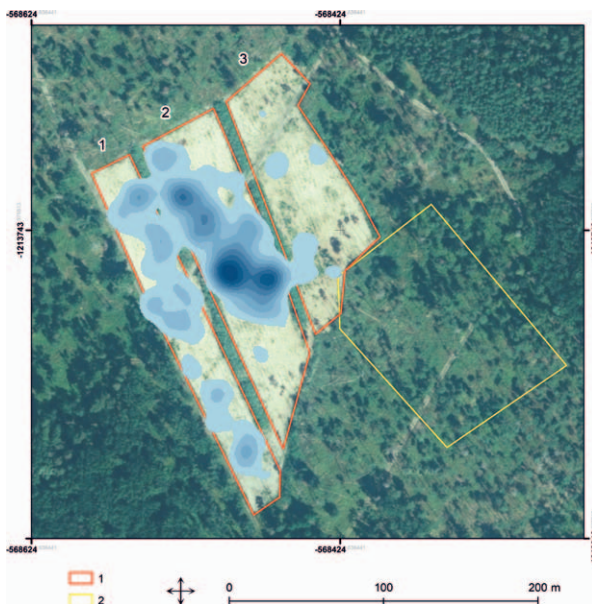


Fig. 5. Results of detector prospecting – interpolated surface density of metal artefacts at the Roman period burial ground site. Legend: 1 – site of the burial ground from the Roman period; 2 – site of early medieval burial mounds.

downwards towards the west. The burial ground lies on a slight elevation (Fig. 3). The burial ground is in the immediate vicinity (western edge) of an early medieval mound site (*Hladík/Hladíková/Červík* 2023). Currently, the area is covered by a managed pine forest. The cremation burial ground from the Roman Period was significantly disturbed by forestry activities in 2020 (Fig. 4). As part of the research strategy, the first step involved surface prospecting of the burial ground, conducted by the Monuments Board of the Slovak Republic in collaboration with the Institute of Archaeology of the Academy of Sciences of the Czech Republic in Brno and the Department of Archaeology at the Faculty of Arts at Comenius University in Bratislava. In 2021, a systematic surface survey using the collection method in section lines (*Kuna et al.* 2004, 327) was conducted across the entire area of the Roman Period burial ground. It was followed by a magnetometric survey (*Felcanová* 2021) and a systematic detector survey, conducted in cooperation with OZ Hradiská and Archeo Moravia, z. s., which surveyed the entire burial ground and the surroundings of the early medieval mounds (covering 2.4 hectares; Fig. 5).

The prospecting revealed the extent of destruction of the burial ground by forestry activities. The prospecting located *in situ* graves, which were examined by probes in 2021 and 2022 (Fig. 6). Despite the significant disturbance of the burial ground, the concentration of these finds indicates the approximate layout of the graves and the distribution of various types of artefacts at the burial ground. Fragments of a pendant/pin were found in Area 2 (Fig. 6) in two locations, two meters apart. Technological analysis (see below) showed that these fragments made up a single item originally deposited in one of the graves.

The primary objective of the article is to present and evaluate a new find of a pear-shaped pendant/pin? in the context of material composition analysis, technological procedures, and traceological/use-wear traces.

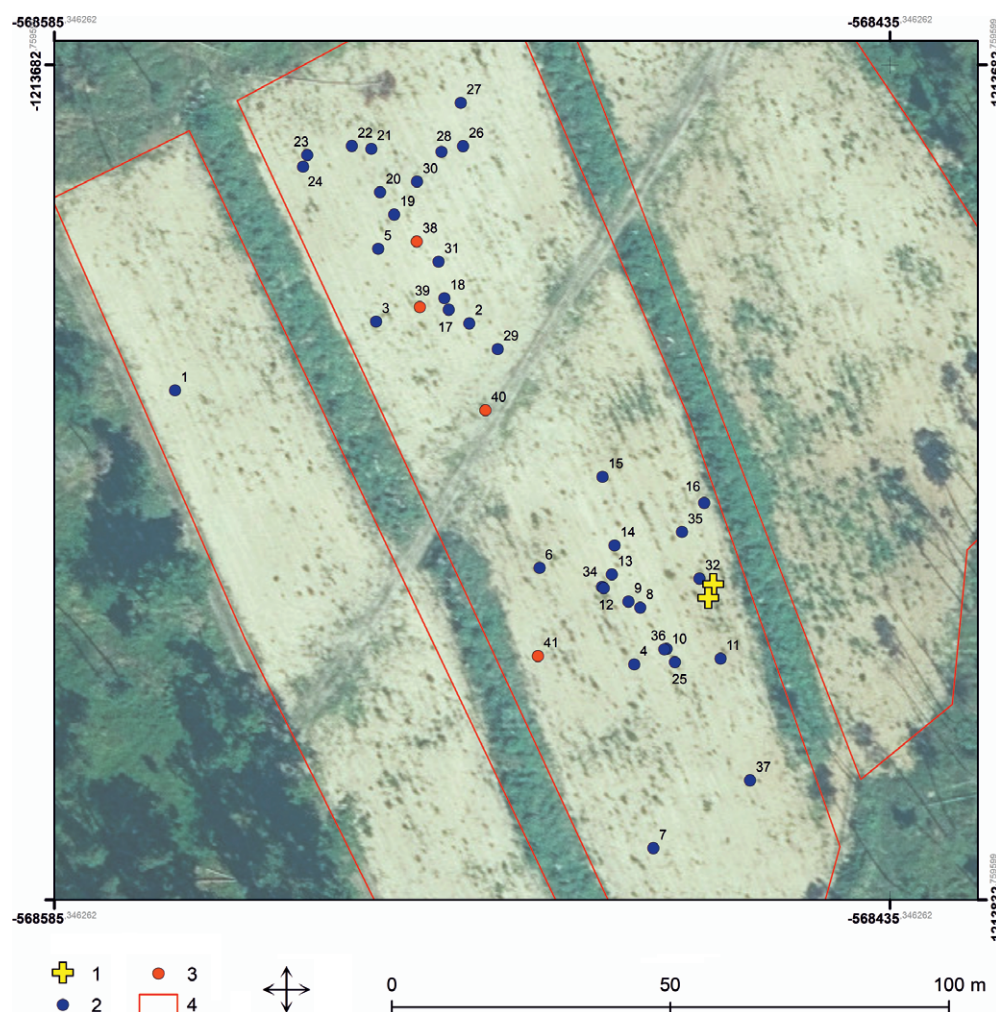


Fig. 6. General plan of the burial ground with the location where the pendant was found. Legend: 1 – pendant; 2 – graves examined in 2021; 3 – graves examined in 2022; 4 – excavated polygons.

DESCRIPTION OF THE ARTEFACT

Fragment No. 1 (Fig. 7): a damaged fragment, probably of the upper hemispherical part made of forged sheet metal shell, with a filigree braided wire/braid fixed to the surface. The decoration consists of preserved 28 rows of filigree braided thin wires of different widths. The worked edge marking the end of this part of the pendant is clearly visible from the inside. The top of the fragment features a distinct rim that marks the end of the artefact. Molten parts of the fragment suggest that it was placed in a pyre.

Dimensions: height 10 mm; width 14 mm

Sheet thickness: 92.95–163.33 μm

Weight: 0.79 g

Fragment No. 2 (Fig. 8): a damaged fragment that made up a single artefact with Fragment No. 1. Fragment No. 2 was made of a forged metal shell with filigree decoration identical to Fragment No. 1. The back of the sheet is not visible due to the deformation of the object. The edges of the sheet are deformed by heat. There is an unidentifiable black residue on both sides of the fragment.

Dimensions: height 10 mm; width 8 mm

Weight: 0.4 g

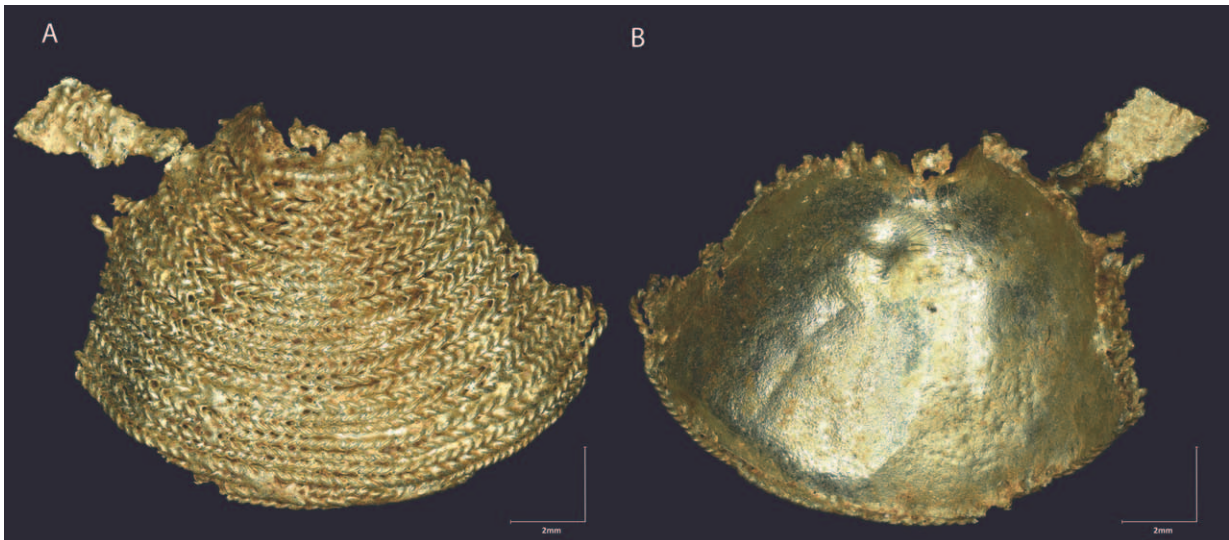


Fig. 7. Fragment No. 1 of pear-shaped pendant/pin. A – frontal view; B – back view.

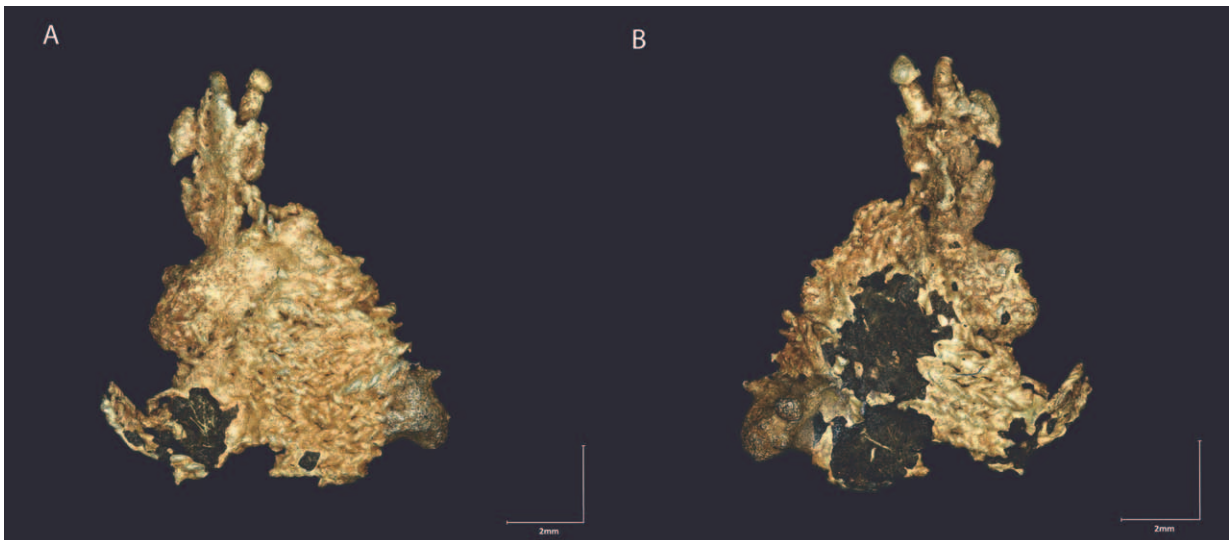


Fig. 8. Fragment No. 2 of pear-shaped pendant/pin. A – frontal view; B – back view.

TYPOLOGICAL AND CHRONOLOGICAL CLASSIFICATION

Given the hemispherical shape of the larger fragment, we assume it represents the upper part of a pear-shaped pendant/pin (?), classified as type III according to *A. von Müller* (1956). If the item was a pin (*Andersson* 1993, 12), it may be classified as subgroup VIIa according to *B. Beckmann* (1966). A type III pendant and a subgroup VIIa pin head consist of two parts: the upper hemispherical part, often formed by braided filigree wires fixed to a sheet metal base, and the lower, more conical part, which, however, has not been preserved in this case. They were made of different types of material: gold, silver, and electrum. Type III pendants started to appear in the second third of the 1st century (*Müller* 1956, 98, 99). Finds of pear-shaped pendants in Slovakia come mainly from burial grounds. Most graves with pear-shaped pendants are dated to the B2/C1 phase (*Dragonidesová* 2022; *Rajtár* 2013, 140). Macroscopic observation suggests that they were made of gold or silver, although this requires verification. Most finds from surface prospection and graves at the Gbely-Kojatín burial ground are preliminarily dated to the 2nd–4th centuries. As a result, this pendant/pin? may originate from a grave dated to the B2/C1-C1a phase, an assumption that can no longer be verified.

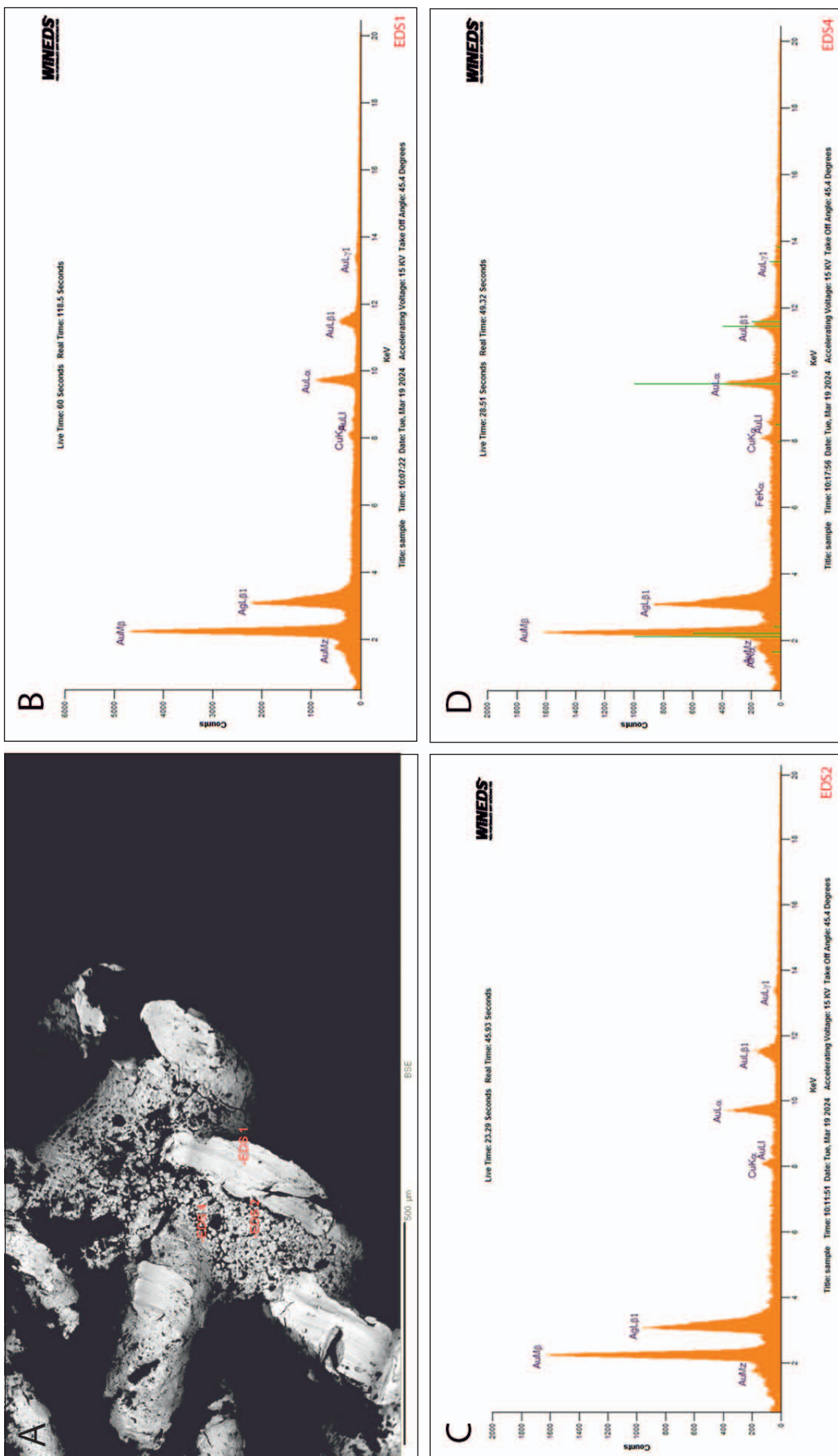


Fig. 9. Fragment No. 1. BSE image and EDS spectra. A – BSE image of twisted wires; B – EDS1; C – 0150 EDS2; D – EDS4.

Table 1. Elemental composition of fragments based on the pXRF surface analysis.

Index	Mode	Duration	Units	Fragment	Sample	Note	Sb	Sn	Ag	Bi	Pb	Se	Au	Cu	Fe	Mn
1	General Metals	31.26	%	no. 1	back side	before cleaning	–	0.686	45.748	0.138	–	–	49.862	2.767	0.567	–
2	General Metals	32.01	%	no. 1	front side	before cleaning	0.096	0.651	43.947	0.16	–	–	50.434	1.976	2.077	0.305
3	General Metals	30.38	%	no. 2	side with black colored area	before cleaning	–	2.231	42.478	0.162	0.137	–	52.197	1.259	1.284	–
4	General Metals	30.21	%	no. 2	side without black colored area	before cleaning	0.097	0.418	43.459	0.132	–	–	51.256	1.418	2.202	0.378
5	General Metals	30.51	%	no. 1	back side	after cleaning	–	–	46.816	0.203	–	0.772	48.558	2.632	0.626	–
6	General Metals	30.95	%	no. 1	front side	after cleaning	0.2	0.685	50.06	0.219	–	0.321	45.508	1.946	0.355	–
7	General Metals	30.69	%	no. 2	side with black colored area	after cleaning	0.098	0.421	40.725	0.135	0.114	–	56.503	1.206	0.411	–
8	General Metals	30.66	%	no. 2	side without black colored area	after cleaning	0.092	1.932	45.022	0.117	–	–	49.906	1.625	0.801	0.172

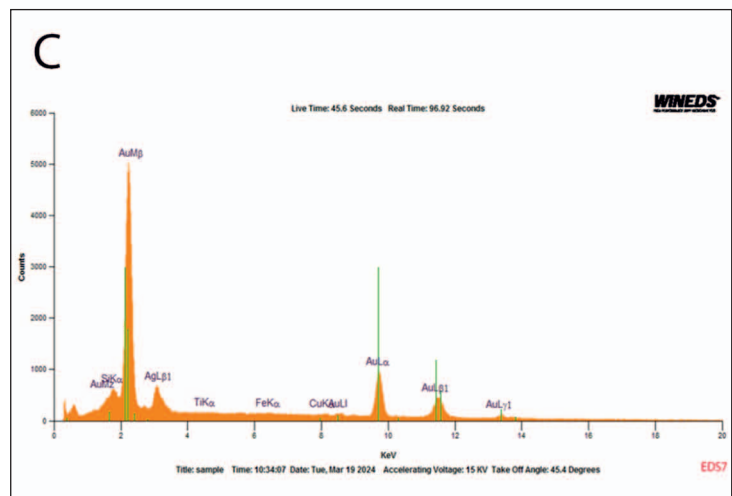
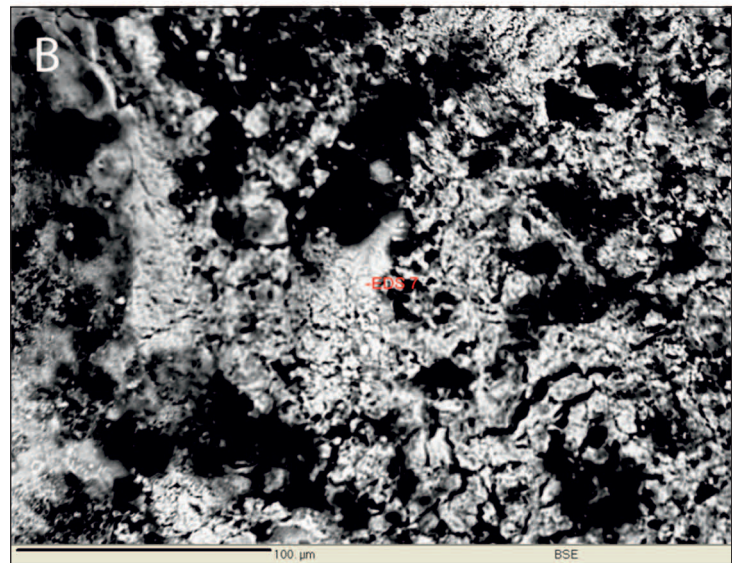
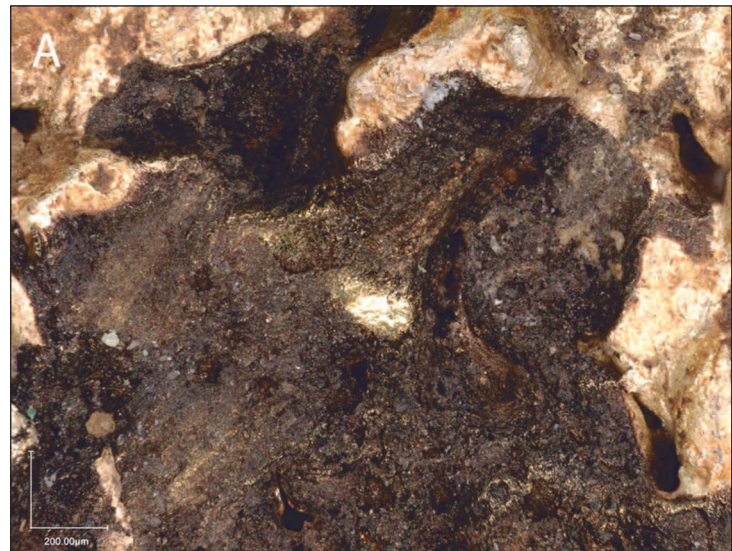


Fig. 10. Fragment No. 2. Black coloured area. A – digital image; B – BSE image; C – EDS spectra.

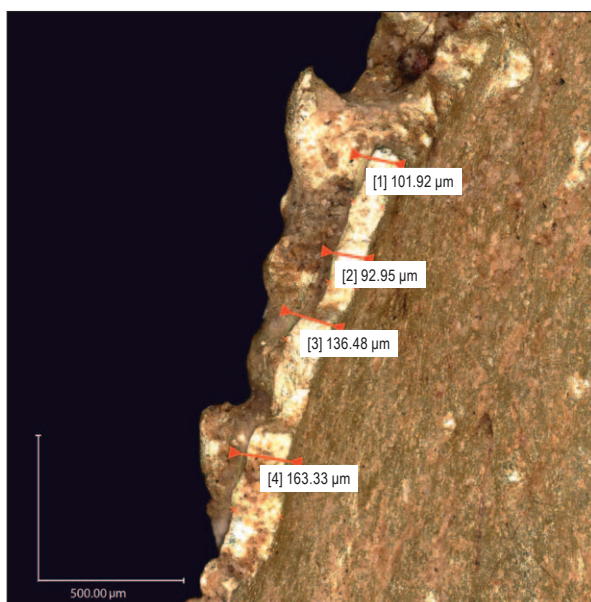


Fig. 11. Fragment No. 1. Digital measurement of the thickness of metal sheet – edge of the metal sheet.

Material and Methods

The elemental composition was identified by portable X-ray fluorescence (pXRF) analysis using a NITON XL3t GOLDD+ handheld X-ray analyser (Thermo Fisher Scientific, Niton, USA). The measurement was carried out on the surface of both fragments from their outer and inner sides. The duration of each measurement was 30–32 seconds. The measured values were expressed as a percentage and only took into account metal elements.

To more accurately determine the elemental composition of the parts of fragments, an energy dispersive spectroscopy (EDS) was conducted using a CAMECA SX 100 electron microanalyser with PeakSight control software in the MS Windows environment. The advantage of EDS analysis is its ability to identify most elements of the periodic table, from boron to uranium, down to ppm concentrations, while the composition measurement takes place at a selected point with a size of only a few microns. The measurement points were selected to provide maximum information about the craftworking of the fragments. The EDS analysis was supplemented with image outputs of the elements present in the analysed section, displayed as backscattered electron (BSE) images. The image is expressed by the contrast of the materials based on their average atomic number, i.e. the higher the atomic number of the element, or the heavier the element, the brighter the contrast.

Visual examination of both fragments was conducted using a VHX-7000 3D digital microscope

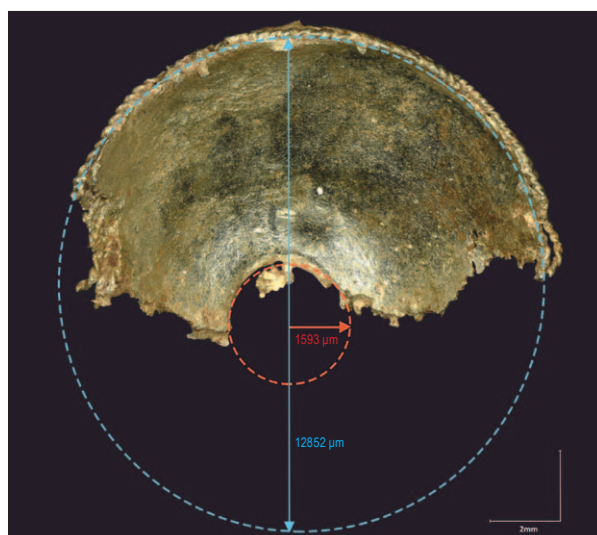


Fig. 12. Fragment No. 1. Digital measurement of the top and bottom edges and digital reconstruction of the original perimeter of the fragment's base.

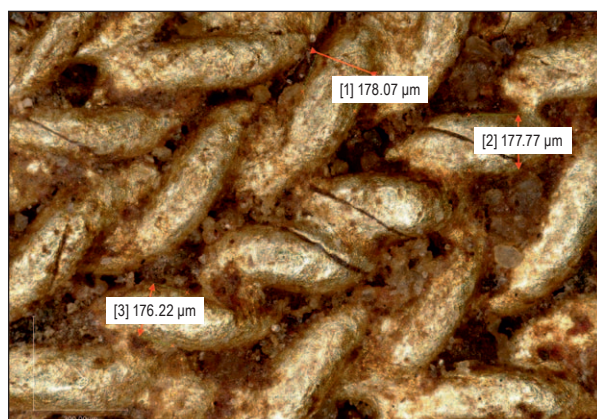


Fig. 13. Fragment No. 1. Digital measurement of the wire thickness – identification of s. c. seamline, sheet metal strip twisting.



Fig. 14. Fragment No. 1. Digital measurement of the wire of twisted sheet metal strip – width of the seamline and thickness of sheet metal strip.

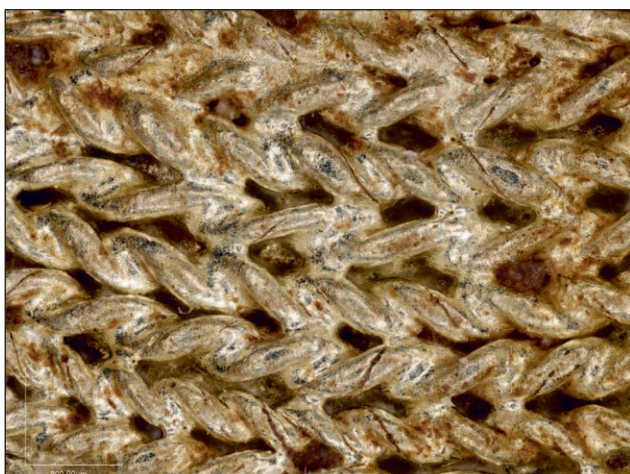


Fig. 15. Fragment No. 1. Digital image of braid pattern of twisted wires.

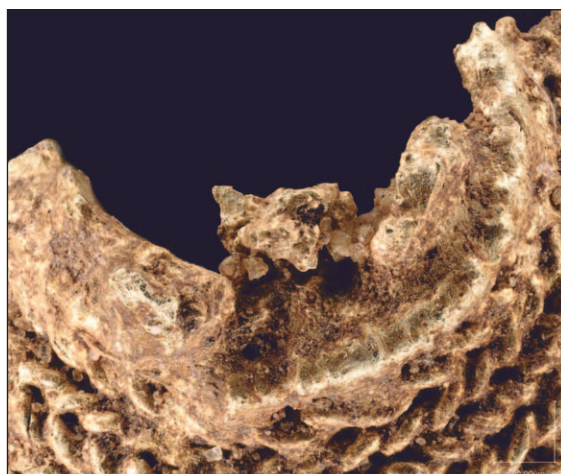


Fig. 16. Fragment No. 1. Digital image of damaged beaded wire on the top.

with VH-Z20R and VH-Z100UR objectives (Keyence). The objects were observed under visible light using zoom ranging from 50× to 1000×. Due to the shiny metal material of the objects, circular lighting combined with an adapter featuring a polarizing filter was necessary to eliminate reflections from their surfaces. The variable lighting adapter highlighted the profile of the objects and their minor surface irregularities, such as mechanical damage, traces of working or surface deposits. In addition to using standard lighting, the object profiles were also observed under an optical shadow effect in a monochromatic scale. This technique enhances surface readability by creating an image composed of several images of objects taken from different angles of side lighting. To facilitate the interpretation of height differences in the object profiles, this mode was supplemented with a display using the basic colour scale. The results of the observation were digitally recorded by sequential imaging. The outputs of the sequential imaging were supplemented with a graphic record of 2D measurement of multiple points on the objects and 3D measurement of the outline of their surface.

Crafting Process of the Artefact

The crafting of pear-shaped pendants or pins (heads) involves the application of fine filigree and other elements, such as granulation, on a sheet metal base. This technique is demanding and we illustrate the process using a find from Gbely-Kojatin.

As mentioned above, the artefact was preserved in two fragments. These fragments consist of a base sheet formed by forging, with filigree wires applied to the outer surface. The results of both pXRF and EDS analyses showed that the sheet metal and filigree wires were made of the same material: electrum, an alloy of gold and silver with admixtures of other metals, especially copper (Fig. 9; Table 1). The EDS analysis of Fragment No. 2 identified a section with a different composition, primarily gold, in the area with black residue (Fig. 10).

Optical microscopy measurements allowed for an approximate determination of the sheet thickness, which ranges between 92.95 and 163.33 µm (Fig. 11). The sheet was forged into a hemispherical shape. The estimated diameter of the base of the hemispherical part is 12.9 mm (Fig. 12). An opening is forged from inside the upper part of the dome, with the original diameter estimated at approximately 3.2 mm (Fig. 12).

The wires were made of thin sheet metal strips, which were rolled and then likely refined to the desired thickness using two drawplates or wire-drawing dies. The wires, as measured from the viewing side, have a width of approximately 177 µm (Fig. 13). The original thickness of the sheet from which the wires were made is unknown, as the technique used precludes retrospective identification after it has been thinned to the required thickness. Only the visible edge was measured, reaching approximately up to 10 µm (average across multiple measurements of visible edges). The method of rolling the sheet metal strip is inferred from the seamlines identified using an optical microscope (opening: 22.97 µm, Fig. 14). The wires were twisted in two ways: clockwise and counterclockwise. They were placed horizontally on the base next to each other, forming a distinctive braid pattern (Fig. 15). This suggests that each row of braided filigree wires was laid separately,

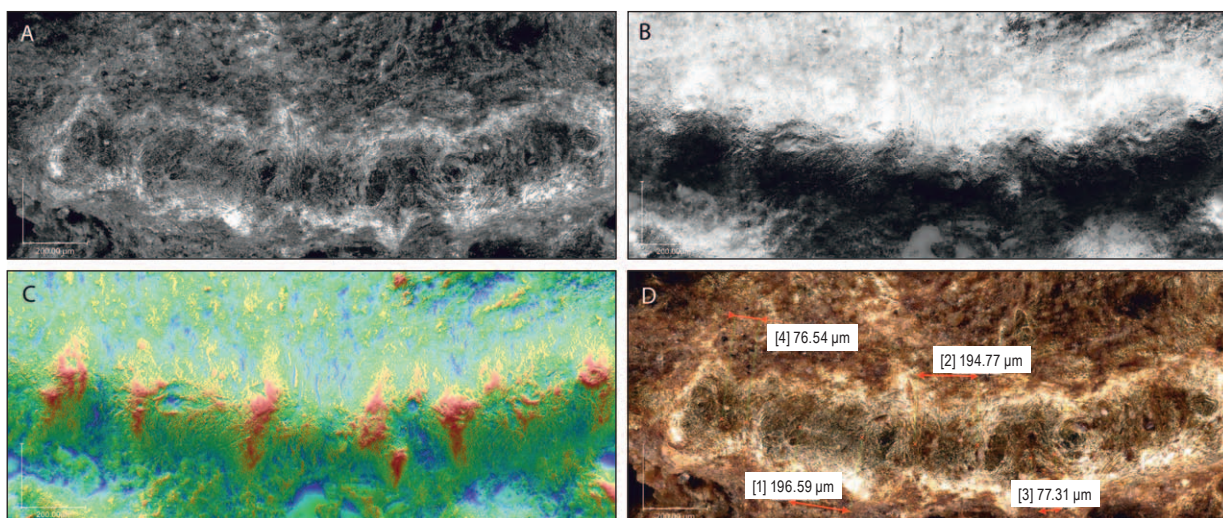


Fig. 17. Fragment No. 1. Visualisation of beaded wire. A – BW image; B – Shadow Effect image; C – Colour Map image; D – identification of bead pattern.

rather than in a spiral. The filigree braided wires were fixed to the sheet metal base. It is unclear whether an organic adhesive was used to fix filigree wires, as it degrades at high temperatures (Schwarcz/Varga 2010, 212, 213). It is assumed that flux was used to fix the filigree to the surface of the sheet (Tănase 2021, 158), though this could not be confirmed using the applied analytical methods. The shell structure was formed by joining two parts. The top of the upper part had a hem made of beaded wire (Fig. 16). The beaded wire is significantly damaged and was identified by optical microscopy visualisation (Fig. 17). As the nature of the fragments prevented the exact measurement of the dimensions of the beaded wire, approximate measurements were made from the viewing side. The beads are approximately 103 μm long and 246 μm wide. The area without beads is 164 μm wide. The spacing between beads follows a pattern with alternating widths of 76–195–195 μm (Fig. 17). The assumed radius of the circle formed by the beaded wire was 2052.37 μm (Fig. 18).

The artefact could have been fragmented by intensive forestry activities, although initial damage likely occurred during the cremation process. Cremation temperatures at funeral pyres ranged between 800–900 $^{\circ}\text{C}$, potentially exceeding 1000 $^{\circ}\text{C}$ (Mays 2021, 312). Analyses of burned human bones (FTIR, histotaphonomic analysis, etc.) at the Gbely-Kojatín burial ground showed that the bones were fully calcined (above ca. 700 $^{\circ}\text{C}$; Hladíková *et al.*, *in press*). The high temperature acting on the air in a closed hollow space could have fractured the artefact (Ottenwelter *et al.* 2020). Finds of pear-shaped pendants from Očkov and Sekule exhibit traces of heat damage, which shows that they were also placed on funeral pyres (Dragonidesová 2022, 347).

Further research and reconstruction of the crafting process require analyses of a larger number of pear-shaped pendants.

DISCUSSION

Pear-shaped pendants or their fragments from Slovakia have been found at multiple sites across the Záhorie region (Sekule, Zohor, Gbely-Kojatín), in the Lower Váh region (Abrahám, Očkov, Sládkovičovo, Tvrdosovce), Žitný ostrov region (Hamuliakovo), and in the Hron region (Želiezovce) and from the area of eastern

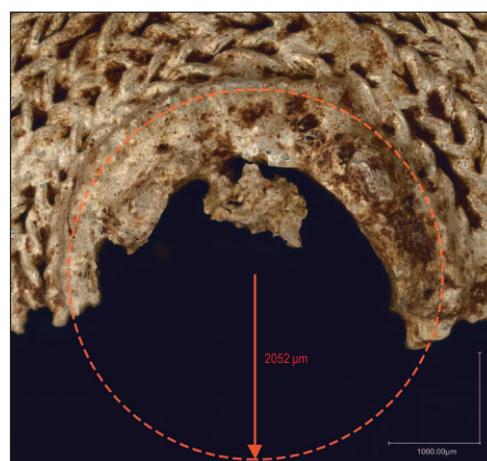


Fig. 18. Fragment No. 1. Digital measurement of beaded wire and digital reconstruction of the original perimeter of the beaded wire.

Slovakia – Rankovce (burial ground), which already belongs to the East Germanic cultural area.² According to the current state of research, they were most frequently documented in the Záhorie region at burial grounds along the Amber Road. However, verifiable hypotheses about their origin or distribution cannot be proposed due to their low count and the state of their research. Pendants from Slovak sites are predominantly dated to the B2/C1 phase, which is likely due to their influx during the Marcomannic Wars from the Przeworsk culture area mediating the cultural influence of the Wielbark culture area – *barbari superiores* (Andrzejowski 2001, 70; Droberjar 2015; Droberjar/Motyková 2023; Godłowski 1984). The hypothesis proposing a migration of larger population groups from the Przeworsk culture area along the Amber Road and other routes is supported primarily by the nearly identical material content of graves at burial grounds in the Záhorie region (e.g. Sekule – Iván/Ölvecký/Rajtár 2019; Rajtár 2013, 149).

Pear-shaped pendants/pins are reported in the literature to be made of gold or silver (for a summary, see Dragonidesová 2022; Rajtár 2013). However, the determination of the material composition of Slovak finds relies solely on macroscopic observation which requires future verification, as shown by the find at Gbely-Kojatín. In addition to the pendant/pin found from Gbely-Kojatín, *electrum* has been identified as the material used for pear-shaped pendants found at Wielbark culture burial grounds, in particular at the sites Wekllice in grave No. 544 (Au : Ag – 39.84% : 51.21%) and Leśno in grave: No. 33 (Au : Ag – ca. 50.22% : 35.26%; Natuniewicz-Sekuła 2017, 190; Walenta 2009, 216). The use of electrum was also identified in the crafting of a spherical pendant analysed using pXRF, originating from the Polish site (Wekllice, site 7, grave No. 26B; Natuniewicz-Sekuła 2017, 190).

Electrum is an alloy that in antiquity was extracted from ore veins and river or riverside deposits, and it could be further refined (Keyser/Clark 2001, 105, 106). Ancient written accounts, such as those by *Pliny the Elder*, mention the production of electrum by adding silver to gold (*Naturalis Historia* 33, 23, 799). Based on the gold-silver ratio of the artefacts from the Gbely-Kojatín, Wekllice and Leśno burial grounds, it is assumed that this electrum was likely supplemented with refined silver rather than occurring naturally (note: natural electrum typically has less than 30% silver). Additionally, artefacts from the Gbely-Kojatín and Wekllice sites contain copper levels exceeding 1%, indicating the presence of added copper in the alloy (Keyser/Clark 2001, 105, 106). The chemical composition indicates the use of a refined electrum alloy.

Imports from the Roman Empire are considered the primary sources of gold and silver during the Roman Period Barbaricum (Andersson 1997; Rajtár 2013, 128; Siegmund 1998, 308). However, whether the product was made in the Barbaricum from these sources or imported as a finished product remains an open question. Theories of local origin were challenged by K. Andersson (1997) based on an analysis of the filigree wire crafting. The filigree wires from the later period when the crafting of filigree and granulation was fully established in Scandinavia indicate a different crafting process for filigree wires on pendants compared to that in the Early Roman Period, which does not suggest continuity of this older tradition (Duczko 1985, 15). The crafting of filigree in Scandinavia started to appear in the Late Pre-Roman Iron Age and especially in the Early Roman Iron Age (Duczko 1985, 15; Müller 1956). However, the crafting process shows links to the crafting tradition in the Hellenistic world, suggesting a transmission of techniques to northern Europe. The morphological similarity of pear-shaped pendants and miniature amphorae of the 1st and early 2nd centuries from this region, and other types of pendants (Droberjar 2011, 27) also indicates links with the northern Black Sea region in the Roman Period.

K. Andersson (1997) explains the spread of the craft by direct contact between Nordic craftsmen and non-local goldsmiths who transferred this know-how and skills to them. A. von Müller (1956, 99) does not propose a single crafting centre from which products were distributed. To identify potential workshops or jewellers, it is essential to conduct a detailed analysis of the crafting process of these products on a broader scale, which could contribute to the development of a theory about the origins or influences of crafting techniques from other milieus (Andersson 1997). Based on the spatial concentration of this type of finds in the Scandinavian region, some researchers suggest that the artefacts were crafted there before spreading to the Wielbark culture region (Woźniak 2016, 209), which could be linked to the migration from Nordic territories, as shown by genetic studies (Stolarek et al. 2023). In Slovakia, pendants are most likely related to the Przeworsk cultural influence (Rajtár 2013, 140).

² Zohor (Elschek 2014), Abrahám (Kolník 1980), Očkov (Rajtár 2013), Sekule (Iván/Ölvecký/Rajtár 2019), Tvrdošovce (Bazovský, in press), Hamuliakovo (Rajtár 2013), Želiezovce (Rajtár 2013), Rankovce (Gašaj/Rákoš 2015) and Gbely-Kojatín.

CONCLUSION AND PERSPECTIVES

The above findings about the crafting process suggest that pear-shaped pendants/pins are mature masterpieces. They indicate the work of artists-craftsmen with a perfect mastery in this high craft. Unfortunately, they remain invisible to us as we lack any information about them (Voss 2012). The high value, underscored by the precise jewellery technique and the use of precious metal – in this case, an alloy of gold and silver known as electrum – indicates the wearer's high social status and correlates with hypotheses discussed in the literature regarding gifts associated with marriage politics (Meller/Schwarz 2018, 114, 115). Microscopic and chemical analyses documented that the pendant/pin was crafted from fine filigree made of electrum with artificial rather than natural origin. The exact origin is very difficult to determine using only non-destructive methods.

While this type of jewellery is linked to a specific social context, its function may be broad across cultural, social, and ritual settings. Pendants/pins made of precious metals had a decorative and probably an apotropaic purpose, as well as reflecting prestige. At first glance, they indicated an affiliation with a higher social status, linked to the identity of their wearers, but also their “different” origin (part of the identity reflected by this pendant). The wearers of the pendants were most likely not members of the local community. They may have entered this community through practices like exogamy, such as through marriage politics aimed at forming alliances. Despite the hypothesis suggesting a direct link between the pendants and the origins of their wearers, it is also possible that these artefacts reached the Morava River region through supra-regional trade contacts. The finds of pendants/pins suggest a supra-regional distribution of goods across extensive trade and social networks. Their presence in the region would indicate the spread of fashion trends. Another mechanism resulting in the presence of pendants in the Central Europe region may have been the bestowing of diplomatic gifts, aimed at improving social relations and alliances in the Barbaricum (Patalan 2017, 330; *Rajtár* 2013, 149).

Given that these artefacts primarily originate from graves, it is essential to consider that survivors may have sought to emphasise a partial identity by placing such artefacts in the grave. This partial identity primarily reflected the wearer's origin or social status in the community. The pendant might have been part of a ritual garment, indicating a special function in the community. The presence of these artefacts provides evidence of a ritual “language” that, through the repeated use of specific grave goods, shows recurring social, economic, and religious relationships in the social context (community). Ritual language enabled the burial rite to clearly convey the status of the wearer of the artefact in the community as the artefact may have had specific functions known to all members during the wearer's life. For example, it may have played a role in specific rites of passage related to changes in status in the community. The pear-shaped pendant was, therefore, not only an important visual identification item for community members but also transformed in meaning and function through ritual language into a burial ritual – the final rite of passage – after the wearer's death.

The aim of the research, whose results are presented in this text, was primarily to go beyond typological and chronological analyses. Using non-destructive survey methods, we focused on describing the basic techniques used in crafting the artefact. In the future, it would be advisable to verify the assumed crafting process through experimental crafting in collaboration with jewellery specialists, which would, among other things, provide data on time consumption. Research on pendants/pins should not only focus on non-destructive analytical methods but also include an analysis of their chemical composition and a detailed study of their crafting process.

In terms of interpretation, the analyses carried out so far show that the pendant/pin did not serve solely a decorative function. It was a potent social artefact that played an important role in rituals during the life of the wearers, indicating status and reinforcing social ties and alliances. At the same time, the artefact was an identity marker in the community. Its significance is underscored by its multifunctionality and deep cultural resonance.

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Tajomstvá dávneho remesla

Hruškovitý závesok alebo ihlica z pohrebiska doby rímskej v Gbeloch-Kojatíne (Slovensko)

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Súhrn

Článok sa zaoberá hruškovitým záveskom/ihlicou? (obr. 7; 8), ktorý bol objavený pri výskume žiarového pohrebiska z doby rímskej (2.–4. storočie) na lokalite Gbely-Kojatín (JZ Slovensko; obr. 1–3). Hruškovité závesky sa nachádzajú prevažne v ženských hrobách a sú spájané s vyšším sociálnym statusom. Takzvané hruškovité závesky sa obvykle vyrábali z drahých kovov, ako je zlato, striebro alebo elektrón, a sú významným dokladom remeselníckej zručnosti v tomto období. Článok sa zameriava na technologické analýzy dvoch fragmentov hruškovitého závesku pomocou nedeštruktívnych metód, ako je prenosná röntgenová fluorescencia (pXRF), energo-disperzná spektroskopia (EDS) a 3D digitálna mikroskopia.

Analýzy doložili, že oba fragmenty závesku boli vyhotovené z elektrónu – zliatiny zlata a striebra s prídavkom medi (obr. 9; 10; tabeľa 1). Prostredníctvom 3D mikroskopie (obr. 11–18) sa podarilo identifikovať spôsob výroby spletených jemných filigránových drôťkov, ktoré boli pripevnené na tenký kovový plech závesku. Drôťky boli vyrobené z tenkých kovových pásov, ktoré boli stáčané a spletané, čím vznikali jedinečné vzory. Tento proces bol a stále je veľmi technicky náročný.

Hruškovité závesky sa vyskytujú v širšom priestore barbarika s koncentráciou najmä v oblasti Baltského mora a Škandinávie a ich rozšírenie siaha až do strednej Európy. Na Slovensku sa nachádzajú na pohrebiskách pozdĺž Jantárovej cesty, ale aj v širšom priestore juhozápadného Slovenska, čo naznačuje, že tieto šperky mohli byť súčasťou obchodných a kultúrnych výmen. Hypotézy o ich pôvode sa rôznia – niektorí odborníci sa domnievajú, že sa mohli vyrábať priamo v severnej Európe, zatiaľ čo iní pripúšťajú možnosť, že šperky boli importované z Rímskej ríše alebo helénskeho sveta. Ich výrobná technika má totiž jasné väzby na filigránové tradície starovekého Stredomoria a helenistického sveta, čo by mohlo naznačovať prenos remeselníckych zručností z týchto oblastí do severnej Európy. Článok okrajovo otvára aj diskusiu o sociálnom a rituálnom význame týchto záveskov. Okrem dekoratívnej funkcie mohli mať aj apotropajný charakter, a slúžili ako vizuálny prejav vyššieho sociálneho statusu. Ich prítomnosť v hrobách môže naznačovať rituálnu symboliku a ich nositelia nemuseli byť vždy súčasťou lokálnej komunity – závesky mohli byť súčasťou svadobných politík alebo aliancií, prostredníctvom ktorých sa formovali spoločenské a obchodné väzby medzi rôznymi skupinami. Navyše, tieto artefakty mohli byť tiež diplomatickými darmi, ktoré slúžili na posilnenie vzťahov medzi rímskym svetom, resp. inou oblasťou a barbarikom.

Ďalší výskum hruškovitých záveskov prostredníctvom detailnej analýzy chemického zloženia a identifikovania jednotlivých krokov výrobného procesu by mohlo prispieť k lepšiemu pochopeniu nielen technologických aspektov, ale aj širšieho kultúrneho a spoločenského kontextu týchto šperkov. Výskum by mal zahŕňať aj využitie experimentov na overenie predpokladaných výrobných postupov. Na záver možno konštatovať, že hruškovitý závesok (ihlica?) zo žiarového pohrebiska Gbely-Kojatín predstavuje nielen technicky majstrovsky zvládnutý produkt, ale aj dôležitý kultúrny a spoločenský symbol. Ich prítomnosť na lokalitách doby rímskej naznačuje nielen široké obchodné a spoločenské siete, ale aj hlboký rituálny význam, ktorý tieto artefakty zohrávali počas života ich nositeľov.

Obr. 1. Lokalizácia pohrebísk Gbely-Kojatín v rámci katastra mesta Gbely. Legenda: 1 – pohrebisko z doby rímskej; 2 – včasnostredoveký mohylník; 3 – vodné toky.

Obr. 2. Lokalizácia pohrebísk Gbely-Kojatín na okraji riečnej terasy rieky Morava, pri sútoku Unínskeho a Gbelského potoka. Legenda: 1 – pohrebisko z doby rímskej; 2 – včasnostredoveký mohylník; 3 – vodné toky; 4 – eolické sedimenty: jemnozrnné naviate piesky (nevápnité, vápnité); 5 – fluvialne sedimenty: litofaciálne nečlenené nivné hliny, alebo piesčité až štrkovité hliny dolinných nív a nív horských potokov; 6 – fluvialne sedimenty: piesčité štrky a štrky nižších stredných terás; 7 – proluvialne sedimenty: hlinité až piesčito-hlinité štrky až reziduálne štrky s úlomkami hornín v stredných náplavových kuzeľoch.

Obr. 3. Hypsometrická mapa okolia pohrebiska Gbely-Kojatín (zdroj LLS dát ÚGKK SR). Legenda: 1 – pohrebisko z doby rímskej; 2 – včasnostredoveký mohylník; 3 – vodné toky.

Obr. 4. Letecký záber na plochu pohrebiska v roku 2021, po výrube a následnej výsadbe stromov (foto M. Vlach). Vyznačenie skúmaných polygónov 1–3.

Obr. 5. Výsledky detektorovej prospekcie – interpolovaný povrch hustoty kovových artefaktov v priestore pohrebiska z doby rímskej a včasnostredovekého mohylníka. Legenda: 1 – areál pohrebiska z doby rímskej; 2 – areál včasnostredovekého mohylníka.

- Obr. 6. Celkový plán pohrebiska s vyznačením miesta nálezu závesku. Legenda: 1 – závesok; 2 – hroby preskúmané v roku 2021; 3 – hroby preskúmané v roku 2022; 4 – skúmaná plocha pohrebiska.
- Obr. 7. Fragment č. 1 hruškovitého závesku/ihlice. A – predný pohľad; B – zadný pohľad.
- Obr. 8. Fragment č. 2 hruškovitého závesku/ihlice. A – predný pohľad; B – zadný pohľad.
- Obr. 9. Fragment č. 1. BSE snímka a EDS spektrá. A – BSE snímka stočených drôtikov; B – EDS1; C – EDS2; D – EDS4.
- Obr. 10. Fragment č. 2. Úsek čiernej farebnosti. A – digitálna snímka; B – BSE snímka; C – EDS spektrum.
- Obr. 11. Fragment č. 1. Digitálne meranie hrúbky plechu – hrana plechu.
- Obr. 12. Fragment č. 1. Digitálne meranie vrchnej a spodnej hrany a digitálna rekonštrukcia pôvodného obvodu základne fragmentu.
- Obr. 13. Fragment č. 1. Digitálne meranie hrúbky drôtikov – identifikovanie spojov, stáčanie plechového pásika.
- Obr. 14. Fragment č. 1. Digitálne meranie drôtu zo stočeného plechového pásika – rozmedzie spoja a hrúbka plechového pásika.
- Obr. 15. Fragment č. 1. Digitálna snímka vrkočovitého vzoru zo stočených spletených drôtikov.
- Obr. 16. Fragment č. 1. Digitálna snímka poškodeného lemu z perlovca na hornej časti.
- Obr. 17. Fragment č. 1. Vizualizácia perlovcového drôtu. A – čiernobiela snímka; B – snímka v Shadow Effect režime; C – snímka v režime Color Map; d – identifikácia vzorca rozstupov v perlovci.
- Obr. 18. Fragment č. 1. Digitálne meranie perlovca a digitálna rekonštrukcia pôvodného obvodu perlovca.

Tabela 1. Prvkové zloženie fragmentov na základe pXRF povrchovej analýzy.

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