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One by One
A Taphonomic Study of the Multiple Grave VI-2 at the Cemetery of Dudka

Abstract

Grave VI-2 is the only grave at the cemetery of Dudka (Masuria, north-eastern Poland) which contains three sitting burials and is the most complicated of all the graves in the cemetery. The taphonomic analyses of grave VI-2 proved that the deceased were buried in the pit in at least two episodes. In the first episode, a young adult male – individual C – was interred in a sitting-squatting position. The next two primary burials of the second male (ind. A) and a child (ind. B) were added sometime later in the second funeral episode, when the body of individual C was decomposing. Disarticulated bones of other individuals were most probably added to grave VI-2 in the second episode, which is suggested by their location inside the grave. The cremation was at the top of the grave, so it could have been added later, in a possible third funeral episode. The body position of the sitting individuals, as well as the location of the bones of the secondary burials, was undoubtedly intentionally arranged. It could have a ritual importance and most probably indicate the kinship and social relations between the deceased.

Keywords

Para-Neolithic / Stone Age hunter-gatherers / sitting burials / burial rites / taphonomy

The Site and the Cemetery of Dudka

General Data

The Dudka site is located on the island in the former Lake Staświn in Masuria, north-eastern Poland (pow. Giżycko/PL; **fig. 1**). The island, like the neighbouring site of Szczepanki, was settled from the Late Palaeolithic until the end of the Late Neolithic (**tab. 1**). Both islands were occasionally visited in the Late Palaeolithic, then occupation became regular and seasonal in the Mesolithic. Dudka was settled mostly in the spring season, whereas Szczepanki in autumn. In the Para-Neolithic, the stay on each island was prolonged up to the whole year, which is indicated, for example, by the rapid increase in the amount of settlement material. In the Late Neolithic, the settlement intensity was decreasing, probably because of the worse condition of the lake, which finally turned into a bog in the Bronze Age (Gumiński 1995; 1999a; 2012; Gumiński/Michniewicz 2003).

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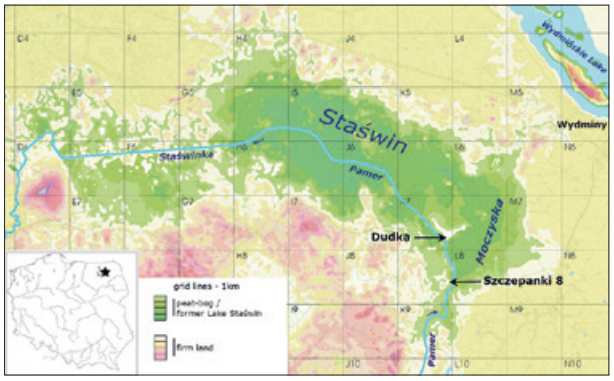

Fig. 1 Map of Lake Staświn with the location of the Dudka site. – (Map W. Gumiński).

The local Para-Neolithic is connected with the Zedmar culture, known also from sites in the Prussian Lowland (Zedmar A, Zedmar D, Utinoie Boloto [Kaliningrad obl./RU]), which originated from the Maglemosian Mesolithic tradition, like the Ertebølle or Swifterbant cultures (Gumiński 1999b; 2001; 2020). The beginning of the Zedmar culture is dated to the introduction of the pottery around c. 4500 cal BC. It was locally produced pottery, which had its specific features in terms of ornamentation, technology and vessel forms, e. g. flat bottoms (Gumiński 2020). The economy in the Zedmar period was still based on hunting and gathering, though the settlement strategy changed to a more sedentary one and the population grew (Gumiński 1995; 1999a; 2012). What is more, the forager economy was maintained until the end of the Late Neolithic, despite the stronger influence of the farmers' societies, demonstrated, for example, by changes in pottery production or burial rites (Gumiński 1998; 1999a; 2012; Gumiński/Kowalski 2011).

History of Excavation

The Dudka site was excavated by Witold Gumiński in the seasons 1985–2000 and again, after a long break, by Witold Gumiński and the author in the summers of 2023 and 2024. The first grave (VI-1) in the cemetery was uncovered in 1991, but further fieldworks in trench VI took place in the seasons 1997–2000. The recent fieldworks were focused on the cemetery and its surroundings, i. e. the settlement in trench XIII, but no new graves were found (Bugajska in print). The graves discovered at Dudka were published to a small extent for a long time (Gumiński 2001; 2003; Gumiński/Kowalski 2011), until comprehensive anthropological-osteological analyses were made. The human remains from Dudka and Szczepanki were researched by the author in the years 2009–2018 for her Master's and then PhD thesis, and after that the graves and different aspects of the local burial rites, like loose human bones, were systematically published (Bugajska 2015; 2021; 2023; 2024a; Bugajska/Gumiński 2016; Gumiński/Bugajska 2016). The chronology of the Dudka cemetery was for a long time problematic. The graves usually do not contain grave goods that can indicate the chronology of burials (Gumiński 2014). Moreover, previous attempts at radiocarbon dating made over 20 years ago failed or gave unreliable results because of the poor preservation of the collagen. The large series of radiocarbon dates were finally obtained in recent years thanks to a grant project found by the National Science Centre, Poland (Bugajska 2023; 2024b).

Burial Rites

The cemetery was located on the island plateau in the middle way between two big settlement areas: »the eastern bay« – trench III – and the »southern promontory« – trench I, II and XII (**fig. 2**). The sloping shore between the cemetery and the lake was also used for settlement purposes – trench XIII and XI (**fig. 2**) – mainly in the Para-Neolithic period. The settlement structures were located only several meters from the graves on the plateau (Bugajska in print). It indicates that the cemetery was close to the settlement and not as isolated as it was supposed earlier (Bugajska in print; Gumiński/Bugajska 2016). The more so as the chronology of this encampment overlaps with the main chronological framework of the cemetery, since most of the graves and cremation burials placed on the surface of the cemetery gave dates which ranged between 4400 and 3400 cal BC, which falls into the early and classic Zedmar periods (**tab. 1**; Bugajska 2023; 2024b; in print). Only one grave – VI-17 – with primary female burial is dated to the Mesolithic with the results of: 6645 ± 30 BP (5628–5484 cal BC, Poz-3913) and 6622 ± 36 BP (5628–5484 cal BC, AAR-39092) (Bugajska 2023; 2024b). The area of trench VI was still used for funeral and ritual purposes in the post-Zedmar and Late Neolithic periods (**tab. 1**). The youngest grave with primary child burial (VI-18) is dated to 3682 ± 32 BP, i. e. to the end of the settlement at Dudka (2194–1958 cal BC, Ua-84431) (**tab. 2**). It should be added that trench VI yielded a lot of pottery of the post-Zedmar or Corded Ware type, as well as a large assemblage of animal bones, so most probably the area was used for settlement purposes as well (Bugajska in print).

The cemetery at Dudka yielded human remains of at least 122 individuals from 28 graves. This num-

archaeological period		period	years ^{14}C BP	cal BC	cemetery	
					dated graves / pit	dated burial types
Late Palaeolithic		Allerod - Younger Dryas	11200-9800	11200-9250	-	-
Early Mesolithic		Preboreal - Boreal	9800-8000	9250-7000	-	-
Late Mesolithic		early - middle Atlantic	8000-5600	7000-4500	grave VI-17	primary on back with pulled up legs
Para-Neolithic · pottery appearance · hunter-gatherer economy · year-round (?) settlement at site	early Zedmar (influences/ pottery imports of KBK)	late Atlantic	5600-5100	4500-4000	6 graves: VI-6, VI-7, VI-8, VI-10, VI-16, VI-n-1/2; 2 pits: VI-i-1, VI-i-2; 1 ind. cremated / loose human bone	cremation, secondary burials, sitting primary burials disturbed / emptied graves
	classic Zedmar (influences/ pottery imports of TRB)	Atlantic/ Subboreal	5100-4700	4000-3500	10 graves: VI-1, VI-2, VI-3, VI-4, VI-13, VI-14, VI-15, VI-g-1, VI-e-1, VI-e-4; 6 ind. cremated / loose human bones	
	post-Zedmar (influenced by GAC)	early Subboreal	4700-4200	3500-2800	2 graves: VI-m-1, VI-h-2; pits: VI-x-1, VI-f/g-2	secondary burials votive(?) pits
Late Neolithic (Corded Ware culture)		early/middle Subboreal	4200-3700	2800-2200	pit VI-t-1; grave VI-18	votive(?) pits primary on back with pulled up legs

Tab. 1 The chronology of the settlement at the Dudka site and of the graves at the cemetery. The chronology is based on stratigraphy and relevant radiocarbon dates (44 from Dudka and 16 from cemetery) obtained mostly from charcoal (Bugajska in print; Gumiński 1995; 1999a; 2008; 2012; Gumiński/Michniewicz 2003) or human remains in the case of the cemetery (Bugajska 2023; 2024b). Pits, graves and burial types are assigned to time periods based on radiocarbon dates obtained (Bugajska 2023; 2024b; in print). – KBK: Brześć Kujawski culture; TRB: Funnel Beaker culture; GAC: Globular Amphora culture.

ber includes the 18 formal graves (VI-1–VI-18)[1] recorded as such during excavations and 10 structures recognized as graves based on the osteological analysis of bone material from the cemetery (Bugajska 2021; 2023; 2024a). Burial rites in the cemetery were extremely diversified and most graves were collective, containing up to 11 individuals. There were primary burials placed in different positions, secondary inhumations and cremations (Gumiński/Bugajska 2016). Moreover, the graves usually contained different types of burial, which in most cases were interred at the same time. It should be noticed that at the Dudka cemetery there is a strong predominance of secondary burials (39) over primary (12), which indicate the important role of multi-step burial rites in the local hunter-gatherer community.

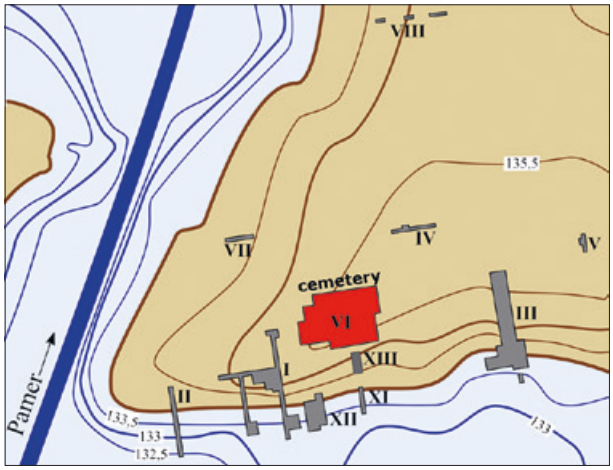

Fig. 2 Dudka: trench VI is marked with red. – (Image W. Gumiński).

1 Structures recognized as graves were subsequently numbered as they were uncovered with the addition of the trench number »VI«. There were 18 such structures. All other pits at the cemetery were numbered within small sub-trenches, so the number of each structure include »VI« for trench and a small letter from »a« to »y« for sub-trench and the following number within the trench. After the osteological analyses some of such pits were interpreted as graves or possible graves (emptied?), but the original number of the structure was preserved, e. g. grave VI-e-4. At fig. 3 the coded names of graves and pits had to be shortened, and the trench number »VI« was not added.

individual	VI-2 A	VI-2 B	VI-2 C	VI-2 D	VI-2 E	VI-2 F	VI-2 G
sex	♂	-	♂	♀	-	-	-
age	Adultus	Infans II	Adultus	Maturus	Juvenis	subadult	elderly adult
age - teeth*	24-30 years	7 years	20-24 years	35-40 years	16-20 years	-	-
age - development of epiphyses/bone size**	-	6-8 years	-	-	-	> 10 years	-
age - pubic symphysis after Todd system***	phase III/IV: 22-26 years	-	phase II/III: 20-24 years	-	-	-	-
age - auricular surface after Lovejoy et al. 1985***	phase 2: 25-29 years	-	phase 1: 20-24 years	phase 4: 35-39 years	-	-	-
age - cranial suture fusion	< 30 years		< 30 years	39.4-43.4 years			
identified bones	complete skeleton	complete skeleton	complete skeleton	cranium, mandible 9 long bones, ilium bones, scapulae, vertebrae (all)	half of mandible	cranial bones, long bone shafts	thoracic vertebra
missing bones	-	-	-	all ribs, both patellae, all bones of feet/hands	rest of skeleton	most of skeleton	rest of skeleton
kind of burial	primary	primary	primary	secondary selected, big bones	secondary single bone	cremation	secondary single bone
position of body/bone arrangements	sitting-squatting	sitting-squatting	sitting-squatting	most bones in »a pile« between ind. A and B, mandible at pelvis of ind. A, femur, ilium behind ind. C	bone added at hip of ind. A	concentration above grave (small)	bone in pit filling

Tab. 2 Dudka, grave VI-2, identified individuals. The sex determination based on the cranial and pelvis morphology (White et al. 2012, 408–419). – * adults: tooth wear was analysed (White et al. 2012, fig. 18.4); child: tooth eruption after Ubelaker (White et al. 2012, fig. 18). – ** estimation of age based on Baker et al. (2005, 157–160) and Schaefer et al. (2009). – *** standard methods were used after White et al. (2012, 391–392. 395–403).

Furthermore, about half of the individuals identified in the cemetery were cremated (Bugajska 2021; 2023; 2024a; Gumiński/Bugajska 2016). Some of the graves were purposely disturbed in order to remove selected bones of the deceased, or even whole skeletons (Bugajska 2021).

The primary burials were placed in different positions, but the sitting position prevailed – 9 individuals in 6 graves (**fig. 3**). Only two individuals were buried on their backs, a female from grave VI-17 and a child from grave VI-18, in both cases with the legs pulled up on the chest, and one individual was placed on the right side – the female from grave VI-3 (Gumiński/Bugajska 2016).

Burials in Sitting Position

All graves with the sitting primary burials are dated to the early or classic Zedmar culture (**tab. 1**; Bugajska 2024b). It can be supposed, however, that such a practice is probably a continuation of previous Mesolithic traditions. Sitting burials are known from sites on the European Plain of the Early and Late Mesolithic (Grünberg 2008). Such a burial custom is connected with the hunter-gatherer societies as such, and that is why such a practice could be maintained for a longer time in the Staświn microregion, until about 3500 BC (**tab. 1**; Bugajska 2024b).

Individuals interred in a sitting position always appeared in collective graves, which were usually accompanied by secondary burials or by concentrations of burned human bones at the top of the grave. The disarticulated bones of other individuals were placed inside the grave pit next to the sitting deceased and were even specially arranged (Bugajska 2021; 2023; Bugajska/Gumiński 2016). In a given grave there was usually one primary burial in a sitting position, with the exception of two graves – VI-2 and VI-13. In grave VI-13 there were two sitting

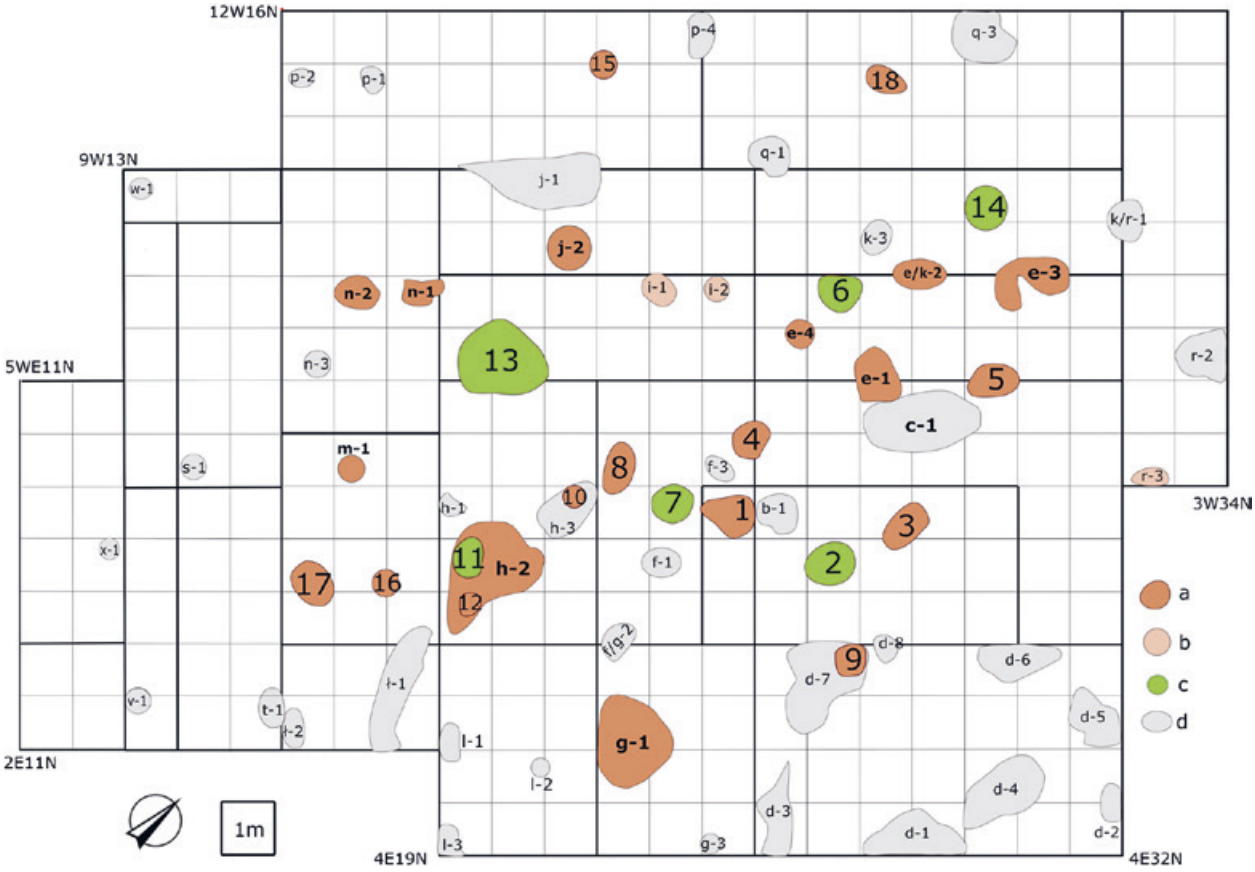

Fig. 3 Dudka, trench VI, the main cemetery. – **a** graves; **b** possible graves/pits with deposit; **c** graves with primary burials in a sitting-squatting position; **d** pits. – (Image K. Bugajska).

juvenile individuals and in grave VI-2 there were three sitting individuals, two adult males and one child.

Some of the sitting burials were disturbed in the Stone Age in order to collect selected bones of the deceased. It concerns burials from graves VI-6 and VI-13 (Bugajska 2016; 2021). There are also several examples of possible emptied graves in the cemetery, from which a whole skeleton was probably removed. Such structures contained single human bones and some artefacts that could be grave goods. Taking into account the size and circular shape of the pits, it is not excluded that the deceased were placed in a sitting position as well (Bugajska 2021).

Methods of the Taphonomic and Osteological Analyses of Grave VI-2

The paper will focus on the taphonomic analyses of grave VI-2, which is the most complicated of all the graves in the cemetery. It is the only grave with three individuals interred in a sitting position, which were placed very close to each other in a comparatively small rounded pit (**fig. 4**). It is an unusual situation at the cemetery of Dudka, as well as in the Mesolithic/Para-Neolithic in general. The sitting position of the deceased is usually known from single burials or, more rarely, from graves with two individuals placed in such a way (Grünberg 2008).

In the case of grave VI-2, the disarticulated bones of other deceased persons were added between the three sitting individuals, as well as by parts of the skeleton – sets of vertebrae – which still remained in anatomical connection (**fig. 4**). Besides, a small concentration of cremated human remains was deposited next to the top of the grave (**fig. 4**), which was common practice at the Dudka cemetery (Bugajska 2023). The general impression during the exploration of the grave was that all three burials were buried at the same time. The problematic issue were additional bones of the fourth individual (D), especially vertebrae, which remained in anatomical order. It was not clear whether it was a disturbed older burial or a secondary burial, or maybe a part of

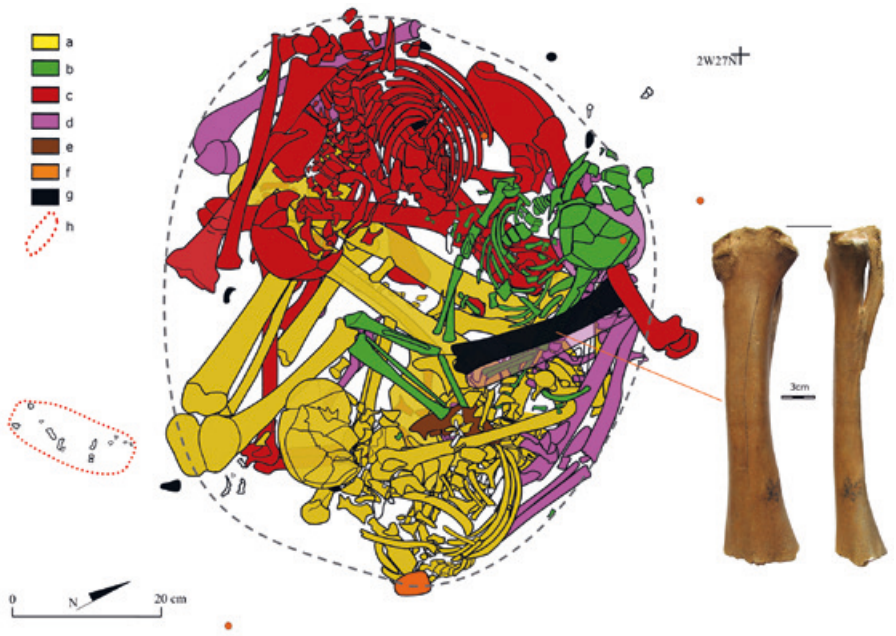

Fig. 4 Dudka, grave VI-2, drawing of the grave and photo of the horse radius. - **a** individual A (male, Adultus); **b** individual B (child, Infans II); **c** individual C (male, Adultus); **d** individual D (female, Maturus); **e** individual E, half of mandible (Juvenis); **f** ochre; **g** grave goods; **h** concentration of cremated human remains. – (Image and photo K. Bugajska).

the body buried along with the sitting individuals. The main problem to be solved in the taphonomic analyses was to determine the character of each burial and to conclude whether all the burials were interred at the same time or successively in different episodes.

Grave VI-2 was explored in the field, and the taphonomic analysis of it is based on the detailed drawings and photos of the grave. Three drawings were made during the excavation on three levels of the grave. All bones were numbered, so consequently each identified bone has a known location in the grave pit. The drawings were digitised by the author and used for the reconstruction of the skeleton position. Numerous photos, which were made during exploration, were used for the analyses as well. There are in total 41 colour and 19 black and white pictures of grave VI-2. The quality of them is good enough to recognize the bones of the individuals marked in the drawings. As a first step all bones were osteological identified and the number of individuals was estimated, then the position of the skeletons and particular bones within the grave pit was analysed.

The determination of the burial character and the differentiation of the primary burials from the secondary ones, based on the analysis of the joints, taking into account that some of them are unstable, which rapidly break down, while the others are persistent joins, which break down more slowly. It is especially important to distinguish the disarticulations and movements of the bones, which are the result of natural post-depositional factors and the decomposition of soft tissues, from the disturbances which may be the result of deliberate human action of a ritual nature (Duday et al. 2009, 15–57. 89–92; Knüsel/Robb 2016; Nilsson Stutz 2003). Another question is if the decomposition of the body took place in a filled or in an empty space, i. e. whether the grave pit was filled with sediment directly after the burial (Duday et al. 2009, 32–57). It has the great importance in the case of sitting-squatting burials, because it has a large influence on the preservation of the primary vertical position of the skeleton (Nilsson Stutz 2005–2006).

Standard methods were used for the sex and age determination (**tab. 2**). The age of adult individuals, if possible, was estimated based on the basis of the pelvis, i. e. the pubic symphysis area and auricular surface, as well on the cranial suture fusion and the degree of tooth wear (White et al. 2012, 379–427). The age of a child (ind. B) was determined based on the dental age and the degree of formation of specific bone epiphyses (Baker et al. 2005, 157–172; Schaefer et al. 2009; White et al. 2012, fig. 18.2).

Fig. 5 Dudka, grave VI-2, the upper part of the grave pit. – (Photo W. Gumiński).

Fig. 6 Dudka, grave VI-2, the view on the child skeleton (ind. B). – (Photo W. Gumiński).

Grave VI-2 – The Arrangement of the Burials and Grave Goods

Grave VI-2 included the remains of at least 7 individuals (**tab. 2**), which were deposited in the regular rounded pit with a diameter of 80–100 cm. There were three primary burials placed in a sitting position: two young males – individuals A and C – and one child – individual B (**fig. 4; tab. 2**). All three individuals were placed tightly close to each other. The two males were placed facing each other and leaning against the wall of the pit and the child was interred between them (**fig. 4**). Apart from that, bones of at least three individuals (D, E and G) were put to the grave as secondary burials (**fig. 4; tab. 2**). Additionally, a small concentration of burned human bones (ind. F) was uncovered on the cemetery ground next to the top of the grave (**fig. 4; tab. 2**).

Grave VI-2 also contained the grave goods. The most interesting is the horse radius, which was placed on the chest of the child – individual B (**fig. 4**). Except that, there were unworked animal teeth (beaver, wild boar), a hedgehog jaw, five flints (unretouched), a belemnite, ochre lumps and three stones: a pseudo-axe and two stone tools possibly used to strike a fire (Gumiński 2014; Gumiński/Bugajska 2016, 476 tabs 2–3). The pseudo-axe was found on individual A, whereas two other stone artefacts appeared on the chest of individual C, and these finds may be given to the sitting males. In other cases, it is difficult to connect grave goods with specific individuals (Gumiński/Bugajska 2016). It should be added that most of the grave goods in the Dudka cemetery had foremost a symbolic character, and many of them were not added to the given individual, but just to the graves. Grave VI-2, like most of the burials at Dudka, does not contain any finds, like bone artefacts, which could suggest its chronology (Gumiński 2014; Gumiński/Bugajska 2016).

Individual B

The skeleton of a child (ind. B) was found in almost undisturbed anatomical order in the upper part of the grave pit (**figs 4-5**). The child was put in a half-lying position, and thanks to that, the primary position of the skull and chest bones was stabilised and preserved (**fig. 6**). The long bones of the left leg were generally articulated indicating that the legs were strongly bent with the feet placed near the pelvis and knees turned sideways (**figs 4; 7A**). The arms were placed along the body with the hands folded at

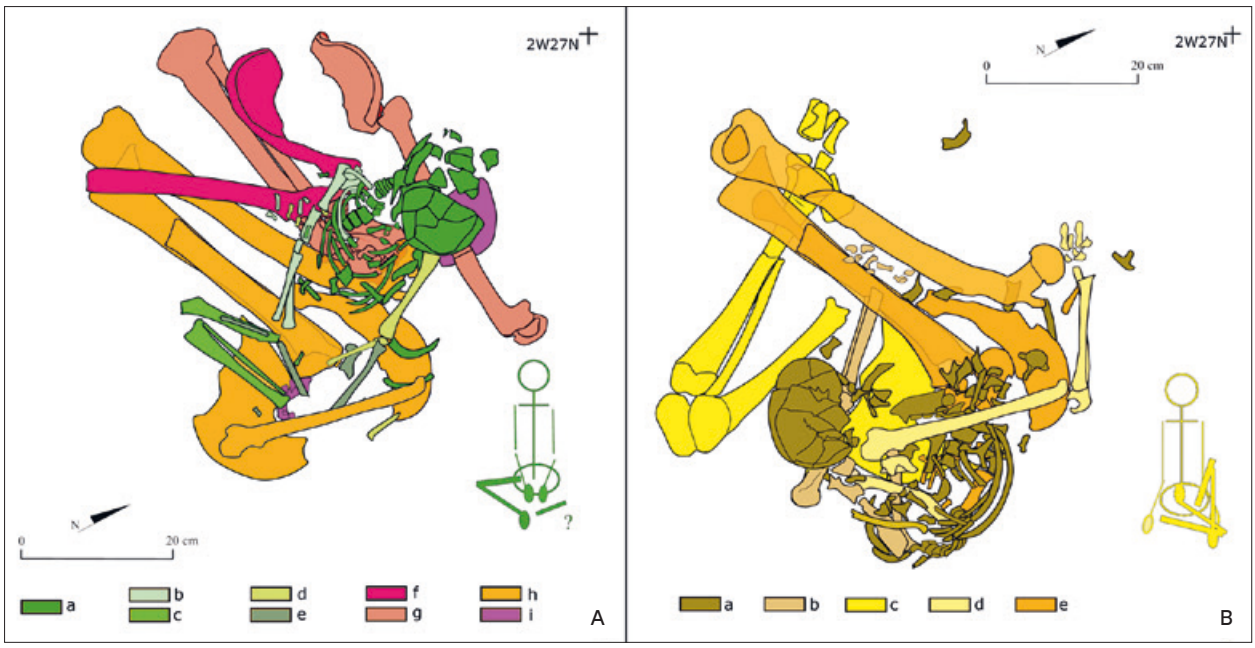

Fig. 7 Dudka, grave VI-2, drawings of the skeletons and the reconstructed position of the body. – **A** individual B (child) in relation to the selected bones of other individuals (**a** ind. B, skull, ribs, vertebrae; **b-c** ind. B, right extremities; **d-e** ind. B, left extremities; **f** ind. C, right femur and ilium; **g** ind. C, bones of the left leg; **h** pelvis and right leg of ind. A; **i** ind. D [secondary burial], skull and mandible). – **B** individual A, position of the skeleton (**a** skull, ribs, vertebrae; **b** left upper extremity; **c** left leg; **d** right upper extremity; **e** right leg). – (Image K. Bugajska).

the waist (**figs 5; 7A**). The small bones of the hands and feet, as well as the long bones of the left leg were fully disarticulated, since they fell down into the area of the abdominal cavity of male A, i. e. into the empty space, which aroused after the decomposition of the soft tissues (**fig. 7A**).

All observed bone movements and the disturbance of the bones of individual B occurred naturally within a secondary empty space, which appeared after the soft tissue decomposition. The skull and chest bones did not collapse forward because of the half-lying position of the child's body. However, it seems also possible that the pit was partially filled with sediment in its eastern part shortly after the deposition of the child's body, because the bones of the chest did not fall down, as if they were to some extent stabilised by the sediment.

The child skeleton was placed on the bones of two adult males. The child was sitting on the right leg of individual A (**figs 4; 7A**) with the feet originally leaning on the male's abdomen. The feet bones fell into the empty space, which arise after the soft tissue decay. In turn, the skull of the child was placed on the left femur of the younger male - individual C (**fig. 7A**). Such a location of the child skeleton indicates that it was the last one of the three sitting individuals buried in the grave.

The child was interred with the radius bone of the horse placed along its chest with one end leaning on its left arm and the other end resting on the child's hands. It looks as if the child was holding a kind of mace in its hands (**fig. 6**). It is the only element of the grave goods that was clearly connected with a particular deceased and was placed in a purposely arranged way.

Individual A

The skeleton of individual A was almost in its anatomical order and the primary sitting position was preserved (**fig. 7B**). Larger displacements took place in the area of the chest and the abdominal cavity due to the soft tissue decomposition. Most of the vertebrae remained in their anatomical order and the vertical position of the column was generally preserved. However, it was broken apart in the cervical section, as the skull together with the first cervical vertebrae collapsed forward and rotated face-down (**fig. 8**). It should also be noticed that the whole upper part of the skeleton was tilted to the left. The body could have been leaning on the western wall of the pit, or it could have fallen to the right after the interment (**fig. 9**). The ribs had fallen down, although most of them were still articulated with the vertebrae (**figs 8-9**).

The upper extremities of the male remained mostly in anatomical position. The disturbances were observed only in case of the shoulders and both humeri which moved with the chest bones due to the soft

Fig. 8 Dudka, grave VI-2, individual A. The view on the upper part of the skeleton. – (Photo W. Gumiński).

Fig. 9 Dudka, grave VI-2, the view from the east on the skeletons. In the foreground: the skeleton of individual A seen from the back. In the background, in the middle-upper part of the skeleton of individual C with the skull turned upside down. – (Photo W. Gumiński).

tissue decomposition. Both clavicles were found over the pelvis of the male, so they had fallen down in the emptied space of the abdominal cavity (**fig. 7B**). Both extremities lay in the same way, with the forearm bones placed horizontally at the bottom of the pit on the sides of the male pelvis (**figs 7B; 10**). In result, even the small bones of the hands remained in anatomical order.

The intact primary position of the legs is preserved as well. The left leg was bent in the knee and placed vertically with the foot located near the pelvis (**fig. 7B**). In turn, the right leg of individual A was placed in an atypical way. It was strongly bent in the knee and turned with the foot to the abdomen of the dead (**fig. 7B**). In result, the femur and tibia along with the fibula were placed horizontally and almost

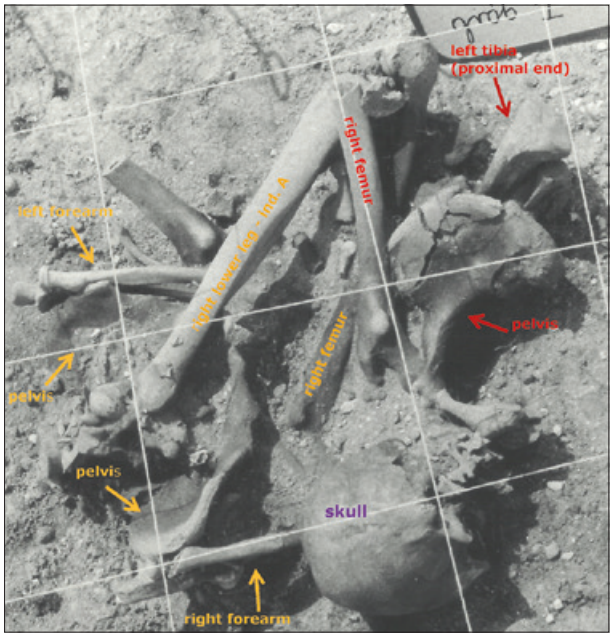

Fig. 10 Dudka, grave VI-2, the bottom of the pit. The bones of particular individuals marked with colours: red – individual C; yellow – individual A; purple – individual D. – (Image W. Gumiński/K. Bugajska).

parallel to each other (**fig. 10**). Moreover, the right femur was rotated so heavily that the head fell out of the acetabulum (**fig. 7B**). The right foot was previously lent on the male stomach, and after the decomposition of soft tissue, its bones fell into the space of the abdominal cavity. Consequently, the foot bones were found just on the pelvis (**fig. 7B**). Such an unnatural horizontal position of the leg was probably specially arranged to make space for the child body (ind. B), which was placed on the leg.

The observed movements of the bones of individual A are connected with the soft tissue decomposition. The bones of the chest collapsed mostly within the empty space which gradually appeared as the soft tissues decomposed. On the other hand, the rotation and collapse of the skull and cervical vertebrae to the forward direction indicates that the upper part of the grave pit was still empty after the funeral. It is not sure if the body was placed leaning against the wall of the pit or it fell to the left after being buried. Anyway, it must have happened before the decomposition of the soft tissue, because the anatomical connections of the chest bones are not disturbed. The body of this male (ind. A) was surely placed in the pit before the child (ind. B). There is no strong evidence of intentional disturbance due to the adding of the next dead to the grave. It may suggest that male A and the child could be placed into the grave together during a funeral ceremony. Furthermore, the position of the right leg of the male was certainly intentionally arranged to make space for the child in the grave.

Individual C

Compared with the other two primary burials, the bones of individual C underwent the greatest displacements (**fig. 11A**). The disturbances of the skeleton partly occurred due to the soft tissue decomposition in the empty space of the pit. It applies undoubtedly to the skull and chest bones which collapsed in the forward and down direction. The skull turned with the base upwards and stopped on the legs of individual A, so it had to collapse after the interment of individual A (**figs 9; 11B**).

The left leg of individual C was probably bent strongly and placed vertically with the knee turned upwards (**fig. 11A**). The bones of the left foot, mostly in intact anatomical order, were found on the bottom of the pit in front of the pelvis, so in their primary position (**fig. 11A**). The left femur was turned with the distal end upwards, leaning against the pit wall and covered by the child burial (ind. B). The proximal epiphysis was still in the acetabulum. The left patella was found on the distal epiphysis of the femur at the pit wall. In turn, the left tibia and fibula lay on the bottom of the pit (**fig. 11A**). Both bones remained in anatomical relation to each other and to the feet bones, but not to the left femur on which the child burial was placed. The question is if the observed disintegration of the left knee joint was the result of natural processes. If the leg was bent and put vertically and the long bones were positioned diagonally, then the left femur together with the patella could collapse forward, whereas the tibia and fibula backwards, after the soft tissue decomposition. However, in such a case both lower leg bones should lay on the pelvis, i. e. on the right ilium of individual C, whereas they were found below it (**figs 10. 12**). The final position of the lower leg bones cannot be the result of natural post-depositional processes, but it indicates human manipulation with the decaying body. It can be surly stated that the lower leg was strongly pushed under the pelvis, to such an extent that the proximal ends of the tibia and fibula (knee joint) stuck out behind the pelvis (**figs 10; 11A; 12**).

There is no doubt that the final position of the left lower leg bones is the result of later intentional human activity and the aim was probably to make space for the next deceased. Furthermore, the child (ind. B) was put on the left femur and left foot of male C, but not on the lower leg bones (**fig. 7A**). It suggests that the knee joint of individual C was undoubtedly already broken, either intentionally or

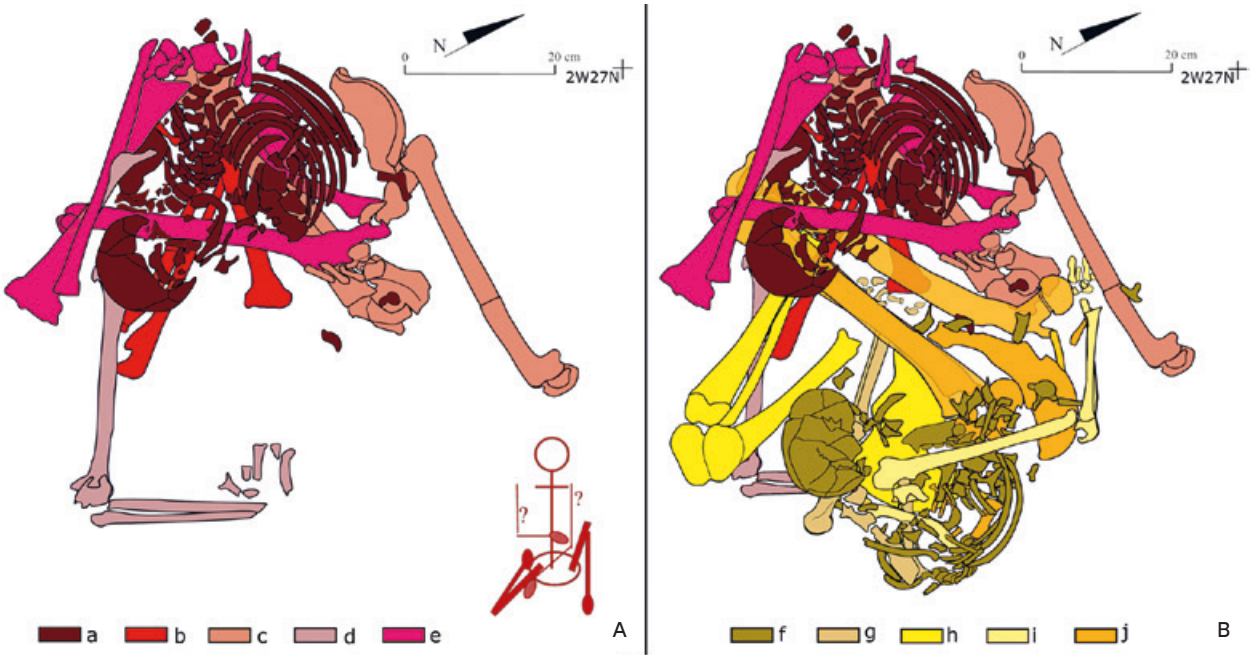

Fig. 11 Dudka, grave VI-2, the position of the skeleton of individual C (male). – **A** drawing of the skeleton and reconstructed body position. – **B** skeleton of individual C in relation to the second male (ind. A). – **a** individual C, skull, ribs, vertebrae; **b** individual C, left upper extremity; **c** individual C, left leg with destroyed knee joint; **d** individual C, right upper extremity; **e** individual C, right leg; **f** individual A, skull, vertebrae, ribs; **g-h** individual A, left extremities, upper and lower; **i-j** individual A, right extremities, upper and lower. – (Image K. Bugajska).

naturally, when the child's body was buried in the pit. The lower leg bones could have been pushed against the pit wall, when the next body was added to the grave. The child's skull was leaned on the femur of the male pressing it to the pit wall. It also seems to be intentionally arranged.

The bones of the right leg of individual C remained mostly in anatomical connection. However, the position of the whole leg was very untypical and to some extent unnatural. The leg was bent strongly in the knee, and the bones of the lower leg were turned with the distal end backwards. In the result, the right foot was placed at the right side of the male hip (**fig. 11A**). The right femur is placed diagonally with its distal end turned upwards and sticking to the pit wall (**figs 11A; 12**). Surprisingly, the right lower leg is unnaturally highly located in the grave, i. e. on its maximal top (**fig. 13**). Moreover, the hip joint was destroyed and the head of the femur fell out of the acetabulum (**figs 10; 11A**). The tibia and fibula were uncovered in almost horizontal position (**fig. 13**). They remained in anatomical relation to each other, as well as to the foot bones. The knee joint is disarticulated, but the distal end of the femur along with the patella is still located near the proximal end of the tibia, i. e. in distance of several centimetres (**fig. 11**). Such a position with the lower leg pulled up so high is unnatural and it seems to be difficult to obtain. It would be more natural if the femur and lower leg bone lay horizontally at the bottom of the pit and

Fig. 12 Dudka, grave VI-2, the lower part of the grave pit. The bones of particular individuals marked with colours: red – individual C; yellow – individual A; purple – individual D. – (Image W. Gumiński/K. Bugajska).

almost parallel to each other. In such a case, the foot would be located just at the right ilium bone. Taking it into account, it seems that the primary position of the extremity was changed when the burial was dis-

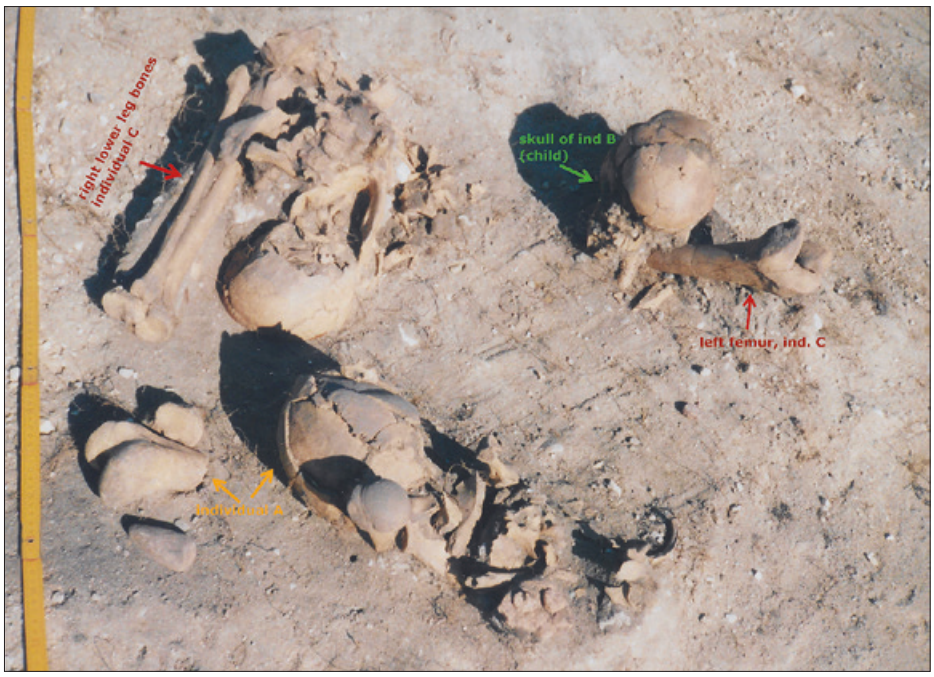

Fig. 13 Dudka, grave VI-2, the upper part of the grave pit. The bones and skeletons of given individuals are marked with colours: yellow – individual A; green – individual B (child); red – individual C. – (Image W. Gumiński/K. Bugajska).

turbed and then the lower leg could have been pulled upwards. It should be also noted that the upper part of the body was found close to the southern pit wall. The whole body of the dead could have been pushed to the pit wall to make place for other burials or it collapsed naturally to this direction pressing the leg bones more to the pit wall.

The right upper extremity of individual C was found on the bottom of the grave, mostly under the skeleton of the second male (ind. A). All bones of this extremity remained in anatomical order including all small hand bones, but the whole extremity was torn from the shoulder joint (**fig. 11A**). Moreover, the whole extremity was moved forward and was found in a large distance from the skeleton of individual C and its primary location (**fig. 11A**). The extremity was bent in the elbow at right angle with the hand turned to the individual A (**fig. 12**). The hand bones were found on the very bottom of the grave pit under the pelvis of individual A (**fig. 11A**). Taking into account the undisturbed anatomical order of all bones, it seems that the extremity was probably torn off the shoulder before the decomposition of the soft tissue and it was purposely pulled forward as a whole and deposited below male A, rather than just fell off the shoulder due to natural decomposition processes.

The left upper extremity was also found on the bottom of the pit. In this case, however, the bones were discovered under the pelvis and left tibia of individual C and were more or less disarticulated (**fig. 11A**). The forearm bones remained together, but they were separated from the humerus and hand bones, which were found next to them. The distal ends of the forearm bones stick to the proximal end of the humerus (**fig. 11A**), while the distal humerus end and the proximal parts of the forearm bones were separated and spaced c. 20 cm apart, so the elbow joint was completely disintegrated (**fig. 11A**). The bones of the hand were found in a cluster near the right ilium of individual C. It is possible that they were generally in their primary location (**fig. 11A**). The position of the long bones suggests that they were undoubtedly intentionally pushed backwards to the pit wall. It also seems that the left upper extremity was torn from the shoulder, because of human activity rather than due to natural decomposition.

Concluding all above, individual C was buried in the pit as the first of the three primary burials. The whole body could have been more or less pushed to the grave wall. Moreover, some of the bones or parts of the body of this male were purposely moved. It applies especially to the bones of the extremities, because their final position may not exclusively result from the natural post-depositional processes. The right upper extremity was torn out from the shoulder and intentionally put on the bottom of the pit, the left lower leg as well as the long bones of the left upper extremity were pushed backwards under the decaying body of male C, and finally the right lower leg was probably pulled up to the top of the grave. The male was most probably buried some time before individuals A and B and his body was decomposing when the next deceased were added to the pit. The condition of the body made possible that the extremities were torn out the joints, and the elbow and knee joints were easily disarticulated. At

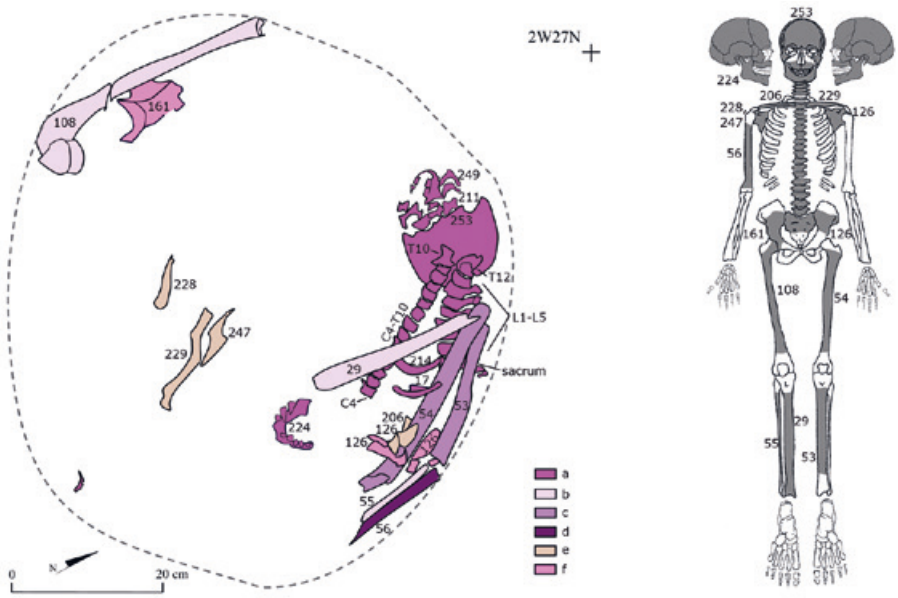

Fig. 14 Dudka, grave VI-2, individual D. The placement of the female bones within the grave pit and the completeness of the skeleton. – **a** skull, mandible, vertebrae; **b** right leg; **c** left leg; **d** right humerus; **e** clavicles and scapulae; **f** pelvis. – (Image K. Bugajska).

the same time, the bones of the whole extremities or of a part of them were kept still together by the soft tissue and could have been moved within the grave pit. It should also be emphasised that the chest was still in such good condition that it collapsed after the interment of the second male (ind. A) and the child (ind. B), not during the manipulation of the body.

The space in the pit was most probably empty when the next individuals were added to the grave, which made it possible to manipulate the body of male C to such an extent. The upper part of the grave pit had to be still empty after the interment of the next two individuals (A and B). It is suggested by the deep collapse of the skull and chest bones of individual C. The fall of the upper skeleton is greater in the case of male C than A, so it probably happened first.

Secondary Burial - Individual D

Almost all of the disarticulated human remains belong to the c. 40 year old female, individual D (**fig. 14; tab. 2**) and were deposited mostly between two sitting individuals – a male (ind. A) and the child (ind. B).

The female bones were arranged in a special way creating a kind of pile. The cranium was deposited on the bottom of the grave with the facial part turned down and to the pit wall. It was found just between the pelvises of both sitting male individuals (ind. A and C; **fig. 10**). The skull was covered by the femur of the sitting male C and partially by the female vertebrae (**figs 7A; 14**). It should also be noticed that the skull was placed directly below the skull of the sitting child and was separated from it only by the left femur of male C (**figs 4; 7A**). The different long bones lay at the top of the bone pile directly on the sets of the vertebrae. The long bones were placed next to each other without any anatomical relation. Three bones were placed closer to the child: right tibia, left femur and left tibia. The next two bones – right fibula and right humerus – were put closer to male A (**figs 4-5. 14**). Additionally, pieces of the left ilium, right clavicle and left scapula were put between the long bone shafts.

The vertebrae of the female individual (D) remained in two anatomical parts. Both sets lay parallel to each other (**figs 12. 14**). The first set, located closer to the pit wall, contained the lowest part of the spine: last thoracic vertebra (T12), lumbar vertebrae (L1–L5) and sacrum. The second set contained ten of thoracic vertebrae (T1–T10) and four cervical (C4–C7). One thoracic vertebra (T11) appeared in the pit filling. In turn, three first cervical vertebrae (C1–C3) were found at the skull (**fig. 14**, bones: #211, #249). Both sets of vertebrae were adjacent to each other on one end, while the other ends were spaced apart in a distance of several centimetres (**fig. 14**). It should be noted that the ends which were anatomically close lay next to each other, i. e. vertebra T10 from one set was placed next to vertebra T12 from the second (**figs 12. 14**). It should also be noted that the vertebrae sets were placed on the female skull, but without anatomical relation to it (**fig. 14**). Both sets of vertebrae gave the impression that someone had tried to deposit a whole column of vertebrae, but it »broke apart« in the middle, i. e. at the end of the thoracic part. Two sets are similar in length, so they could have been intentionally divided to make them easier to carry.

The female mandible was separated from the cranium and it was found at the pelvis of male A (**figs 7a; 14**). It was probably placed close to the dead man's abdomen, but fell down when the soft tissue was decomposed. At the left side of male A there were pieces of the left scapula and the whole left clavicle (**fig. 14**, bones #228/247, #229). In turn, two other female bones (ind. D) were also found next to the second male individual C (**fig. 4**). It was the right femur and right ilium (**fig. 14**, bones #108, #161), i. e. the bones which were anatomical close. Both bones were stacked behind the back of individual C and partially covered by the male right leg and the bones of the chest (**fig. 4**).

The female skeleton was not complete. Mostly the big bones which are more resilient and distinctive were present (**fig. 14**). All small bones of feet and hands are missing, as well as the ribs. Only a few pieces of ribs were found next to the female vertebrae, which may belong to this individual. Moreover, the assemblage of the long bones is not complete either. Almost all the long bones of the legs were present, but from the upper extremities only the right humerus was found. It should also be noted that both scapulae and clavicles were present, as well as pieces of both ilium bones, and were found in different parts of the grave pit (**fig. 14**). The preservation of the female long bones is not so good as that of the males and even the child skeletons. All the long bones are represented only by the shafts, whereas the epiphyses are broken and missing. However, not all of the missing long bones could decompose, and the assemblage of bones seems to be intentionally selected and considered.

Such a difference in completeness and preservation between the female skeleton and the primary burials indicates that this was a secondary deposit and the remains were brought to the grave as dry bones, probably from the temporary burial place. Such a character of the female burial is also suggested by the general disarticulation of the bones. The long bones were placed parallelly to each other without any anatomical relations. The female mandible was found in another location than the cranium, which also indicates that both bones were brought to the grave as dry separated bones. On the other hand, there were bones preserved in anatomical articulation. It was the cranium and the first cervical vertebrae, as well as the vertebrae which remained in two anatomical sets. The anatomical articulation between particular bones may generally occur in the secondary burials (Duday et al. 2009, 89). Their preservation depends on the possible presence of the soft tissue remnants, the anatomy of the bones, as well as on the way how the bones were collected from the place of the temporary burial and transported to the destination grave (Bugajska 2015; Bugajska/Gumiński 2016; Duday et al. 2009, 89–92; Nilsson Stutz 2003; 2005–2006). It should be added that the first cervical vertebrae, even if not directly articulated, were often recorded in secondary burials, but the articulation between the occipital bone and the first cervical vertebra is especially durable (Dudy et al. 2009, 89–92). The anatomical articulation of the female vertebrae may indicate that some of the soft tissue could have been still present when the remains were collected from the temporary burial site. On the other hand, the anatomy of the vertebrae makes it easier to keep them together even as dry bones. Such preserved anatomical sets of bones, including parts of vertebrae collum, were also present in the case of other secondary burials at Dudka, in graves VI-10 and VI-13 (Bugajska 2015; Bugajska/Gumiński 2016).

The location and way of deposition of the female bones in the grave pit is not accidental and the bones were specially arranged. The remains of the female were most probably added to the grave in the second funeral episode, i. e. with male A and the child (ind. B), because most of them were put between these two individuals or just at the hip of individual A. On the other hand, the presence of two female bones behind individual C is intriguing and potentially in contradiction to that. It may suggest that the secondary burial was placed in the grave with individual C, i. e. in the first funeral episode and the later bones could have been re-arranged in the grave. However, such a scenario seems to be less probable, because it is difficult to explain why the vertebrae could remain still in anatomical order after the possible »re-arrange« of the bone pile. Moreover, the bones which were found behind individual C were located in the upper part of the pit and it is possible that they have been purposely pushed between the pit wall by the male body when the grave was reopened.

Secondary Burials – Deposits of Single Bones

Except for the female skeleton (ind. D), a half of the mandible of the next young individual (E) was found in the grave. It was deposited at the waist of individual A, similarly as the mandible of the female (D) (**fig. 4; tab. 2**).

One single thoracic vertebra of a mature individual was also found in the grave. It could not belong to individual D, because the female vertebra column is complete and was placed in anatomical sets, so it is undoubtedly another individual – ind. H (**tab. 2**).

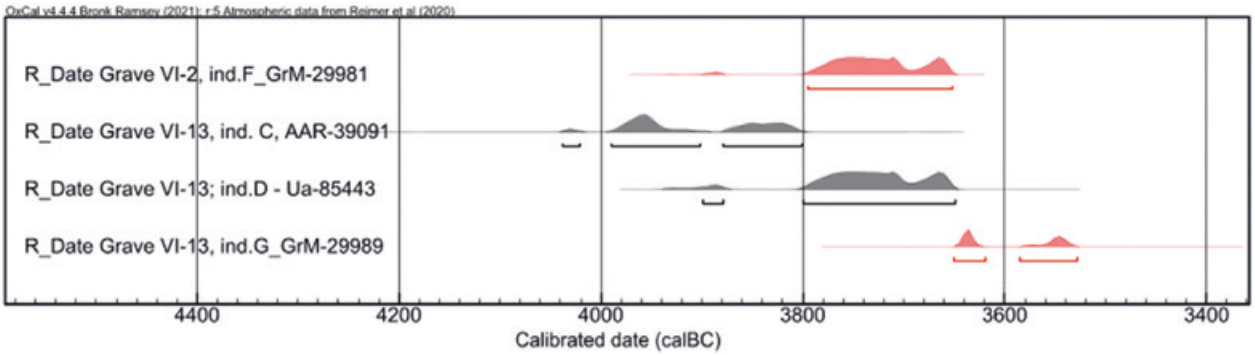

Fig. 15 Radiocarbon dates for graves VI-2 and VI-13. – (Image K. Bugajska).

The vertebra appeared in the lower part of the grave and directly at the left side of the pelvis of individual A. Such a location of the vertebra indicates that it was probably an intentional addition to the grave, rather than just a bone that had fallen into the grave accidentally.

Cremation - Spatial Relation to the Grave and Absolute Chronology

A concentration of burned human remains belonging to at least one juvenile individual was uncovered near the grave. It was located up to 10 cm from the top of the grave pit. The bones were burned to the white colour and were heavily fragmented, so the more precise anatomical identification was not possible. There were a total of 282 small bone fragments, mostly pieces of long bone shafts, weighing a total of 85 g (**tab. 2**; Bugajska 2023, tab. 3). The concentration was deposited directly at the cemetery ground, but very close to the top of grave VI-2, so it seems to be done on purpose. It is not sure if the cremation is precisely contemporary to the grave or if it was added later, when the location of the grave was still known.

Unfortunately, there was not enough good quality collagen in the bones from grave VI-2 to obtain a direct date for the burials. It was only possible to measure one of the burned bones from the concentration. It gave a result of 4968 ± 26 BP (3796–3652 cal BC; GrM-29982) which falls into the classic Zedmar period (**fig. 15**). It can be assumed that the burials placed in the grave pit are generally of the same age, or possibly slightly older than the cremation.

Conclusion

Grave VI-2 is the only grave in the cemetery of Dudka which contains three sitting burials, and the only unquestionable example of a grave being re-opened to add more dead individuals and disarticulated bones, but not to take out selected bones from the primary burials, as in the case of graves VI-6 and VI-13 (Bugajska 2021; Bugajska/Gumiński 2016).

Grave VI-13 is especially interesting to compare, because it contained two sitting individuals, not just one like in graves VI-6, VI-7, VI-11 and VI-14 (Gumiński/Bugajska 2016). There were two sitting burials of children in grave VI-13, which were placed close to each other and in probably arranged manner (**fig. 16**). The older child – ind. VI-13B – was leaning against the wall. The legs (probably both) were bent with the knees pointing out to the sides and the feet were placed at the opposite pit wall than the pelvis. Such a position of legs was purposely arranged to make space for the second younger child – individual A – which was placed between them. The position of the body of the smaller child was probably similar as the older one with bent both(?) legs and the face turned to the same direction (**fig. 16**). The arrangement of the burials in grave VI-13 is doubtless considered and to some extent similar as in grave VI-2. There were also a large number of bones of several other individuals, i. e. secondary burials, deposited next to the sitting children, on either sides of them and in a thoughtful way. To the left were mandibles and skulls from secondary burials, while to the right were probably mainly long bones from different individuals (Bugajska/Gumiński 2016; Bugajska 2021). Moreover, the concentration of burned remains was also located at the top of the grave, just behind the skull of the sitting individual (**fig. 16**).

Both sitting burials in grave VI-13 were disturbed in the Stone Age and the left parts of the skeletons were taken. The whole skull with the mandible was taken from the younger child (A), whereas in the case of the older child (B) the mandible was taken and the

grave	ind.	depth (cm)	material	burial / context	BP	cal BC (2σ)	C/N	d13C (‰)	d15N (‰)	lab. no.	archeological period
grave VI-2	VI-2F	35-40	cremated bone	concentration at the top of the grave	4968 ± 26	3796-3652	-	-	-	GrM-29982	classic Zedmar
grave VI-13	VI-13G	35-40	cremated bone	concentration at the top of the grave	4832 ± 24	3651-3620; 3586-3529	-	-	-	GrM-29989	classic Zedmar
grave VI-13	VI-13D	50-55	tooth	secondary burial	4969 ± 32	3899-3880 (3.3 %); 3800-3649 (92.2 %)	3.2	-15.9	12.3	Ua-85443	classic Zedmar
grave VI-13	VI-13C	40	tooth	secondary burial	5129 ± 35	4039-4021 (3.4 %); 3991-3903 (50.1 %); 3880-3801 (41.9 %)	3.2	-17.1	11.3	AAR-39091	early Zedmar
grave VI-17	VI-17A	30-35	bone	primary burial placed on back with pulled up legs	6645 ± 30	5628-5521 (91.2 %): 5496-5484 (4.2 %)	-	-	-	Poz-3913	Late Mesolithic
grave VI-17	VI-17A	30-35	bone	primary burial placed on back with pulled up legs	6622 ± 36	5628-5521 (91.2 %): 5496-5484 (4.2 %)	3.3	-20.4	11.6	AAR-39092	Late Mesolithic
grave VI-18	VI-18A	80-85	tooth	primary burial placed on back with pulled up legs on the chest	3682 ± 32	2194-2176 (3.5 %); 2145-1958 (92 %)	3.2	-18.7	9.8	Ua-84431	Late Neolithic

Tab. 3 Radiocarbon dates mentioned in the paper (Bugajska 2023; 2024b). – The calibration of the measurement was made based on: OxCal v.4.4.4 (Bronk Ramsey 2021), IntCal20 curve (Reimer et al. 2020).

skull was destroyed in the facial and base parts. It is not excluded that the skull of individual B was rotated with the base turn upside when the grave was re-opened. It could cause such a destruction, and then the preserved part of the skull (calotte) was placed back into the grave in a formally »proper« position (Bugajska 2021; Bugajska/Gumiński 2016). Concluding all above, grave VI-13 was disturbed to take the bones of the sitting individuals out, not to add more burials. Moreover, it seems that the »preparator« was only focused on the sitting individuals, not on the disarticulated bones, because in the destroyed part of the pit a lot of bones from the secondary burials were scattered and left, but almost no bones from the primary burials were found there (**fig. 16**). It should be noticed that there is a second difference between graves VI-2 and VI-13. Grave VI-2 was re-opened again when the pit was still empty and the body of the sitting male (C) was not decomposed, while in the case of grave VI-13, the pit was already filled with the sediment and the soft tissues were probably not preserved. The location of the grave could not be so precisely known, because the pit was very disturbed which suggests that there was a need of longer digging before the grave was found (Bugajska 2021; Bugajska/Gumiński 2016).

Graves VI-13 and VI-2 indicate a different ritual behaviour connected with the intentional re-opening of the grave, despite the fact of general similarity of these graves, and possibly similar age. The concentration of burned remains in grave VI-13 is dated to 4832 ± 24 BP (3651–3529 cal BC; GrM-29989) (**tab. 3**), so it is slightly younger than in grave VI-2 (**tab. 3**). It was not possible to make AMS measurement for the sitting burials, because of the low collagen content. Two reliable radiocarbon dates were made for the secondary burials and both are older than the cremation: the tooth of individual VI-13D gave a result of 4969 ± 32 BP (3899–3649 cal BC; Ua-85443), and the tooth of individual VI-13C a result of 5129 ± 35 BP (4039–3801; AAR-39091). In both cases the samples were taken from the remains which were found in the undisturbed part of the grave. The difference in dating results may to some extent be due to the reservoir effect or the quality of the dated collagen. However, it must be also taken into account that disarticulated bones of given individuals could have followed a different »burial path« before being finally deposited in the cemetery, i. e. they could have come from different older graves or temporary burials, or they could have been kept at the settlement for longer time (Bugajska 2024a). In turn, the cremation

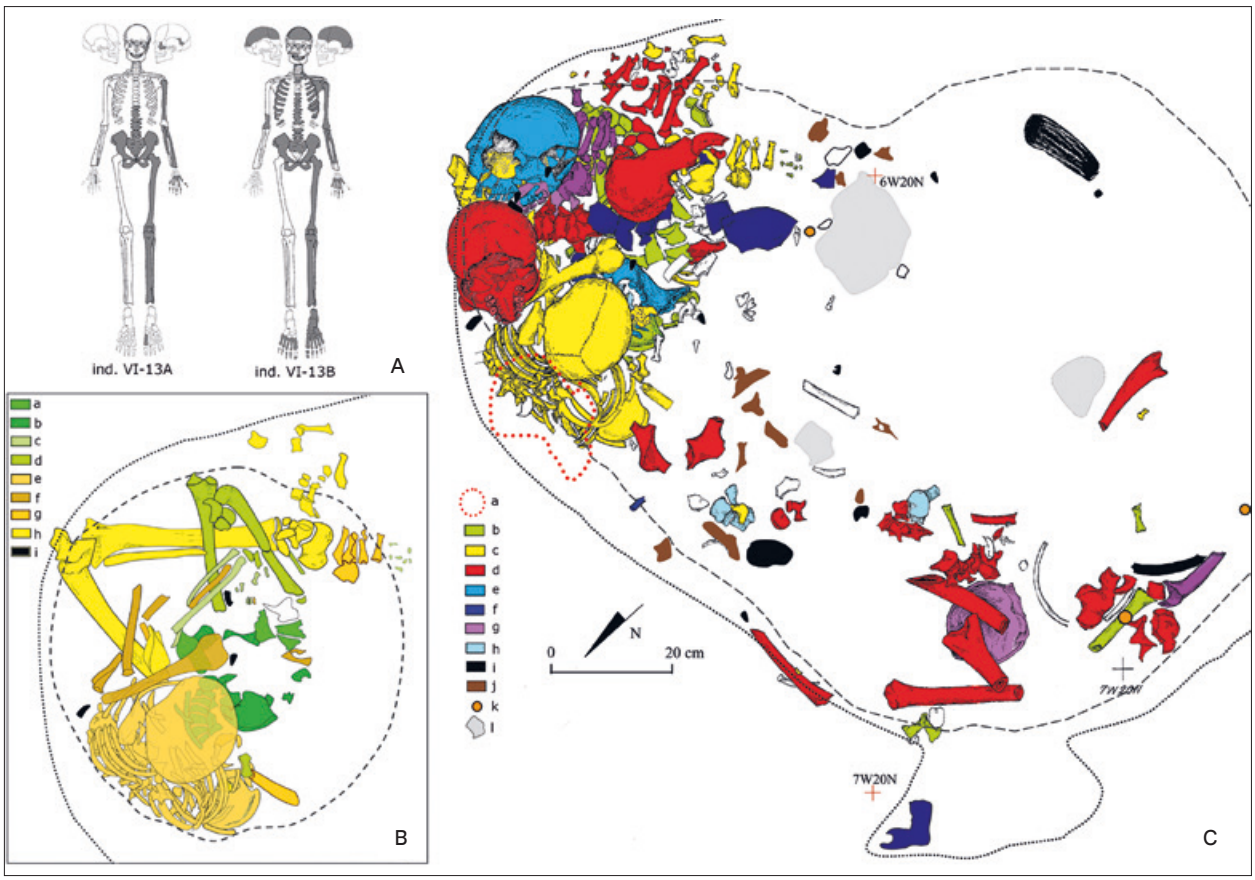

Fig. 16 Dudka, grave VI-13 with two disturbed sitting burials. – **A** sitting individual (VI-13A and VI-13B), bones marked with grey were present. – **B** position of sitting individuals (**a-d** ind. VI-13A: **a** skull; **b** pelvis and lumber vertebrae; **c-d** left extremities: upper and lower; **e-h** ind. VI-13B: **e** skull, bones of chest and pelvis; **f-g** right extremities: upper and lower; **h** right extremities; **i** grave goods). – **C** drawing of the grave (**a** concertation of cremated remains at the grave pit; **b-c** sitting individuals; **d-h** secondary burials [**b** grave VI-13 A; **c** ind. VI-13B; **d** ind. VI-C, male; **e** ind. VI-13-D, female; **f** ind. VI-13-E, skull and half of mandible; **g** ind. VI-F, male; **h** bones of adult individuals]; **i** flint, pottery pieces and bone artefacts; **j** bones of animals; **k** ochre lumps; **l** stone). – (Image K. Bugajska).

could have been added later to the grave, e. g. when the grave was disturbed (Bugajska 2021; 2023).

The taphonomic analyses of grave VI-2 proved that the deceased were buried in the pit in at least two episodes. It means that maximally two bodies were buried in a sitting position at once. In the first episode, one young adult male – individual C – was interred in the grave in a sitting-squatting position. At this stage it was probably a grave with a single primary burial. The next two primary burials of the second male (ind. A) and a child (ind. B) were added sometime later in the second funeral episode. The time span between the burials was probably not large. The body of male C was to some extent decomposed when it happened, but it generally remained in a sitting position. There was still an empty space around the body of individual C, and most probably the grave was just covered with something rather than filled in with sediment. Thanks to that, it was possible to re-open the grave easily and to move the body of individual C against the pit wall in order to make some space for the next burials. The decomposing state of the body of individual C caused that the position of the skeleton was disturbed and the joints of extremities were broken apart.

The grave pit contained the remains of three other individuals, which were more or less disarticulated. Most of the bones belong to one female skeleton (ind. D), while the next two individuals were represented by single bones – mandible (ind. E) or vertebrae (ind. G). The secondary burials were most probably added to grave VI-2 in the second episode, which is suggested by their location inside the grave pit at individual A or in a pile between individual A and the child (ind. B).

It should be emphasised that the disturbances on the body of male C were not only made to prepare space for the next burials. Some manipulations may also have more ritual character and were probably purposely arranged to express the connection between the deceased. A good example is the left femur of male C on which the body of the child (ind. B) was placed and the female skull (ind. D) was found below. The same may be true for the right upper extremity

of male C, which was separated from the body and put below the second male (ind. A).

The way in which the next bodies were put into the grave was also not accidental, but specially arranged. The body of male A was interred first, and his right leg was purposely placed in an atypical way to support the body of a child. In turn, the child was laid on the legs of both males, and its skull was placed directly above the skull of the female (ind. D). It should also be noticed that all three sitting individuals are put with their backs to the pit wall and with the faces turned to each other. The arrangement of the bodies most probably reflect the connections and keen relations between the deceased. The same seems to be true for the secondary burials. The bones were put next to the sitting individuals in a specially arranged way. Two mandibles of individuals D and E were placed at the waist of individual A, two bones from the female skeleton (ind. D) were put behind male C, and the rest of the remains of the female (ind. D) were deposited in a pile between the two sitting individuals (A and B). In result, all the disarticulated bones were placed in a special relation to the sitting individuals, and nothing seems to be accidental.

The special arrangement of the bodies of the sitting individuals and the disarticulated remains in the grave pit is a rule common to the most graves affiliated to the Zedmar culture, although the details of the arrangement may differ in each grave (Bugajska 2015; 2023; Bugajska/Gumiński 2016; Gumiński/Bugajska 2016). It can be supposed that in each case the way of deposition and the spatial relation between the remains of the different individuals may be connected with their kinship or social relation. Unfortunately, the poor preservation of collagen and DNA at the cemetery prevented a deeper analysis of the timing and kinship links between the burials. In consequence it is impossible to say if the disarticulated bones come from close relatives, and in such cases a larger number of bones could have been added to the grave, or from remote ancestors, so only a single bone was available.

Acknowledgements

This research was funded by the National Science Centre, Poland, grant no. 2020/39/B/HS3/02375.

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Zusammenfassung
Résumé

Einer nach dem anderen. Eine taphonomische Studie zu dem Mehrfachgrab VI-2 auf dem Gräberfeld von Dudka

Grab VI-2 ist das einzige Grab auf dem Gräberfeld von Dudka (Masurien, Nordost-Polen), das drei sitzende Bestattungen enthält, und es ist das komplizierteste aller Gräber an diesem Ort. Die taphonomischen Analysen dieses Grabes legen dar, dass die Verstorbenen in mindestens zwei Phasen in der Grube bestattet wurden. In der ersten Phase wurde ein junger erwachsener Mann - Individuum C - in sitzend-hockender Position in dem Grab beigesetzt. Die nächsten beiden Primärbestattungen eines zweiten Mannes (Ind. A) und eines Kindes (Ind. B) wurden später in der zweiten Bestattungsphase hinzugefügt, als die Leiche von Individuum C bereits verwest war. Die disartikulierten Knochen anderer Individuen wurden höchstwahrscheinlich in der zweiten Phase in Grab VI-2 beigesetzt, worauf ihre Lage innerhalb des Grabes hindeutet. Die Einäscherung befand sich am oberen Ende des Grabes, könnte also später, in einer möglichen dritten Bestattungsphase, hinzugefügt worden sein. Die Körperposition der sitzenden Individuen sowie der Ort, an dem die Knochen der Sekundärbestattungen platziert wurden, wurden zweifellos absichtlich gewählt. Sie könnten eine rituelle Bedeutung haben und sehr wahrscheinlich auf die verwandtschaftlichen und sozialen Beziehungen zwischen den Verstorbenen hinweisen.

Un par un. Étude taphonomique de la tombe multiple VI-2 au cimetière de Dudka

La tombe VI-2 est la seule tombe du cimetière de Dudka (Mazurie, nord-est de la Pologne) qui contient trois sépultures assises et est la plus compliquée de toutes les tombes du cimetière. Les analyses taphonomiques de la tombe VI-2 ont prouvé que les défunts ont été enterrés dans la fosse en au moins deux épisodes. Lors du premier épisode, un jeune homme adulte - l'individu C - a été inhumé dans la fosse en position assise-accroupie. Les deux sépultures primaires suivantes, le deuxième homme (ind. A) et un enfant (ind. B), ont été ajoutées un peu plus tard au cours du deuxième épisode funéraire, alors que le corps de l'individu C était en train de se décomposer. Les ossements désarticulés d'autres individus ont probablement été ajoutés à la tombe VI-2 au cours du deuxième épisode, comme le suggère leur emplacement à l'intérieur de la tombe. La crémation étant située au sommet de la tombe, elle a pu être ajoutée plus tard, lors d'un éventuel troisième épisode funéraire. La position du corps des individus assis ainsi que l'emplacement des ossements des sépultures secondaires ont sans doute été disposés intentionnellement. Elle pourrait avoir une importance rituelle et indiquer très probablement les liens de parenté et les relations sociales entre les défunts.

Schlüsselwörter
Mots-clés

Para-Neolithikum / steinzeitliche Jäger und Sammler / sitzende Bestattungen / Bestattungsriten / Taphonomie
Para-Néolithique / chasseurs-cueilleurs de l'âge de pierre / sépultures assises / rites funéraires / taphonomie