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ACCUMULATION OF HUMAN AND ANIMAL BONES IN AN ARCHAEOLOGICAL SITE OF THE MIDDLE BRONZE AGE

ABSTRACT: *In 1986, site No. 23, a shallow pit with an accumulation of human and animal bones, ceramic sherds, stones, and some bronze objects was excavated during archaeological research at the "Skalka" site at Velim (Czech Republic). Through osteological analysis it was determined that incomplete skeletal remains of at least 30 people (men, women and children) and 12 kinds of animals (domestic animals predominated: cows, dogs and pigs) had piled up in the pit. Various kinds of fractures (transversal, spiral, etc.) and traces of other manipulation (cutting, breaking, drilling, etc.) were found on both human and animal bones. On the edge of the pit the skeleton of an adult male laid in a crouched position. The find disposition at the archaeological site No. 23 are a vivid example of the contrasting burial methods of the Middle Bronze Age.*

KEY WORDS: *Middle Bronze Age – Tumulus Culture – Velim – Czech Republic – Accumulation of bones – Manipulation of bones – Male burial*

INTRODUCTION

Archaeological research at the "Skalka" site at Velim has been carried out by the Archaeological Institute of the Czech Academy of Science in Prague. Since 1984 a system of several ditches was gradually excavated at the site (Hřala, Vávra 1986). Their course was labelled with the letters A–H (*Figure 1*). In ditch E, which was interrupted at places, the sites with findings (Nos. 23, 30, 62 and 64) were gradually excavated (Hřala, Vávra, Sedláček 1991).

This study deals with the circumstances found and with the osteological analyses of the findings from site 23 (Hřala, Sedláček, Vávra 1992).

ARCHAEOLOGICAL SITUATION OF THE FIND DISPOSITION AT THE SITE No. 23

In ditch E a part of a large shallow pit, whose uneven bottom was formed by several irregular depressions, was excavated

at a depth of 90 cm from the terrain's surface. The largest accumulation of bones, ceramic and stone fragments was found roughly at the centre of the pit in the largest depression (400 cm × 460 cm, depth 140 cm). On the eastern edge of this site the human skeleton of an adult male (K 7) was found in a smaller oval pit (106 cm × 45 cm, depth 50 cm). The man was lying on his right side in a crouched position, oriented from S to N (*Figure 2*).

We can describe the site No. 23 as a pit of an irregular shallow bowl-like form (*Figure 3*). The findings of osteological material, ceramic fragments and sherds, gravel and stones were dispersed (*Figure 4*) at various depths including the bottom of the pit. Various types of fractures and marks of cutting, breaking, chopping, etc., were found on certain human and animal bones. In some exceptional cases, also separate, whole and undamaged bones were found. The human bones with the mentioned marks of human activity belonged to individuals of various ages and sexes – men, women and children. The animal bones found together with the human ones were whole or broken as

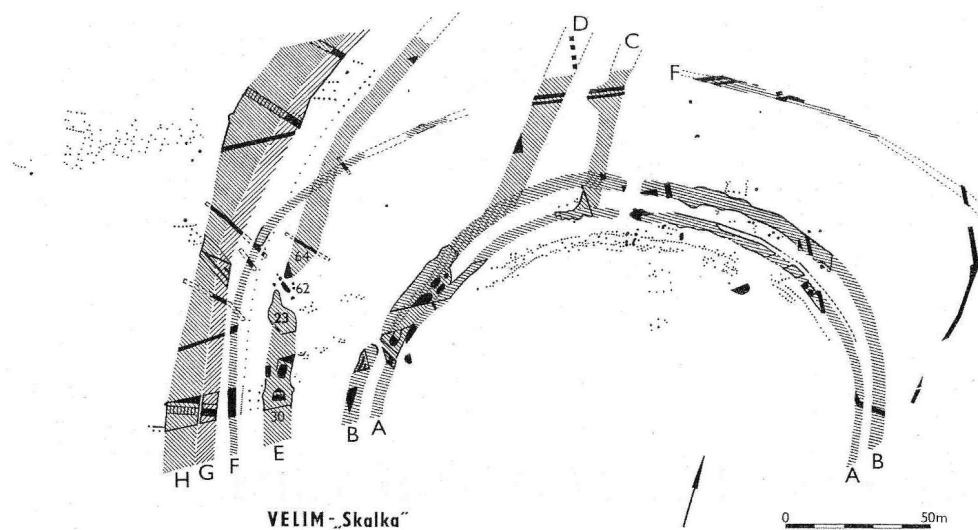


FIGURE 1. "Skalka" site near Velim (Czech Republic). Plan of 1984-1992 excavation. Course of ditches labelled with the letters A-H. Ditch E with sites 23, 30, 62 and 64 (by J. Hrala, M. Vávra and Z. Sedláček).

well, and they belonged to various kinds of animals, predominantly cows, horses, pigs, dogs, sheep and/or goats. According to the disposal and various types of manipulation determined on the bones of animals, these should be interpreted as food waste.

ANATOMICAL DETERMINATION OF THE HUMAN BONES AND ASSESSMENT OF THE NUMBER OF INDIVIDUALS

Over the entire site 710 human bones, their parts or fragments were found. Anatomical determination (Table 1) was divided into 6 groups.

1. Skull: cranial bones, fragments and teeth
2. Thorax and backbone

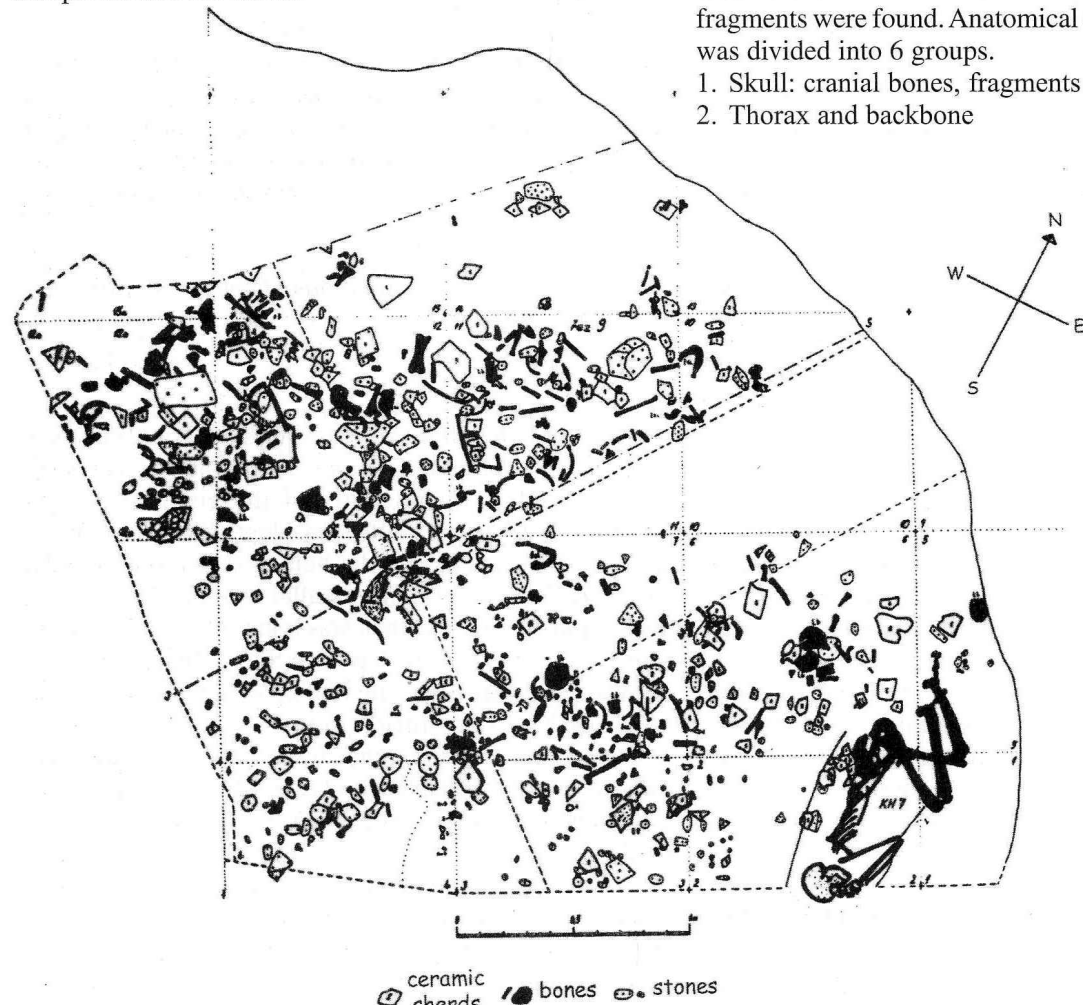


FIGURE 2. Part of the uncovered find disposition at site 23 with a male skeleton (by J. Hrala, M. Vávra and Z. Sedláček).

FIGURE 3. View of the excavated upper layer with findings at site 23 with the adult male skeleton (the arrow indicates the skeleton of an adult male lying on his left side in a crouched position).



FIGURE 4. Detailed view of the human and animal bones accumulation with ceramic sherds and stones, found at site 23.



3. Upper extremity with clavicle and scapula
4. Hand bones
5. Lower extremity with pelvic bones
6. Foot bones

Skull: cranial bones, fragments and teeth

Of the entire number of human bones found, bones of the skull and their parts made up the largest number (200 items), accounting for 28.17% of the findings from the six established groups. Out of this amount only the skeletal

findings, where it was possible to determine the sex, age and type of bone, were included in the assessment. Of the 17 frontal bones the remains of eight individuals were determined: two children, one younger individual and five adults. From the findings of 24 parts and fragments of the occipital scale, there were only two whole scales and they belonged to an adult and a child. The greatest number of findings were those of the parietal bones – 69 in total. 30 pieces were determined to be from the right side of the skull, 21 pieces from the left side of the skull, and the

TABLE 1. Anatomical determination of human bones from pit No. 23 expressed in percentage of representation.

Bones	Skull	Thorax	Upper ex.	Lower ex.	Altogether	%
Frontal	17				17	2.39
Occipital	24				24	3.38
Sphenoid	4				4	0.56
Parietal	69				69	9.72
Temporal	25				25	3.52
Zygomatic	12				12	1.69
Maxilla	9				9	1.27
Mandible	19				19	2.68
Teeth	21				21	2.96
Sternum		5			5	0.70
Ribs		57			57	8.03
Cervical vertebrae		33			33	4.65
Thoracic vertebrae		28			28	3.94
Lumbar vertebrae		21			21	2.96
Sacrum-coccyx		15			15	2.11
Clavicle			17		17	2.39
Scapula			12		12	1.69
Humerus			27		27	3.80
Radius			13		13	1.83
Ulna			14		14	1.97
Carpal bones			4		4	0.56
Metacarpal bones			28		28	3.94
Phalanges			23		23	3.24
Pelvic bones				19	19	2.68
Femur				41	41	5.77
Patella				10	10	1.41
Tibia				16	16	2.25
Fibula				18	18	2.54
Tarsal bones				50	50	7.04
Metatarsal bones				37	37	5.21
Phalanges				22	22	3.10
Total	200	159	138	213	710	100.00
%	28.17	22.39	19.44	30.00	100.00	

TABLE 2. Number of children and adults expressed in percentage of representation.

Sex category	inf1	inf2	juv	adu	mat	sen	Altogether	%
Children	85	60	5				150	21.13
Males				109	37		166	23.38
Females			10	84	18		112	15.77
Undetermined			12	267	22	1	282	39.72
Total	85	60	27	460	77	1	710	100.00
%	11.97	8.45	3.80	64.79	10.85	0.14	100.00	

remaining parts were rather fragmented (17 pieces). Of the 25 temporal bones, 18 had the petrous part connected, and in seven cases only the petrous part was preserved. Of the temporal bones preserved, 14 were from the right and 4 from the left side of the skull. Of the temporal bones where age could be determined, 3 belonged to individuals at the age *Infans I*, one to the age *Infans II*, one to a juvenile

individual, six to young adults and three to older individuals (*Maturus*).

Of the twelve zygomatic bones found, three belonged to children and nine belonged to adults. Of the nine upper jaw bones found, the remains were determined to be of two young children (*Infans I*), two older children (*Infans II*), two younger individuals (*Adultus*) and three older individuals.

Of the mandible there were six whole bones (these belonged to two children, one adult, and three older individuals) and eleven halves (seven from the left side: two young children – *Infans I*, four older children – *Infans II*, and only a single half of the mandible belonged to an adult; from the right side there were halves of the mandible of two children, one juvenile individual and two adults).

The following bones were further determined: four fragments of the sphenoidal bones, 15 permanent teeth and six deciduous teeth.

The findings with the greatest representation were those of the parietal bone (30 from the right and 21 from the left side, in 18 fragments it was not possible to determine whether they were left- or right-sided). It can be assumed from these findings that the minimum number of individuals whose remains were found in the pit was 30. Taking into account all aspects of the findings it is evident that there were remains of a considerably larger number of individuals, which may be assessed by the simple fact that 30 parietal bones belonged solely to adults or those close to adulthood, yet the deciduous teeth and individual fragments of different bones indicate also the presence of other very young individuals.

Thus, a serious estimate to the number of individuals is between thirty-six and fifty. Another striking fact is that the majority of cranial remains is from the skull vault and the mandible; while few findings are from the cranial base. Even if it is taken into consideration that some bone parts from the cranial base were joined to the temporal bone, frontal bone or the upper jaw, the lack of balance between findings from the cranial base and the vault of the skull is obvious.

Thorax and backbone

A total of 159 pieces and bone fragments from the thorax and backbone were found, i.e. 22.39% of the total number of the human bones discovered. Five fragments were from various breastbones, and the findings of 57 broken ribs were rather fragmented. Of all the vertebrae found, 33 were cervical, 28 thoracic, 21 lumbar; only ten were whole (five from adults and five from non-adults), the rest were incomplete.

Upper extremity with clavicle and scapula

83 pieces, i.e. almost 12% of the total number of bones, were found from the upper extremity. Of the eleven well-preserved clavicles, five were from the right side. They belonged to four adults and one child. Different fragments of twelve scapulae were also found. For determining the number of the twelve individuals, we used those in which at least a part of the *cavitas glenoidalis* was preserved. Of the 27 humeri found, there were five complete, undamaged bones: one belonged to a child and four to adult individuals. Of the forearm bones thirteen radii were found: of these, whole, undamaged bones belonged to one child and three adults. Only four bones of the fourteen determined to be of the ulnae were complete. These belonged to adult individuals.

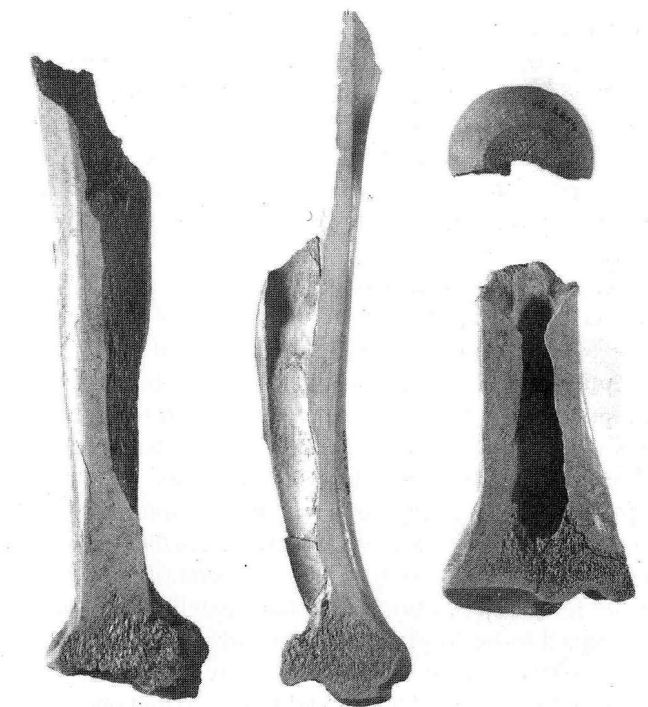


FIGURE 5. Cleanly ground and smoothed animal bones (domestic cattle).

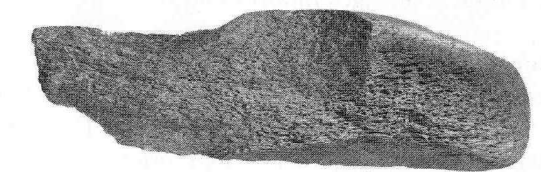


FIGURE 6. Modification of a European deer antler surface (fragment of a tool).

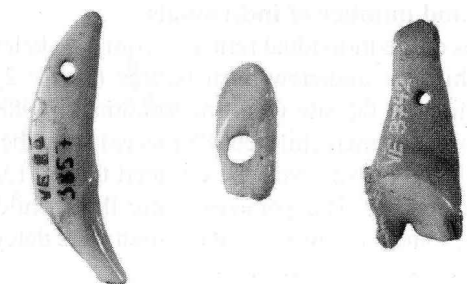
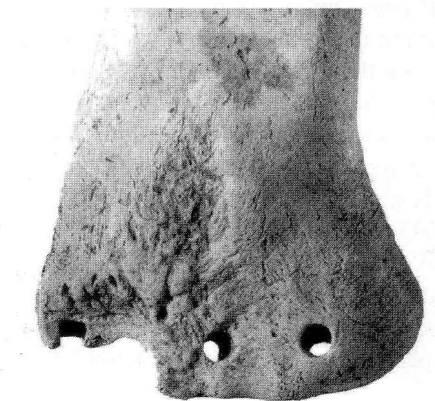


FIGURE 7. Drilled bones and animal teeth (the end of a "skate" and pendants).

Hand bones

55 pieces represented the bones of the hand, making up 7.75% of the total bones found. As with the ribs, we can only divide them into groups of adult and non-adult in terms of age. Four carpal bones belonged to adults; of the 28 metacarpal bones, only two were children's. Of the 23 phalanges three were children's bones.

Lower extremity with pelvic bones

104 pieces, making up 14.65% of the total number of bones, were found from the pelvis and bones of the lower extremity. Five entire halves of pelvic bones, belonging to two men, two women and one child were preserved. The other discovered parts of pelvic bones were damaged and belonged to children and adults of both sexes.

Of the 41 bones identified as femurs, only four children's bones and two adult bones were preserved in their entirety. The other 35 fragments were various parts of the femur. Of the ten well-preserved both sides patellae, five were determined to be from adults; none were from children. Of the sixteen tibiae found, three were complete. Two belonged to children (*Infans I* and *Infans II*) and one to an adult. The fibulae were predominantly preserved in various fragments. Of the 18 pieces found, two belonged to two small children at the ages *Infans I* and *II*.

Foot bones

109 pieces, making up 15.35% of the total number of bones found, were preserved from the foot region. There were 50 tarsal bone pieces. In order to appropriately determine the number of individuals, two very compact bones, the *talus* and *calcaneus*, were assessed independently. Of the twelve *calcanei* found, six were from the left side, with five belonging to adults and one to a small child. The six *calcanei* from the right side belonged solely to adults. Of the eighteen *tali* found, twelve were determined to be from the right side and belonging to ten adults and two children. There were six *tali* from the left side coming from five adults and one child.

Of the 37 metatarsal bones, only two were children's bones, and of the 22 pieces of digital phalanges only two were children's.

The above-mentioned summary shows that a random selection of bones of the entire skeleton is represented in the pit.

Sex, age and number of individuals

710 pieces of the individual remains from the skeletons of adults, children and new-born babies (Table 2) were withdrawn from the site (Martin, Knußmann 1988). The findings of very small children (85 pieces) from the age of 3 months to five years were determined to be 11.97% of the entire number. The youngest were three children of the ages 3, 4 and 5 months. Eight children were determined to be of the ages one to six years.

The age category *Infans II*, i.e. children from 7 to 15 years of age, was represented in 60 findings, making up

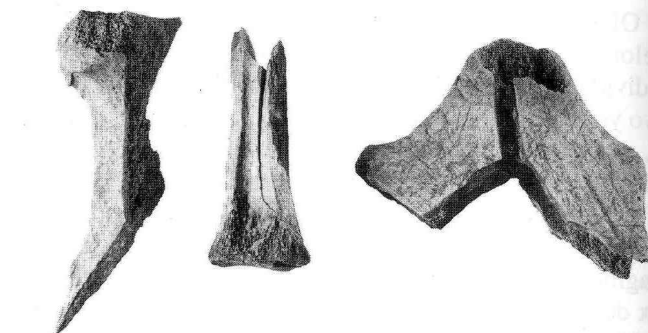


FIGURE 8. Waste material from treated animal bones (scapula, long bone and antlers).

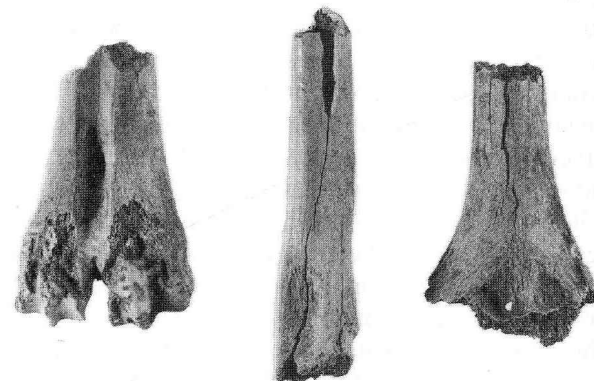


FIGURE 9. Tooth-marks on the bone epiphyses. Metatarsal of the domestic cattle, human ulna and human humerus.

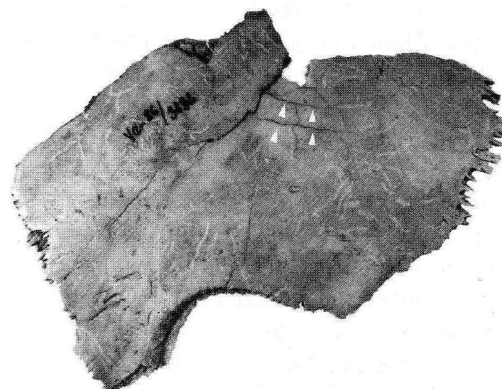


FIGURE 10. Left parietal bone of a small child. There are round and radiating marks after blows to the skull.

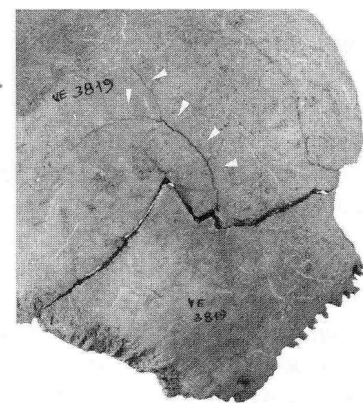


FIGURE 11. Left parietal bone of an adult. There are marks after blows to and breaks on the skull.

8.45% of the total. Two children of the ages 7–9-years-old and 10–13-years-old were determined. Five findings were categorized in the age group of 14–16 years.

The findings of skeletal remains from juvenile individuals were less represented. Out of 27 juvenile bones found, five were identified as belonging to younger individuals, ten women were not older than 18 years of age. In twelve individuals it was not possible to determine their sex, their age was less than 20 years.

The adult age between 20–30 had the greatest representation. The findings of 460 parts or bone fragments represent more than half of the bones, coming to 64.79% of all bones found. Of this amount 109 male bone remains and 84 pieces of female bones were determined. It was not possible to determine the sex of 267 bone findings.

Of the older age group of 30–50 years, 77 skeletal remains, i.e. 10.85% of the total, were determined. 37 male bone pieces accounted for the greatest representation while only 18 pieces were female. In twenty two individuals it was not possible to determine their sex.

Only one finding, which was undeterminable in terms of its sex, belonged to the over-sixty age category.

As it was mentioned above, a total of at least 30 people were identified at the site, though the real number was probably between 30–50 individuals.

Manipulation of the bones

710 human and 787 animal bone pieces totalling of 1,497, were withdrawn from site 23. Traces of damage by human interference, animals and the influence of the climate were determined on numerous bones.

The assessment of manipulation determined in individual findings was taken for the possibilities of comparing the kinds of human and animal bone damage.

Characteristics of the determined damage

A. Evidence of human activity

- Various damages, e.g., cutting, chopping and such kind of fracturing which proves the breaking of fresh bones, etc. are preserved on both human and animal bones.
- The conditioning of the bone surface or bone region. Various grinding (Figure 5) or smoothing down (Figure 6), which could also be combined with the drilling of bones or teeth (Figure 7), are found on animal bones. This was the treatment of bones or antlers in the production of various items – bone awls or other tools. The bones which served as raw material produced waste in the form of various scraps and bone fragments, remains of antlers, etc. (Figure 8).

B. Evidence of animal presence

Unambiguous evidence of this activity are the tooth-marks of dogs or rodents found predominantly on animal bones. These tooth-marks are on the epiphyses and on jagged bone edges (Figure 9). Sporadic cases of tooth-marks on human bones were also found.

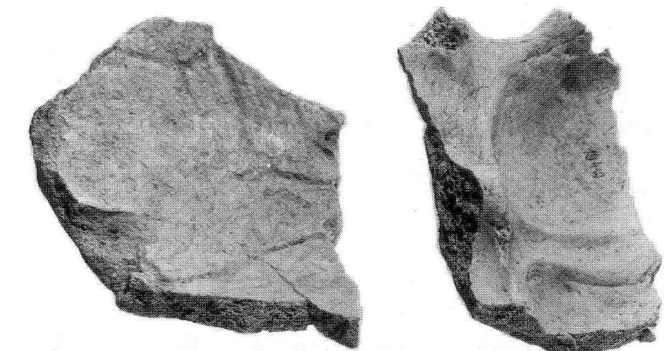


FIGURE 12. Broken and chopped parts of the parietal and occipital bones of an adult individual.

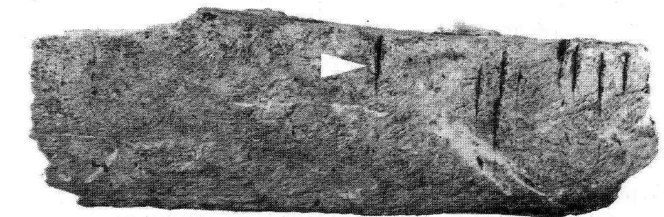


FIGURE 13. Cut-marks on the rib of a domestic animal.

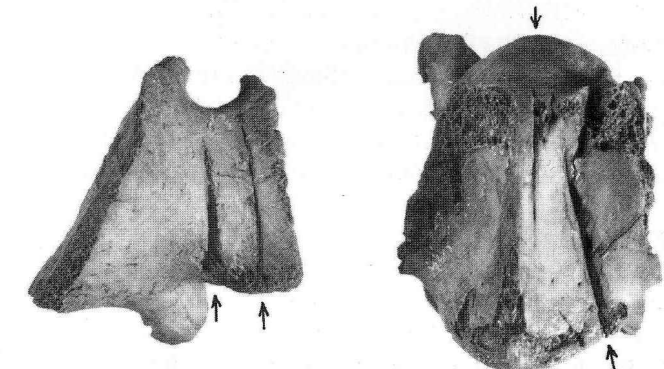


FIGURE 14. Animal vertebra and part of the sacrum with deep cut-marks.

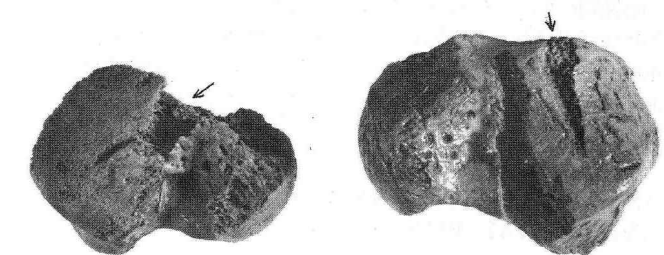


FIGURE 15. Children's talluses with chinks.

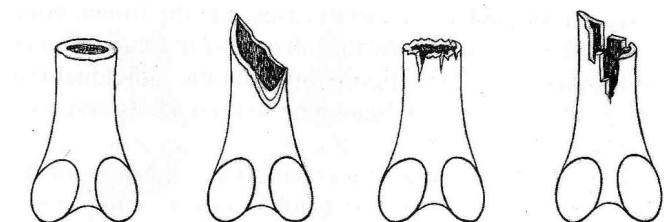


FIGURE 16. Types of fractures (according to Marshall 1989, drawing by L. Píčová): Clean transversal fracture, Spiral fracture, Irregular fracture, Step fracture.

C. Climatic influence

It is necessary to take into consideration the impact of these influences even when they are not easily distinguishable. For example, cracked bone surfaces are caused by drying up during exposure to climatic changes. This proves that these bones laid for some time on the surface.

Kinds of damage caused by humans

Pounded bones

There are traces of pounding and smashing the bones, caused by some hard items. On the long bones these are often near the epiphyses. The bone surface is often broken or cracked inwardly on the spot of the blow. Also on the skulls there are some traces of blows, in the form of radiating or circular cracks (Figures 10, 11).

Chopped or broken bones

Chopping is mostly found on flat bone edges, mainly on cranial bones. Chopping occurs in all kinds of bones, the flat bone surface bears straight traces of chopping (Figure 12).

Bones with cuts and chinks

The traces of cuts are feint, shallow, or there are even deeper grooves on the bone surface caused by sharp objects (Figures 13, 14). The chinks are deep grooves, often found in the vicinity of the joint surface (Figure 15).

Fractures

Various kinds of fractures occur, which can be divided into several groups (Figure 16, according to Marshall 1989). Clean, transversal fractures have a straight, smooth surface of the broken bone. Spiral fractures are those with the fracture wound up longitudinally. Irregular, transversal fractures – the area of the break is not straight and has an irregular surface, it is often a splintered break. In the step-fracture the bone is broken in the form of a step. It is often necessary to consider the division into groups as just approximate.

ASSESSMENT OF DAMAGE TO HUMAN AND ANIMAL BONES

Human bones

Traces of pounding on the surface of cranial and long bones were determined in a series of cases, e.g. the frontal bone with traces of blows above the left orbit (Figure 17). Traces of breaking were found quite often on the individual flat bones of the braincase, belonging to both adults and non-adults.

On the surface of several cranial bones it is possible to see the circular impressions and fractures resulting from a blow. In the case of juvenile individuals this mostly resulted in the crushing of cranial bones (Figure 10). The parts of the broken skulls of three small children were found



FIGURE 17. Frontal bone of a juvenile individual. Marks of pounding above the left orbit.

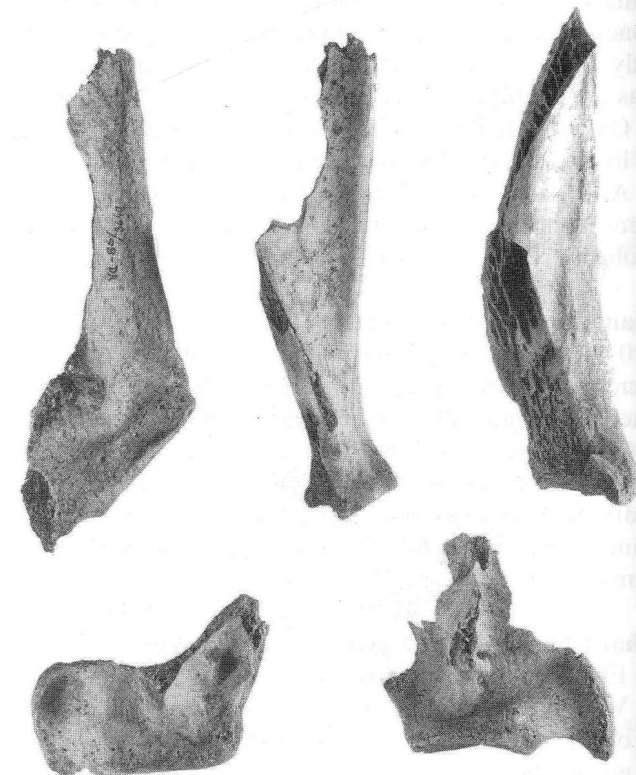


FIGURE 18. Chopped and broken human and animal scapulae.



FIGURE 19. Damaged dental crowns.

together at one place. The adult cranial bones were broken, but clearly they were not splintered to such a degree as those of the children's skulls (Figure 11). In some cases the parts of one bone were found in various places of the site, distant from each other.

Not only cranial bones were purposefully chopped and broken, but also the scapula (Figure 18). The very thick occipital bones of robust individuals, mainly men, are broken in the same way as the temporal bones of gracile individuals or the thin parts of the scapula. Zygomatic arches are missing from the temporal bones, while various individual bone parts of the ridges and protuberances are missing from the scapula. Also teeth are often damaged (Figure 19).

As was already mentioned the mandibular bone is sometimes split into two pieces by a spiral fracture (Figure 20). If the mandible is violently forced off the skull, the parts of the *processus condylaris* or the parts of *processus coronoideus* of the ascending branch are often broken off.

Interesting is the finding of the thoracic vertebra whose triangular opening was broken by a violent blow (Figure 21a, b). It was discovered together with cranial bones (frontal bone, mandible) and other parts of the skeleton (pelvis, femur and others).

It is characteristic of the arm bones to be broken at distal parts near the joints (Figure 22) – it indicates a specific method of bone breaking in order to obtain bone marrow.

710 human bones, their parts or fragments were found at site 23. From this amount 430 traces of manipulation were determined on human bones, and 280 bone pieces were without any such traces (Table 3).

Animal bones (Table 4)

The greatest amount of manipulation was found on the bones of domestic cattle (*Bos taurus*). Human manipulation most commonly occurred on cattle mandible, scapula, tibia, pelvis, metacarpal bones and metatarsal bones. In total there were 178 such traces on the inspected bones, while 113 bones and bone fragments remained without such signs.

Traces of human manipulation of the bones of domestic pigs (*Sus domestica*), though less frequent than those of the domestic cattle, were determined – there were 54 cases of manipulation while 105 bones showed no such signs. The most frequent traces of human manipulation of the pig, similar to the case of cattle, occurred on the mandible, the humerus, the ulna, the femur, and the metatarsals.

In total 24 cases of human manipulation were determined on the bones of the horse (*Equus caballus*). Similarly to the previous species, chopping and breaking, and often fracturing as well, occurred most often. There was an obvious prevalence of human manipulation on the horse scapula.

For the domestic sheep (*Ovis aries*) the frequency of human manipulation was similar as in the horse. The most common type of manipulation in sheep was the fracture, mainly occurring on the metacarpal and metatarsal bones, the pelvis, the radii and the mandible.

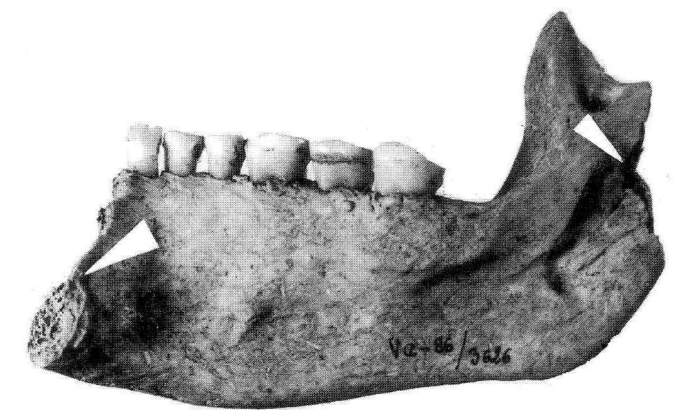


FIGURE 20. Broken human mandible with missing *processus condylaris*. A spiral fracture is clear on one of the jaws.

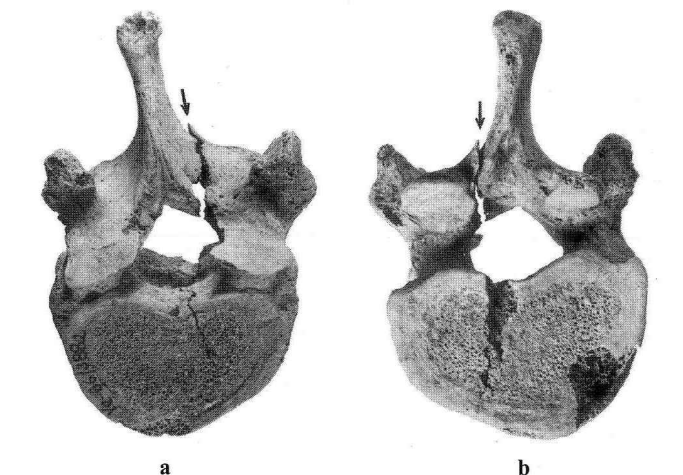


FIGURE 21. a: Cranial view of human thoracic vertebra with marks of violence; b: Caudal view of the same vertebra.

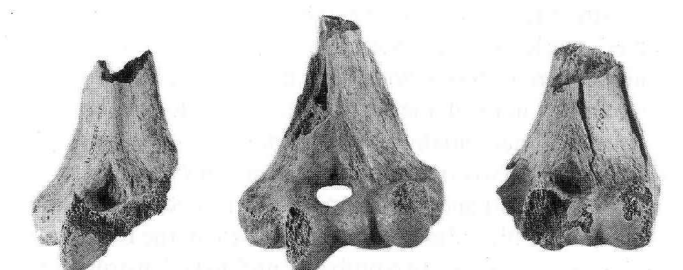


FIGURE 22. Examples of characteristic breaks of distal parts of the human humerus.

TABLE 3. Traces of manipulation on human bones from pit No. 23.

Traces on bones	Skull	Thorax	Upper ex.	Lower ex.	Total
Clean fracture	9		2	2	13
Irregular fracture	3		15	20	38
Spiral fracture	12		6	5	23
Step fracture	1		13	26	40
Pathological changes		11	2	4	17
Tooth-marks			2		2
Breaks	98	69	24	23	214
Chopping	34	2			36
Cutting	5	2		4	11
Pounding	2	7	2	8	19
Other	10	2	3	2	17
Total	174	93	69	94	430
No manipulation traces	26	66	69	119	280
Total number of bones	200	159	138	213	710

TABLE 4. Traces of manipulation on animal bones from pit No. 23.

Traces on bones	Bos taurus				Sus domestica				Equus caballus				Ovis-Capra				Canis familiaris				Cervus elaphus	
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D		
Clean fracture			4	1			1	2					1			2			2	2		
Irregular fracture	4		6	9			5	5				2	1		2	2			3	2		
Spiral fracture	2		6	8	2		2	1				3	1		1	2	1		1	30		
Pathological changes																						
Tooth-marks	1	1	4	10	3		3	6				1	1			1	3		1			
Breaks	4	5	10	12	9		5	3	2	1			1		2	2			1	2		
Chopping	12		18	15				4				3	7	1		1				2		
Cutting	8	5	4	17		3					2	1							2	1		
Pounding	2		5	2							1					1			2	1		
Other		1	1	1													2					

	Bos taurus	Sus domestica	Equus caballus	Ovis-Capra	Canis familiaris	Cervus elaphus	Total
No manipulation	113	105	52	47	149	12	478
Manipulation	178	54	24	27	23	3	309
Total number of bones	291	159	76	74	172	15	787

A – Skull, B –Thorax, C – Upper extremity, D – Lower extremity.

The lowest amount of human manipulation, compared to the number of intact bones, appeared on the bones of domestic dogs (*Canis familiaris*). There were 149 intact bones, while only 23 bones showed traces of human manipulation. Vertebrae and ribs or their fragments prevailed considerably in the domestic dog remains found at site 23.

Traces of manipulation were found also on the bones of wild animals. Two fractures, two traces of chopping, one longitudinal split and animal tooth-marks occurred on the bones of wild pigs (*Sus scrofa*). In the case of the European deer (*Cervus elaphus*) two probably unfinished instruments made of antlers are of special interest (Figures 6, 8).

Traces of human manipulation were found in 60% of

the determined bone findings of domestic cattle, in 30.5% of the findings of domestic pigs, in 43% of the findings of horses, in 45% of the findings of sheep (goats) and in only 13% of the findings of dogs. In the osteological findings of all assessed species the common damage of bones was caused by fracture, and also by the breaking and chopping of bones.

CONCLUSION

Tooth-marks are a clear, conclusive result of animal activity. Cutting and chopping, on the other hand, are evidence of

human activity. As for such traces of human manipulation found on animals bones, they are, without a doubt, considered to be food remains.

In order to declare with certainty that the human bones at site 23 are food remains as well, we consider it to be appropriate to study other findings of human bones discovered at the other sites at Velim.

For the relevance of answering the question of prehistoric rituals or possible cannibalism, we intend to tackle this issue after the study of all discovered material including the find disposition and after a wider comparative study.

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