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# To accompany and honour the deceased: the horses from the graves of the Pazyryk culture

Sébastien Lepetz,<sup>1</sup> Karyne Debue,<sup>2</sup> Dunburee Batsukh<sup>3</sup>

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## Abstract

Sacrificing horses and placing them in graves are standard elements of Scythian funerary practices and recent archaeological projects in Mongolia provide additional evidence of this. These sites complement earlier investigations carried out at the site of Berel' in Kazakhstan. The descriptions of the age, gender, colour and form of sacrifice of these horses allow a better understanding of the criteria of choice, enable a better understanding of why they were selected and underline the primordial place these horses enjoyed during the funerary ceremonies.

**Keywords:** Sacrifice; horses; graves; Pazyryk culture; zooarchaeology

## Introduction

We need to restore to the horses found in the tombs the place and importance they enjoyed during the funeral ceremonies. Notwithstanding their importance when alive, whether as mounts or protagonists of ritual processions – a matter which is difficult to determine precisely – the magnificence and richness of their decoration and harness, as well as the structural and architectural arrangements that their installation in the tombs required, raise questions over the attitude paid to them by Scythian horsemen. The horse was an essential biological component of Iron Age societies and their tombs. It was a food source and indigenous to the steppe and mountain landscape of central and middle Asia. It was also a medium for many artifacts whose study help us understand human groups and their inter-relationships. Horses were also cultural features, and participants in these societies as they were highly regarded and individualised through modifications to their ears and manes, and the addition of spectacular horsegear, probably during their lifetime but also at the moment of their death. Their role and the reason for their presence alongside human burials is difficult to determine: they may have been regarded as sacred animals, psychopomps or spiritual guides accompanying the deceased into the presumed afterlife, or transporters of prayers intended for divinities related to the world of the dead and/or to whom it was necessary to pay respect.

Their placement in the tomb and the nature and attribution of the elements of ornament, in view of all the rites celebrated at the time of the funeral, must have been part of an extremely elaborate and precise scenario, most of which unfortunately cannot be reconstructed as it has not left any material remains. Despite being unable to define, reach or even approach the meaning of their sacrifice, their remains nevertheless inform us about its form and several stages of its unfolding.

Excavations at numerous sites in the Altai and across the steppes of Kazakhstan and Russia have provided a rich literature on the horses and other remains found in these tombs.<sup>4</sup> Recent work conducted in Mongolia by the team led by Ts. Turbat from 2005 to 2012 uncovered many tombs of the Pazyryk culture.<sup>5</sup> For some, as at Berel', these allowed the recording *in situ* of certain data concerning the position of the horses. These data, combined with those recently acquired from genetic analyses of horses from Berel',<sup>6</sup> provide a new opportunity to offer a synthesis and propose some answers to old questions concerning the selection criteria of these animals and their treatment at the moment of their killing. However, it must be admitted that this is research in progress: the description of the elements of harness, arrangement of objects, information concerning the deceased, their age,

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<sup>4</sup> E.g., Derevyanko and Molodin 2000; Francfort and Lepetz 2010; Lepetz 2013; Kozintsev and Samashev 2014.

<sup>5</sup> The excavations were directed by Ts. Turbat (Institute of History and Archaeology, Academy of Sciences) with the collaboration of N. Bayaraa and D. Batsukh within the framework of a programme conducted with P.-H. Giscard. Archaeozoological studies were carried out by S. Lepetz, either in the field or in Ulaanbaatar (with the assistance of K. Debue), on the basis of remains partly or entirely collected by the archaeologists or by the author.

<sup>6</sup> Librado *et al.* 2017.

gender, practices of preservation of the bodies and the modes of decomposition have not yet been published in detail for the Mongolian sites as these analyses are not yet complete and, as far as the Berel' valley is concerned, reference is made to the publications concerning this site, specifically for tomb 11<sup>7</sup> and for the other excavated burial mounds.<sup>8</sup>

### What to describe and how to describe?

Analysing faunal remains involves the use of a series of methods, some of which are standard archaeological practice, yet others are restricted to archaeozoological or veterinary disciplines or are specific to individual researchers. Thus, the method of determining the position of individuals in a grave is similar to those deployed by anthropologists who seek to define the initial position of corpses, understand the movement of bones and the history of the body either before its deposition or once it has been transformed into a skeleton. In the same way that it is no longer sufficient just to have a physical description of the humans buried, attention should be paid to the acts which led to the horse being deposited in the pit and to the consequences of the combined effects of the degradation of the body and other organic matter. The excavation and *in situ* observation of animal remains by an archaeozoologist is therefore essential.

The description then recognises the gender and age of the horses. Equid bones have the distinction of having a number of sexual characteristics which are very easy to spot on complete skeletons: females have a very flat pubis whereas males have a very rounded equivalent. The mandibles and maxillae of female horses only very rarely have canines (they are in this case of reduced size), whereas stallions always carry some. Describing buried animals also involves estimating their age. This combined approach can highlight an important aspect of their selection and help better understand the condition, rank and role of horses prior to their sacrifice.

The age of the animals is determined using various easy-to-use and precise methods. One is to evaluate the level of skeletal epiphysation and this allowed Kozintsev to evaluate the age of the Berel' equids through observation of the bones.<sup>9</sup> The other method is to observe the state of tooth eruption and degree of tooth wear: this method is similar to that traditionally used by breeders and horse-traders and provides fairly accurate and relatively reliable results. The horse has two pairs of six incisors on its mandible and maxilla. The eruption and replacement of milk teeth by permanent teeth takes place according to a relatively

fixed chronology. Once the adult teeth are present, the wear evolution of these incisors may allow further estimates of age. This is assessed on the basis of criteria such as the contact between the opposing teeth (lower and upper), the extent of wear and the shape that these teeth take with age.

However, it should be noted that the evaluation of the age of a horse has several pitfalls: the first source of variation is related to the reference data-sets used by individual researchers as these may differ. As far as Berel' tomb 11 and the Mongolian burials are concerned, the wear tables were based on tables established for horse-traders and previously published by Cornevin and Lesbre.<sup>10</sup> It should also be noted that the nature of the feed, which may be more or less abrasive, will affect the speed of tooth wear, hence the use of a reference framework established for European horses may not be appropriate for the study of animals with very different living and feeding conditions. Nevertheless, although the speed of wear will vary, the order of successive stages will be similar and therefore a cross-observational approach makes it possible to establish a relative age of the animals, insofar as the diet of Altai horses (whether from Mongolia or Kazakhstan) was more or less similar, if not identical. It is also the case that beyond 10–12 years of age the evaluation becomes more uncertain and the margin of uncertainty increases with the age of the horse. Furthermore, the individual variability of wear should not be under-estimated and pathological anomalies are not rare, factors which may lead to further errors. In short, the values obtained cannot account for all these variables and the ages determined must be considered in relative rather than absolute terms.

### Sites recently excavated in the Mongolian Altai

The Pazyryk culture graves excavated in this region by the team directed by Ts. Turbat and P.-H. Giscard have not yet been the subject of final publication but a great deal of information is already available.<sup>11</sup> The excavated cemeteries of Baga Tünger 1–3 and 6 (BTG), Tsengel Khairkhan 1 (TSK), Syrgal 1–3 and Khatuu 1–3 are located in the extreme western part of Bayan-Ölgii Aimag (Figure 1) and have yielded 20 graves, from which as many as 36 horses have been studied (Figures 2–3). It is not the place here to describe all the deposits but instead to highlight the archaeozoological characteristics of some of them in order to identify some recurrent features, thus Figure 4 provides previously unpublished information concerning the position of individuals, gender and age, while Figure 15 indicates their affected pathologies.

<sup>7</sup> Francfort, Ligabue and Samashev 1998; Samashev *et al.* 2000a.

<sup>8</sup> Kozintsev and Samashev 2014.

<sup>9</sup> Kozintsev and Samashev 2014.

<sup>10</sup> Cornevin and Lesbre 1894.

<sup>11</sup> Turbat *et al.* 2009; Jordana *et al.* 2009; Batsukh 2015; Turbat and Batsukh 2015; Bendrey *et al.* 2017.

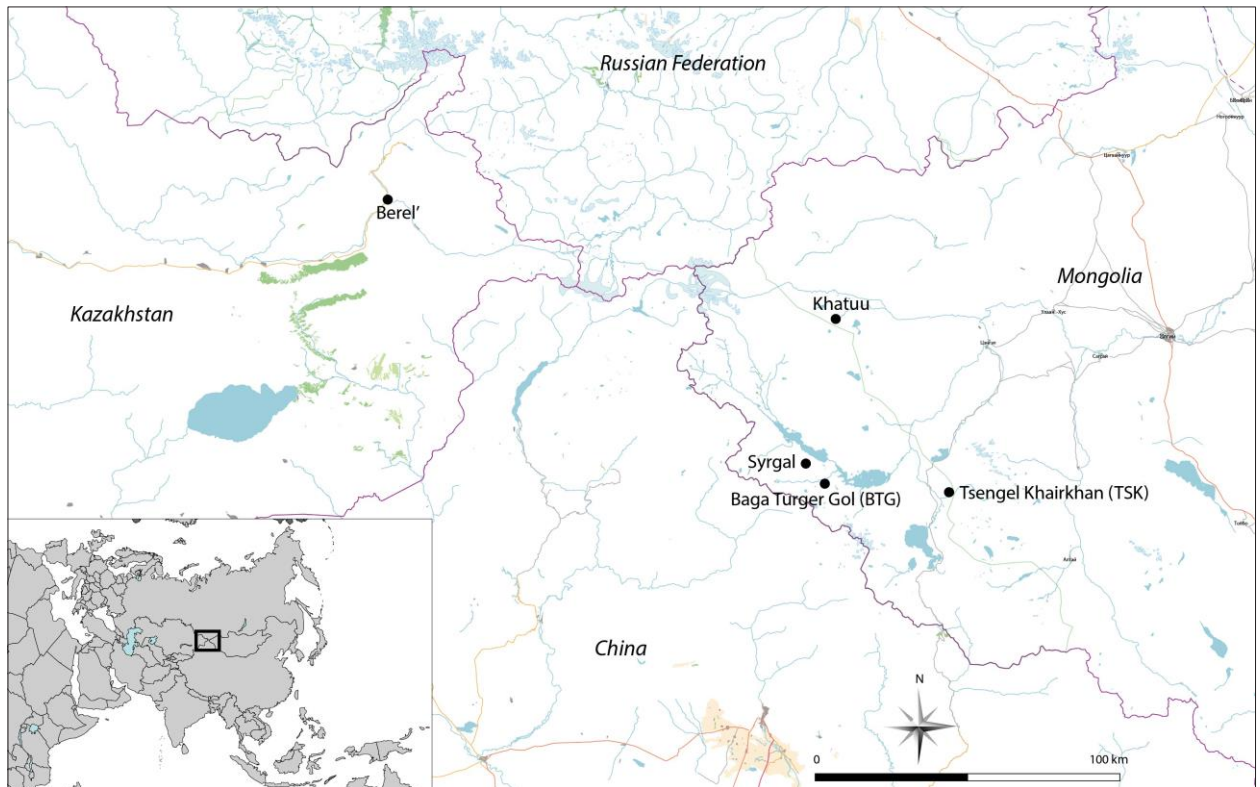


Figure 1. Geographical location of sites

#### ***Baga Turger Gol 6: tomb 10***

This grave contained a horse in the northwest part of the pit. The heads of both the dead person and the horse face northeast. The animal was placed at the edge of the pit in a relatively confined space. The forelegs, and especially the hind right limbs, slide along the north face. It is a very old adult male, about 1.30 m tall, who was hit by probably two blows from an axe on the left parieto-frontal zone (Figure 5). The diameter of the perforations is approximately 2 cm, but these successive blows created a single large cavity.

#### ***Baga Turger Gol 6: Grave 11***

This grave contained two horses. Horse A was a male aged about 18 years and about 1.37 m high. It was placed north of the tomb on its right side, with its head orientated in the same direction as the human bodies, i.e. towards the east. Its forelegs were folded under its thorax. Two blows are visible on the right temporal: one is elongated but from an impact caused by a 16 mm diameter rounded object which caused the bone to burst. The other cavity probably has the same origin, but in this case the head profile of the axe is not visible. Many pathological diseases can be observed. On the vertebral train, ankylosing spondylosis affects the vertebral bodies of the thoracic TH12 to TH15, there is a sacralisation of the lumbar vertebrae L5 and L6, and the TH16 to TH18 joint apophyses show strong bone proliferations connecting them to each other.

Lesions are also observed on the distal end of the right metacarpus (arthropathy?) and on a humerus. The animal must have had a serious limp if one considers that it also had a particularly bad left knee: a femoropatellar osteoar disease with a very advanced wear of the cartilage led to the formation of osteophytes. Wear was also observed on the femoral trochlea and the articular surface of the patella.

Horse B was placed on its right side and on top of horse A. Its hind legs were strongly folded with its head resting on its right cheek. This horse was a male aged about 17 years and 1.29 m high at the withers. A large break in the left temporal bone and a blow from a 33 mm cutting edge on the forehead illustrate how it was slaughtered. The most posterior impact hit a fragile part, creating a cavity which does not allow the precise nature of the weapon to be determined but the other stigmata is elongated and comes from the edge of an axe; the extraction of the axe head, once the blow was made, caused a distinctive deformation of the bone walls of the wound. The orientation of the impact indicates that the person responsible was standing at the front of the horse, on the right side of the animal's head (if that individual was right-handed) and the weapon struck the forehead of the horse more or less perpendicularly.

#### ***Baga Turger Gol 6: tomb 12***

The horse was positioned north of the human corpse and the two heads were on the same side of the grave,



Figure 2. Position of human bodies and horses in the main tombs of the Mongolian Altai



Figure 3. Position of human bodies and horses in the main tombs of the Mongolian Altai

looking east. Placed on its belly, the animal had its front limbs folded beneath it and the hind limbs in an open position on each side of the pelvis. Its head rested slightly on its right side. It was a very old male, possibly aged over 20 years, and its size is estimated at 1.37 m. Three perforations, one on the right temporal (14 mm across), the other two on the left temporal (13 mm and 17 mm across) illustrate the means of sacrifice (Figure 6). It should be noted that one of these is located far behind the skull, at the limit of the occipital protuberance, and the tip entered the compact bone by 36 mm which implies considerable force.

**Baga Turger Gol 6: tomb 13**

The horse from here was located north of the tomb and faced the human remains. It lay on its left flank

while the man lay on his right side with his head to the east. The front limbs of the horse were folded against its abdomen and the hind limbs against its thorax; the animal was pressed against the walls of the burial chamber. It was a young male aged about 1 year. A 15 mm diameter perforation at the top of the head at the temporal crest is clearly visible; a second impact was probably made in the same area, just next to and after the first, but fragmentation precludes precise description.

**Tsengel Khairkhan 1: Grave 1**

The horse was positioned north of the grave with its head facing east. This horse was a male aged about 5 years and 1.35 m in size. It was placed on its belly, face down with its fore and rear limbs folded on each side of

		horse's location in the grave	head's position of the human bodies	head's position of the horse	horse position in the grave	Age of horse (y. o.)	sex	size of horses	number of impacts	shape of impacts	size of impact
Baga TÜRger 1	tomb 1	in the north	to the west	to the west		1- 2 y. o.		n. d.			
Baga TÜRger 1	tomb 2	in the north	to the west	to the west	on the belly	1 y. o.		n. d.			
Baga TÜRger 1	tomb 8- Horse 1	in the north				3,5 y. o.		n. d.			
Baga TÜRger 2	tomb 8-Horse 2	in the north	to the west	to the west	various positions	4,5 y. o.		n. d.			
Baga TÜRger 3	tomb 8-Horse 3	in the north				5-6 y. o.		n. d.			
Baga TÜRger 6	tomb 3	in the north	to the east	to the east	on the left flank	+20 y. o.	male	n. d.	at least 1 impact	circular	16 mm
Baga TÜRger 6	tomb 8	in the north	to the east	to the east	on the back	+/- 4 y. o.	male	n. d.	?		
Baga TÜRger 6	tomb 10	in the north-west	to the north-east	to the north-east	on the belly	+20 y. o.	male	1,31 m	probably 2 impacts	circular	20 mm
Baga TÜRger 6	tomb 11-Horse A	in the north	to the east	to the east	on the right flank	+/- 18 y. o.	male	1,39 m	2 impacts	circular	1x16 mm
Baga TÜRger 6	tomb 11-Horse B	in the north	to the east	to the east	on the right flank	+/- 17 y. o.	male	1,31 m	1 impact	elongated	30
Baga TÜRger 6	tomb 12	in the north	to the east	to the east	on the belly	+20 y. o.	male	1,38 m	3 impacts	circular	14, 13 et 17 mm
Baga TÜRger 6	tomb 13	in the north	to the east	to the east	on the left flank	+/- 1 y. o.	male	1,25 m	2 impacts		1x15 mm
Khatuu 1	tomb 1	in the north		to the east	on the belly	very old	male	1,39 m	3 impacts	squares	7,8 - 8 et 9 mm
Khatuu 1	tomb 2	in the north-west	north-east	north-east	on the right flank	+/- 19-20 y. o.	male	1,36 m	1 impact	square	11,2 mm
Khatuu 2	tomb 1	in the north	north-east	north-east	on the belly	+/- 19 y. o.	male/gelding	1,29 m	1 or more ?	large perforation	
Khatuu 3	tomb 6-Horse 1	in the north	to the east	to the east	?	very old	male	1,33 m	2 impacts (3 ?)	1 circular et 1 square	11,6 et 14 mm
Khatuu 3	tomb 6-Horse 2	in the north	to the east	to the east	rather on the belly	very old	male	1,34 m	2 impacts	elongated	33 et 36 mm
Khatuu 3	tomb 6-Horse 3	in the north	to the east	to the east	on the belly	very old	male	1,37 m	2 impacts	circulars	14,5 et 14,5 mm
Syrgal 1	tomb 1-Horse 1	in the north	to the east	to the east	on the left flank	+/- 16-17 y. o.	male	-			
Syrgal 1	tomb 1-Horse 2	in the north	to the east	to the east	on the right flank	+/- 17-19 y. o.	male	-	2 impacts	1 square et 1 ? (mixte)	14 mm
Syrgal 1	tomb 1-Horse 3	in the north	to the east	to the east	on the left flank	+/- 16-17 y. o.	male	-			
Syrgal 1	tomb 1-Horse 4	in the north	to the east	to the east	?	+/- 18-19 y. o.	male	-			
Syrgal 1	tomb 1-Horse 8	in the north	to the east	to the east	?	+/- 18 y. o.	male	-			
Syrgal 1	tomb 2	in the north	to the east	to the east	on the left flank	+/- 18-19 y. o.	male	1,32 m			
Syrgal 2	tomb 1-Horse A	in the north	to the east	to the east	on the belly	+/- 19-20 y. o.	male	1,33 m			
Syrgal 2	tomb 1-Horse B	in the north	to the east	to the east	on the left flank	+/- 19 y. o.	male	1,34 m	at least 2 impacts	circulars	
Syrgal 2	tomb 1-Horse C	in the north	to the east	to the east	on the belly and on the right flank	+/- 4,5 y. o.	male	1,42 m	1 impact	circular	15,2 mm
Syrgal 2	tomb 1-Horse D	in the north	to the east	to the east	on the belly	très âgé	male	1,36 m	1 impact	circular	15,4 mm
Syrgal 3	tomb 1-Horse 1	in the north		to the west	on the belly	+/- 3 y. o.	male	1,31 m	1 impact	angular	15 mm
Syrgal 3	tomb 1-Horse 2	in the north	to the west	to the west	on the right flank	+/- 18 y. o.	male/gelding	1,36 m	1 impact	square	12 mm
Syrgal 3	tomb 1-Horse 3	in the north		to the west	on the belly	+/- 12-13 y. o.	male	1,43 m	more than 2 impacts	1 square et 1 circular	14 mm (square)
Syrgal 3	tomb 1-Horse 4	in the north		to the west	on the left flank	old	male/gelding	1,34 m	?		
Tsengel Khaïrkhan 1	tomb 1	in the north	to the east	to the east	on the belly	+/- 5 y. o.	male	1,37 m	3 impacts	2x elongated	29 et 23 mm
Tsengel Khaïrkhan 1	tomb 2	in the north	to the east	to the east	quite on the belly	+/- 19-20 y. o.	male	1,40 m	2 impacts	rather squares	15 et 15 mm
Tsengel Khaïrkhan 1	tomb 3-Horse A	in the north	to the east	to the east	on the belly, head on the left cheek	2-4 y. o.	male	1,27 m	at least 2 impacts		9,2 et 15 mm
Tsengel Khaïrkhan 1	tomb 3-Horse B	in the north	to the east	to the east	on the right flank	+/- 10 y. o.	male	1,33 m	1 impact	circular	15 mm
Berel'	tomb 11 -horse A	in the north-west	to the north-east	to the north-east	on the left flank ?	+/- 10,5	male	1,38			
Berel'	tomb 11 -horse B	in the north-west	to the north-east	to the north-east	on the left flank		male	1,36			
Berel'	tomb 11 -horse C	in the north-west	to the north-east	to the north-east	on the left flank	+/- 19-20	male	1,39			
Berel'	tomb 11 -horse D	in the north-west	to the north-east	to the north-east	on the left flank	+/- 16-17	male	1,45			
Berel'	tomb 11 -horse E	in the north-west	to the north-east	to the north-east	rather on the left flank	+/- 19-20	male	1,39	1 impact	circular	12 mm
Berel'	tomb 11 -horse F	in the north-west	to the north-east	to the north-east	on the belly	+/- 18	male	1,35	1 impact	circular	7 mm
Berel'	tomb 11 -horse G	in the north-west	to the north-east	to the north-east	on the belly and on the right flank	+/- 12	male	1,38			
Berel'	tomb 11 -horse H	in the north-west	to the north-east	to the north-east	on the belly and on the right flank	+/- 11-12	male	1,41	1 impact		
Berel'	tomb 11 -horse I	in the north-west	to the north-east	to the north-east	on the belly	+/- 10,5	male	1,38			
Berel'	tomb 11 -horse K	in the north-west	to the north-east	to the north-east	on the belly	+/- 11,5	male	1,39			
Berel'	tomb 11 -horse L	in the north-west	to the north-east	to the north-east	on the right flank	+/- 10,5	male				
Berel'	tomb 11 -horse M	in the north-west	to the north-east	to the north-east	on the belly	+/- 19-20	male	1,4			
Berel'	tomb 11 -horse N	in the north-west	to the north-east	to the north-east	rather on the belly	+/- 13	male	1,37			

Figure 4. Main characteristics of the horses for each of the tombs studied



Figure 5. Perforations on the skull of the horse of tomb 10 at Baga Tünger 6

the vertebral axis. The skull has three perforations, two of which are proven to be related to the killing of the animal. A blow was made by the sharp part of an axe on the left frontal in the supraorbital area (32 mm long). A similar blow is visible on the right temporal, near the sagittal ridge (29 mm long). The third perforation does not have a shape which would allow it to be attributed to the sacrifice, although this is more than likely and is located at the level of the right parietotemporal suture, thus in an off-centre zone. The orientation of the first impact indicates that the person responsible stood at the front of the horse, on the right side of the animal's head if this person were right-handed, whereas the shape of the second impact shows that the weapon struck the horse's forehead more axially (Figure 7).

#### ***Tsengel Khairkhan 1: Grave 2***

The horse was north of the grave with its head to the east and its body placed on its belly. The hindquarters faced slightly south and the hind legs were folded back. The forelegs were extended and passed beneath the body of the animal to the point where the lower legs reached the rear legs. This forced extension was probably caused by the pulling of the body by the head when the dead animal was placed in the grave. It belonged to a male of 1.39 m height, aged about 19–20 years and it had been hit in the axis of the head with an axe. One hole is located on the temporal crest (15 mm), the other is slightly forward at the edge of the frontal bone (15 mm).

Figure 6. Perforations on the skull of the horse of tomb 12 at Baga Tünger 6



Figure 7. Perforations on the skull of the horse of tomb 1 at Tsengel Khairkhan 1



### **Tsengel Khairkhan 1: Grave 3**

The two horses from this grave were located in the northern part and faced one another with their heads to the east. The first (horse A) was positioned on its belly, next to the burial chamber. The limbs were arranged on each side of the vertebral axis, while its neck was twisted to allow the head to rest on its left cheek. It was a young male about 3–4 years old and its size can be estimated at 1.26 m. A perforation of 9.2 mm is visible in the axis of the skull a little in front of the sagittal ridge; a second, 15 mm across, is located near the first, on the left temporal. These two shocks, possibly combined with others, resulted in significant depression of the left temporal wall.

Horse B was the second to be placed in the grave as its left fore limb rested on the withers of horse A. It was placed on its right side with its head resting on its right cheek, with the tip of the muzzle touching that of horse A. It was a male aged about 10 years and its size can be estimated at 1.32 m. The animal was hit by a blow carried by an axe to the back of the skull on the right temporal, leaving a rounded perforation of 15 mm.

### **Syrgal 2: tomb 1**

This grave contained four horses. They were arranged north of the burial chamber with their heads to the east. The horses were arranged so that the first animal (A) lowered into the pit was the westernmost animal and placed against the wall of the burial chamber, while the second horse (C) was placed in front of it against the wall. Horse B was then placed on the left side of A, possibly before horse D, which was placed north of C. The first horse may be regarded as ‘closing the funeral convoy’, was placed on its belly with its legs folded beneath its body and was a very old male, perhaps aged around 19–20 years. The high fragmentation of its head, and the impossibility of reconstructing it, render it impossible to determine the location and shape of the killing blow.

Horse C was placed in front of A and was also placed along the wall of the burial chamber. Its head pointed downwards and there is a break in continuity between the occipital and the first cervical vertebra, revealing a forward tilting of the cranial block at the time of decomposition. The forelegs were in right ventrolateral position. It was a male aged about 4.5 years old. A perforation 15.2 mm across is observed on the right temporal, near the temporal line.

Horse B appears to have been placed next, the limbs wedged against the sides of horse A. The animal lies on its left side, the forelegs and hind legs flexed and its head resting against the north wall of the pit. It is a very old male (around 19 years old). A large cavity

from at least two blows to the right and left parietals indicates the manner of slaughter. The shape of the depression does not allow the exact number of impacts to be defined but we may consider three or four blows.

The remaining horse (D) was apparently placed last but the contacts between the bones do not allow certainty and it could either have been placed at the same time as the previous one or immediately before. On the other hand, it was well placed at the head of the convoy, on its belly, its hindquarters folded under its abdomen and the left front slightly unfolded outside. The head looks down, the nose appears to be planted on the ground. The rupture at the junction of the atlas and occipital indicates that decomposition occurred in an unclogged environment. It is a very old male, older than individuals A and B. A depression of 15.4 mm on the right temporal illustrates its slaughter.

### **Syrgal 3: tomb 1**

Tomb 1 of Syrgal 3 contained four horses placed north of the burial chamber with the head of each placed towards the west. The excavation conditions did not allow stratigraphic recording of the sequence of deposition but the photographic records make it possible to determine that the first horse to have been deposited is horse 4, i.e. the one which closes the funeral convoy. It was placed against the wall of the room, its abdomen covering part of the forehead of horse 4, then horse 2. Horse 1 has its hindquarters resting on the head of horse 2. He was placed third. It appears that horse 3 was placed last, but the information for this last animal is incomplete. The bones are well preserved and the humidity of the substrate allowed a good conservation of organic materials but, combined with the weight of sediments, heavily deformed the skulls.

Horse 4 was placed against the north wall of the chamber. He was placed on his left flank with his head pointing down. It is an animal whose coxal is female but whose mandibles and jaws carry well-developed canines, so is probably a castrated male. Its age is advanced but the enamel of the teeth is completely ruptured, preventing a definite evaluation. The state of the skull does not permit recognition of any trace of slaughter.

Horse 2 is an adult of about 18 years. The coxal is very clearly of female type, but the dental series comprise very well-developed canines. It was placed on its right flank; the hind legs unfolded and the front legs rather bent. A square depression of 12 mm can be seen on the left temporal fossa. Horse 1 is a juvenile male of 3 years posed on the belly with the front quarter slightly twisted and posed on the right side. Death was caused by a blow to the left temporal boundary and the outer sagittal crest. A bone fragment is present, still connected to the edge of the wound; the shape of

the latter is a square of 15mm sides. Finally, horse 3 is a male of about 12–13 years, wedged in front of horse 4, against the wall. It is placed on its belly, the head making an angle with the neck and protruding partly on the west side of the grave; it is a very massive animal. Several blows are visible on the frontal: one, on the left, is of a square shape with 14 mm sides; the others, more central, created, in their multitude, a broad cavity of 4 x 2 cm.

### ***Khatuu 1: tomb 1***

The tomb consists of a coffin next to which a horse was placed. It was oriented with its head to the northeast and was placed on its belly with its limbs folded beneath. This was a very old adult. Three marks were found on the skull (Figure 8). One was a square hole 7.8 mm across, located on the right frontal; a second square hole, 8 mm across, was located on the occipital (right part), and an elongated hole 25.5 mm long was found on the left temporal. Either the animal was not

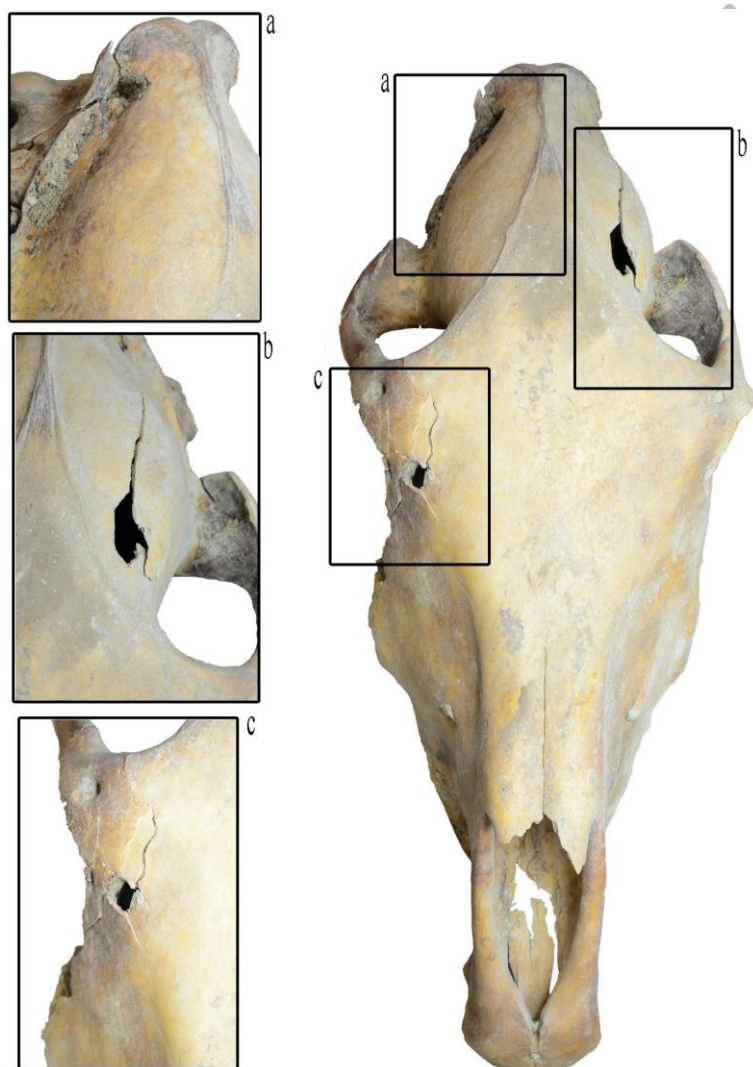


Figure 8. Perforations on the skull of the horse of tomb 3 at Khatuu 1

knocked out the first time, or perhaps two or three individuals took part in the slaughter. In any case, it is clear that different elements of the axe-pick were used: in one case it was the flat part but for the other two it was the point.

### ***Khatuu 1: tomb 2***

This double burial is oriented along a northeast/southwest axis. It includes a coffin along which a horse (at the northwest) has been placed. The animal sits on its right side with its head to the northeast, so that its back is pressed against the coffin. The left foreleg is extended, the right bent under the abdomen. The left posterior part, on the other hand, has undergone a major displacement which has scattered the bones and is probably not of human origin, hence the femur has been dislodged from the pelvis and moved to the front of the animal, and the tibia placed on the thorax. The presence at its distal end of the slope and the proximity of the metatarsus, in alignment, testify to the

date of disturbance. The calcaneus is isolated, revealing a scattering process which had occurred gradually. It is hard to imagine that these movements took place in a cramped environment and the upheavals must have occurred while an empty space still existed around the dead horse. The cause is uncertain but may have been caused by a burrowing animal, such as a fox, although there are no taphonomic traces, such as tooth marks, to prove this. The horse is a very old male (19–20 years). A strike with an axe was made at the left temporal line, at the frontal and temporal limits. A unique 11.2 mm square recess attests to this.

### ***Khatuu 2: tomb 1***

The horse in this tomb had its head to the northeast and its hindquarters to the southwest. It was placed north of the burial chamber on its belly, with its legs bent below it. Its head pointed down and the accumulation of soil under the neck and the perfect connection of the neck and head seems to indicate decomposition in a packed environment. It is a very old animal (19–20 years) and its sex determination was a problem. The shape of the pubis, flattened and angular, would correspond to a female, but the



Figure 9. Perforations on the skull of the horse of tomb 6 at Khatuu 6

Horse 1 was a very old male with no bone pathology. The skull has slaughter stigmata. One is a bilobed cavity on the right side of the temporal: the impact diameter is 11.6 mm. A particular flaking is observed on the edges of the second part of the cavity. This reveals a lever extraction of the weapon, once the blow was made; this gesture enlarged the wound by blowing up elements of bone on the edge. The other trace is that of a square depression of 14 mm on the right part of the temporal. Horse 2 was a very old male aged 19–20 years or possibly even older, without visible bone pathology. At least two blows were made to the left side of his forehead using the sharp, elongated side of the axe (Figure 9). The recesses are 33 mm and 36 mm long. Horse 3 was also very old (but a little less than 1 and 2), and placed on its stomach. There are two marks of the same size (14.5 mm) located side by side on the right side of the temporal. These two successive strokes created a cavity larger than the sum of the diameter of the two initial impacts alone.

presence of well-developed canines (especially the lower canines) make it possible for it to be male. The particular conformation of the coxal could therefore be due to early castration. The trace of the slaughter is characterised by a circular depression 29.4 mm across on the right temporal, under the temporal crest.

### ***Khatuu 3: tomb 6***

This tomb contained three horses. They were located north of the burial chamber with their heads facing east. The disposition of the animals could not be estimated in the field. It appears that horse 3 was covered by the other two. The disposition of its neck is marked by a pronounced angle which makes its head rest on its left side. Horse 2 seems to have been placed second, on its belly, its limbs generally folded below it and its head pointing down. Horse 1 covers horse 3 and appears to be set against horse 2. Its bones were removed during excavation but their disposition can be established from photographs: the main information is that its left front was folded under its thorax, but the right front was extended with the front hoof located under its head. This arrangement stems from the placement of the latter animal in a restricted space.

### **A varied number of horses in the graves**

Of the 40 kurgans identified for this work, the majority (24) only contain a single horse (Figure 10). In this case, the animal may have belonged to the deceased. In the other 40% of cases, there are several animals, the number varying from 2 to 13. The largest numbers (8, 10 and 13 horses) are only encountered once and are all located in Berel' (tombs 8, 10, 11). Elsewhere, the number is more modest. For some (BTG 6, tomb 11), there is a double pair: two adult men and two horses, thus it is possible that these individuals are the owners of the animals. However, it is not possible to address the question as to whether they were interred at the same time or subsequently. In other cases, the grave is that of two individuals but with only one horse. This is the case for example at BTG 6 Grave 10, where a woman and a 6–7 year child were placed side by side. One can note here the association of a woman and a horse, suggesting that the deposit of horses was not reserved for men, unless the animal is to be associated with the child (who is of unknown gender). The pattern is similar to TSK Grave 2 where an adult male and a child of 8–9 years were associated in the grave and accompanied by a single

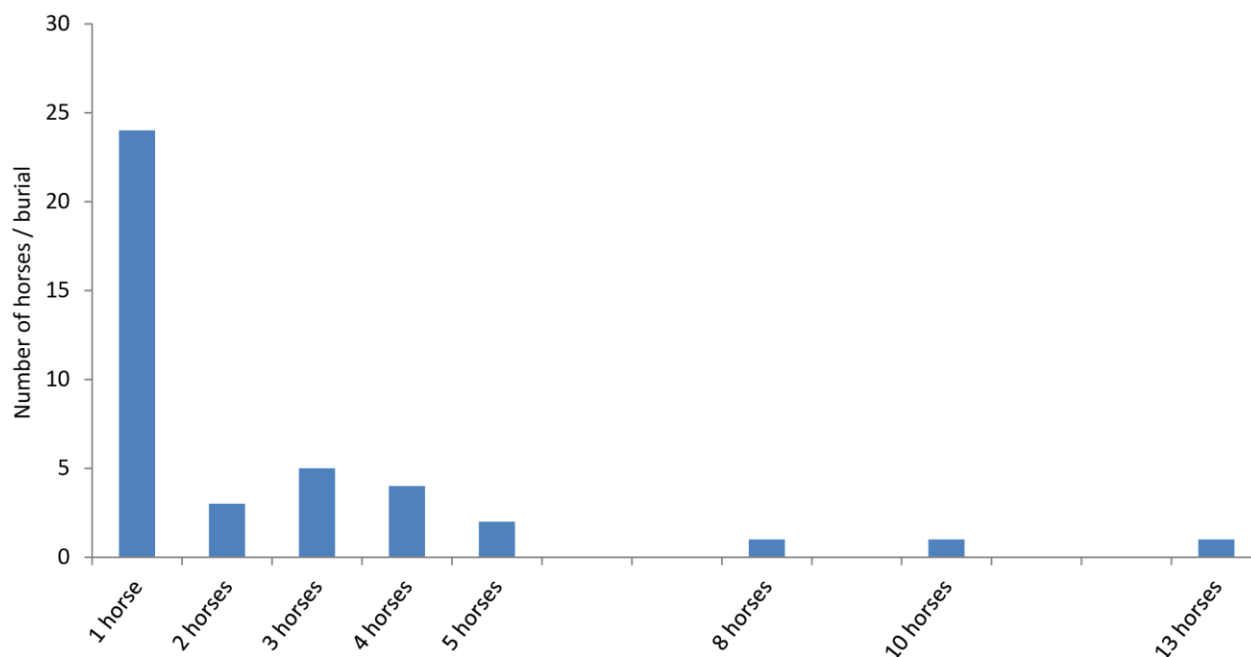


Figure 10. The number of horses in the graves

horse. The other cases of plural deposits are: Syrgal 1 tomb 1, where two individuals were found with five horses, and Syrgal 2 tomb 1, where the four horses were associated with only one individual. It is tempting to think that the quantity of horses is linked to the social status or wealth of the deceased, especially in the case of princely tombs like Berel', even if one does not know if the number itself has a meaning, or if there was a rule concerning the age or gender of the buried.

### Positions and arrangement of horses

The arrangement of the animals meets fairly precise rules. Horses were systematically positioned north (or northwest) of the grave whereas humans are placed in the southern part. The horses' heads, like those of the human remains, are overwhelmingly placed to the east or in some cases to the northeast. This is a constant for tombs of this period.<sup>12</sup> At Pazyryk, the animals were mainly oriented eastwards but the practice at this site was to adapt to the space available in the pit.<sup>13</sup> Thus, several variants are present: two animals had their heads facing south in tomb 1, one in tomb 2, four in tomb 3, whereas two other horses were turned west. Tomb 4, on the other hand, was organised in a singular way with 14 animals positioned in a variable way. At Berel', the 13 horses are arranged at the north of the tomb and also all faced east. However, this rule is broken in four Mongolian tombs: at Baga Tünger 1 (tombs 1, 2, 8) and at Syrgal 3 tomb 1, horses and humans are arranged so that their heads are west of the pit.

<sup>12</sup> See also the cases described in Levine *et al.* 1999: 47 and Ervynck 1995.

<sup>13</sup> Rudenko 1970.

One could propose a connection between the arrangement of the tombs with choices linked to the movement of the constellations: the east/west axis of the bodies is located, for example, on the orbit of the sun, moon and stars. Consequently, the north/south separation (horse/human) is established with respect to this axis. One might then speculate on the meaning of this organisation but it is difficult to distinguish between rules with ritual meaning, recognised and envisaged as such by the officiants, and cultural customs. The fact that the rules were not always respected makes it possible to consider different meanings.

### Selection by gender

At the site of Berel', as well as in Mongolia, all of the dental series of adult horses present well-developed canines, thus 101 horses are males. This phenomenon is characteristic of Scythian tombs and is also the case at Arzhan-2<sup>14</sup> and Pazyryk.<sup>15</sup> Cases where horses are females are extremely rare, such as at the site of Kizil in the Siberian Altai, north of the Belucha massif, where the excavations carried out by I. Bourgeois *et al.* revealed an exceptional case of a mare, the remains of which were studied in detail by A. Ervynck.<sup>16</sup>

We would like to know to what extent these animals were entire males or geldings. We have to admit that osteology is rather unhelpful here. At Pazyryk, where only males were present, the exceptionally good preservation of the animals allowed Rudenko to affirm

<sup>14</sup> Bourova 2004.

<sup>15</sup> Rudenko 1970: 118.

<sup>16</sup> Bourgeois *et al.* 2000: 89; Ervynck 1995.

Figure 11. Detail of the Pazyryk carpet: the gender of the horses is clearly indicated



that all the animals had been castrated;<sup>17</sup> Vitt went on to suggest that the largest horses there were young castrated geldings.<sup>18</sup> We know from Strabo that the Scythians and Sarmatians castrated their horses so that they would be more docile: ‘It is a peculiarity of the whole Scythian and Sarmatian race that they castrate their horses to make them easy to manage; for although the horses are small, they are exceedingly quick and hard to manage.’<sup>19</sup> A similar remark was made by Ammianus, the later Roman military historian, in his description of the Sarmatians:

‘These people, better fitted for brigandage than for open warfare, have very long spears and cuirasses made from smooth and polished pieces of horn, fastened like scales to linen shirts; most of their horses are made serviceable by gelding, in order that they may not at first sight of mares become excited and run away, or when in ambush become unruly and betray their riders by loud neighing. And they run over great distances, pursuing others or themselves turning their backs, being mounted on swift and obedient horses and leading one, or sometimes even two, to the end that an exchange may keep up the strength of their mounts and that their freshness may be renewed by alternate periods of rest’.<sup>20</sup>

There are some indications that some of the animals studied here had been castrated. Indeed, the pubis of

certain hip bones (TSK1–2, TSK1–3B, and especially at Syrgal 3, tomb 1 and Khatuu 2, tomb 1) are particularly thin and the dorsal pubic tuber particularly not marked, thus very probably reflect geldings. The first horse is a fairly large animal, which might support Vitt’s hypothesis, but the others are not particularly so, which does not allow us to conclude that there is a proven link between the size of the animals on the sites studied and the practice of castration. However, it remains to be seen whether the other horses are entire or not. The difficulty of this research lies in the extent of the physical transformations which depends on the age of operation as the morphological modifications is less marked within the framework of a late sterilisation. At Arzhan-2, it seems that at least six of the 14 males were castrated.

There is thus undeniably a common character to all the tombs of this period: the sacrificed horses are males. One must then question the reasons for this specificity: are these choices related to funeral practices or the consequence of the configuration of the herd which favours males as ridden animals and which will leave the females in the herd to produce milk and foals? Unquestionably, the major proportion of the horses deposited in the tombs were ridden since most carry bits and elements of harness, but that does not settle the question of selection and one could conjecture that ridden females were not chosen for sacrifice.

In fact, not knowing herd structures, breeding and riding practices, other than through graves, creates biases in our perception of choice. Scythian figural representations are of little help to us since they rarely

<sup>17</sup> Rudenko 1970: 118.

<sup>18</sup> Vitt 1952.

<sup>19</sup> Strabo, *Geography* 7.4.8.

<sup>20</sup> Ammianus, *History* 17.12.3.

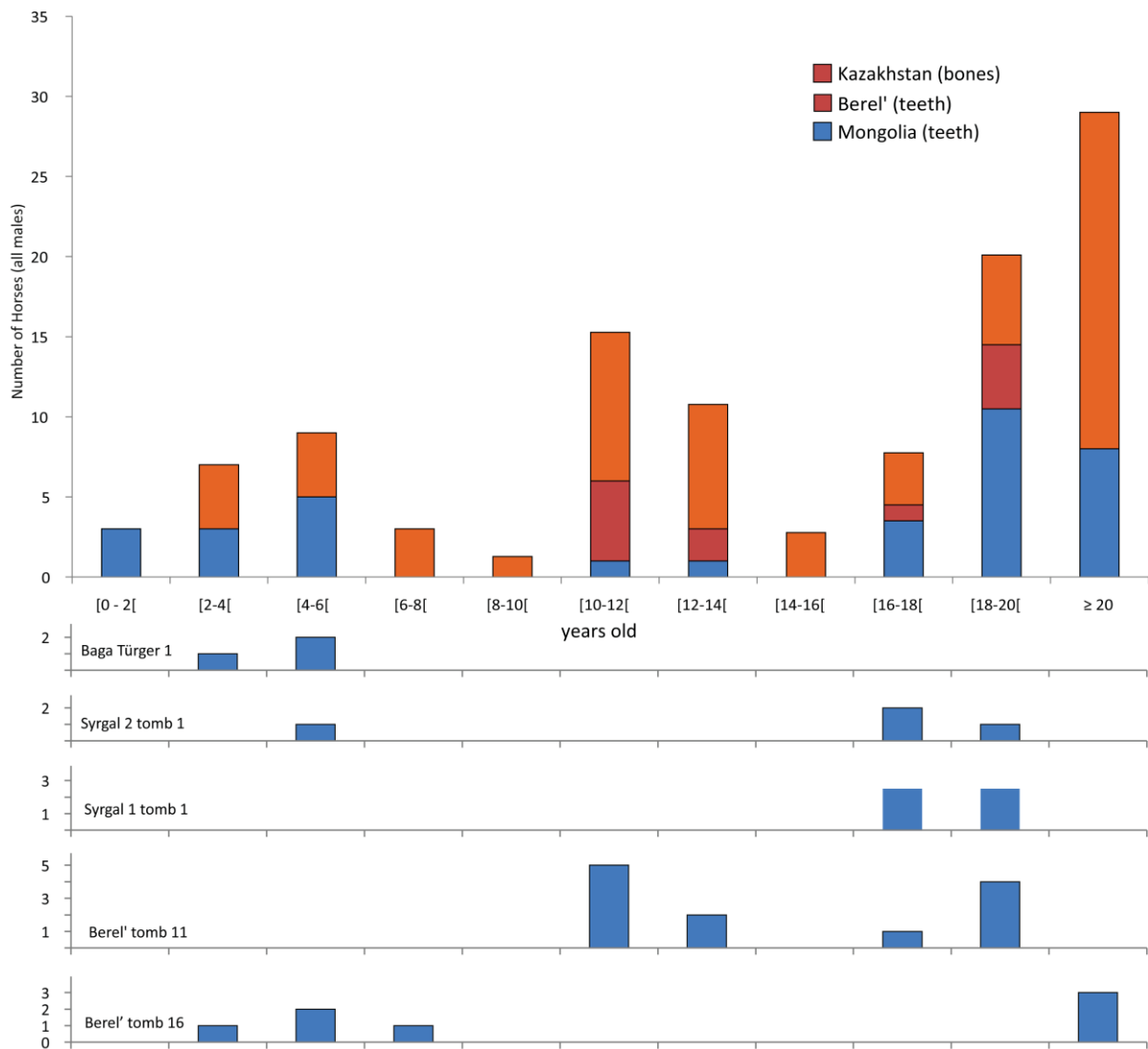


Figure 12. Age of horses in graves

represent the sexual attributes of horses, and a count from these is therefore irrelevant. It is true that the images coming from Achaemenid Persia are quite different: the horses represented on the Persepolis monuments are males, be they royal horses or those of tributary peoples (including the XI-Saka delegation). Another very characteristic example is the Pazyryk carpet, made in Bactria or one of the eastern satrapies, on which the horses are represented with all their characteristics, allowing positive recognition of males (Figure 11). This is probably not an unimportant detail, inasmuch as the gender of the animals is represented as precisely as the knots of the tail, the ribboned mane, toupee on the head, bells, fringed saddle and clothing of the grooms, all indications of Persians.

### Age of the horses; age selection

Describing buried animals involves estimating their age. As the methods used vary according to different

researchers it is necessary to distinguish information derived from dental data (Berel' 11 and the Mongolian sites) from that derived from analyses of the bones.

For the Mongolian sites, the age range is rather wide, as one not only finds very old animals in the tombs but also juveniles of less than 2 years (Figure 12). Adults were the most common and those aged over 16 years represent two thirds of the animals but it is interesting to note that at Baga Tünger some human beings were buried with animals aged only 1 year. At Berel' 11, the animals were not all of the same age: a good 10 years separated the youngest horse (horse A), which was around 8 years old, from the older horses (horses E and M) which were over 19 years old. There was therefore no strict selection of ages: there are adults of an advanced age since one group is made up of six animals around 10–14 years old and another of five old horses aged over 16 years. At Berel' 16 (an estimate based on bones), the situation is different since both young and

old are present, while the intermediate class of 10–14 year olds is absent.

There is therefore no rule in age association when several horses are present in the same grave. In tomb 1 of Syrgal 2, one horse was young whereas the other three were rather old; in tomb 1 of Syrgal 1, the five horses were old, whereas at Baga Turger 1 all three were young. The analysis thus reflects an absence of strict selection, even if adults were in the majority and, among them, the elderly were in good position. This situation is confirmed at other Altai sites.

At Kizil, the mare was 11 years old;<sup>21</sup> horses from Ak-Alakha 5 were 7–10 years old, 10–15 years old and over 18 years old,<sup>22</sup> and at Arzhan-2 the ages were also between 8 and 20 years.<sup>23</sup> This does not correspond with the idea sometimes advanced that animals were chosen from among the oldest, those which become unfit for riding, developed diseases or had the least value.<sup>24</sup> The selection criteria must therefore depend on various conditions, doubtless linked to the availability of the animals and the choices of their owner.

### The size of the animals, the shape and coat: elements of description

The size of the horses found in the burial mounds has received a good deal of attention in the literature and the aim of many authors was to try to characterise herds and define forms or breeds mentioned in texts or represented on sculptures and other media.<sup>25</sup> One could consider that osteometric analysis also made it possible to define the level of homogeneity of a set of horses, thus addressing questions related to the single or multiple origin of the animals sacrificed at the time of the funeral. In terms of rituals, it can also be a question of whether, in a grave, the largest animals are those to whom the most attention had been paid, through their harness for example, and it is a search which can also be applied to other selection criteria such as age.

The horses of the Mongolian tombs have an average height at the withers of 1.35 m. This is roughly the same as that found in other horses of this period and this region.<sup>26</sup> However, there are small differences between individuals. The tallest animal comes from Syrgal 2, tomb 5 (horse A: 1.46 m), while the smallest of the adults comes from Khatuu 2, tomb 1 (1.29 m). Excluding those juveniles which have not reached

their adult size (1.24 m for BTG6,13 and 1.26 m for TSK1,3A), there is almost 12% difference between the smallest and largest animals. Located within their Altai context, we note that the animals of BTG6 and TSK1 are perfectly within the average range of contemporary horses judging by measurements of about 90 horses collected by Derevyanko and Molodin.<sup>27</sup> However, at Berel' the animals were larger (1.38 m on average), i.e. in the upper part of the recorded range.<sup>28</sup> At Arzhan-1, the animals were quite small, do not exceed 1.38 m (for an average of 1.36 m) and some animals were less than 1.20 m high at the withers.<sup>29</sup> At Arzhan-2, on the other hand, they were quite tall as the vast majority (86%) was between 1.36 m and 1.44 m high, with some even reaching 1.52 m (the average is 1.41 m). Finally, at Pazyryk, the situation is different again as the range of heights is rather wide, more so than either Berel' or Arzhan-2, but notably consisting of the tallest animals in our corpus (more than 1.56 m).<sup>30</sup>

Ultimately, it is difficult to compare horse size from the withers height as size estimates are obtained by using coefficients which have been calculated on horses of different types and morphologies from those of the Altai. However, depending on their origin, some will have shorter or longer leg bottoms and more or less developed thighs. It is therefore more prudent to work from the length of each bone.<sup>31</sup> This more objective approach shows that the difference between the bones of the tallest and smallest individuals is between 14% and 22%. As early as 1952, Vitt had used a metapodial length index (length of the metatarsus relative to the length of the femur) to estimate the ratio between the length of the thigh and that of the cannon bone. Applied to our skeletons, the method highlights the presence of animals whose lower legs are slightly longer than others but without significant differences. One must be careful not to over-interpret such data, particularly when using paleoenvironmental data, as was done in the study of the horses from Arzhan-1 and Arzhan-2.<sup>32</sup> The author believed that the reduction in the size of the metapodials between the 9th and 7th centuries BC was an indicator of climate change which was linked to the establishment of a humid climatic phase, as attested by palynological and radiocarbon studies.<sup>33</sup> Since it is difficult to imagine such a rapid modification of equid

<sup>21</sup> Eryvnc 1995.

<sup>22</sup> Levine *et al.* 1999.

<sup>23</sup> Benecke, Pruvost and Weber 2010.

<sup>24</sup> Bökönyi 1968.

<sup>25</sup> E.g., Vitt 1952.

<sup>26</sup> Multiplicative coefficients were applied to bone lengths; reference coefficients are from von May 1985.

<sup>27</sup> Derevyanko and Molodin 2000.

<sup>28</sup> Francfort and Lepetz 2010.

<sup>29</sup> The averages for Arzhan-1 and Arzhan-2 were calculated using data from Bourova (2004) and applying our coefficients, but without integrating the values provided by the femurs (which are not exploitable). The data provided by Benecke and Weber (2007) are different: Arzhan-2 from 1.35 to 1.47 (mean: 1.40); Arzhan-1 from 1.29 to 1.42 (mean: 1.35) but without knowing the coefficients these authors used.

<sup>30</sup> Vitt 1952.

<sup>31</sup> Francfort and Lepetz 2010.

<sup>32</sup> Bourova 2004; see also Zaitseva *et al.* 2005.

<sup>33</sup> Van Geel *et al.* 2004.

morphologies, one must consider other possibilities: the largest horses are met in some tombs, those which seem the most prestigious (Pazyryk, Berel'). It would then be tempting to consider that there is a link between the status of the tombs (royal, princely, more modest) and the size of the horses buried there. The other possibility would be of a cultural nature and would stem from the herds and peoples who buried them but there is still a lack of precise data which would make it possible to categorise the phenomenon.

Until recently, it was impossible to describe the coats of the horses, except where the hair was preserved, even though the conditions for excavation and collection of samples were often not always met for this type of analysis. However, recent work in genomics applied to ancient DNA completely changes this field of knowledge. Work conducted at Berel' revealed that six horses have chestnut coats, four are bay, one is bay/cream, one is black and one is spotted (Figure 13).<sup>34</sup> The first conclusion highlights the diversity of hair colour at that time. The other finding is the absence of exclusive choice regarding the colour of the coat when animals are sacrificed. It also appeared from these analyses that the animals were not related, except for horses K and L (which were placed side by side in the tomb). It is therefore very likely that at least all the other horses came from different herds, confirming the conclusions of the analysis of ornaments and harness elements and echoing Herodotus' description of sacrificial practices involving horses donated by allied tribes at the funerals of important members of the community.<sup>35</sup>

### Animals in pretty good condition

At Berel', the paleo-parasitological study revealed that although the horses had indeed been hosts to pathogens, namely *Oxyuris equi* and a nematode belonging to the order Strogylidae, parasites were common but not responsible for serious debilitating infections.<sup>36</sup> One horse had a slight back problem but this could not have disabled it. However, at many other sites, horses present pathological anomalies (osteophyte, ankylosing or deforming spondylitis, bone proliferations) which mainly affected the vertebrae and the BTG6 and TSK1 animals were also severely affected by these problems. Indeed, if we exclude the two younger animals (TSK1,3A and BTG6, 13), all animals were affected in this manner (Figures 14–15).

The back is certainly one of the most complex parts of the musculoskeletal system in horses and is also that most commonly affected by riding, use as a pack animal or in traction. As regards the first, depending on the

intensity of use, the nature of the saddle will have had a determining role but it should be borne in mind that these pathological diseases can also have a genetic origin, thus these deformities can be ankylosing spondylitis which weld the thoracic vertebrae together (three horses), the lumbar vertebrae (one horse), or which join the lumbar vertebrae to the sacrum (four cases), with some animals presenting all these pathologies. Often these attacks are combined with others, notably those manifested by bone proliferation on the joint apophysis: the last thoracic and the first lumbar vertebrae are then affected (six cases). Horizontal fissures across the caudal vertebral body of two thoracics may also be present (one in two thoracic cases). This type of pathology has been observed on several excavated horses of different origins. Some hypotheses have been put forward to explain this type of fracture: repeated jumps made by a horse carrying an unsuitable saddle, or a horse ridden too hard or for too long.<sup>37</sup>

The horses from TSK1 and BTG6 had clearly been used intensively but one should probably not conclude too quickly that they had become unfit for riding and that was the reason why they were selected for the tomb as the presence of young and quite healthy horses supports an alternative hypothesis. Moreover, the ritual slaughter of an old horse can be an important mark of respect insofar as the latter may have belonged to the deceased. In the case of prestigious graves, where horses were numerous, they may have been donations made by other tribes or come from a group of animals used in processions during their lifetime. Thus the old age of a particular beast may reveal its high symbolic value, as well as a low price. It is interesting to note that the Berel' horses are much less affected by this kind of pathology than those of other sites. Indeed, only one animal at that site had a reduced pathological disease on two lumbar vertebrae. This is strange, especially since the animals were also old horses, and perhaps this phenomenon was linked to a particular type or use of saddle at Berel'. Levine has drawn attention to the link existing between these pathologies and the use of padded saddles which are in contact with the dorsal vertebrae,<sup>38</sup> whereas reinforced saddles do not rest on the spiny processes of these vertebrae. The riding conditions of the animals at Berel' may explain the low frequency of bone pathologies.

### A sacrifice which leaves its mark

The horses were struck by a weapon of the same type and they received one or more blows to the head. Where the skulls are sufficiently well preserved,

<sup>34</sup> Librado *et al.* 2017.

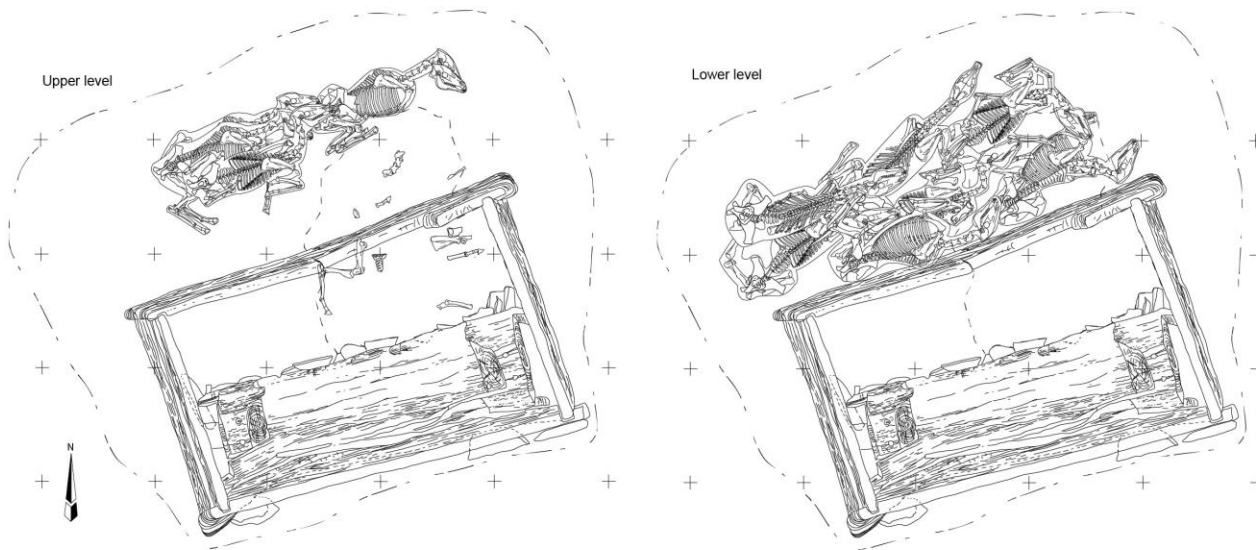
<sup>35</sup> Herodotus, *The Histories* 4.72, quoted in full by Chugunov, this volume.

<sup>36</sup> Le Bailly *et al.* 2008.

<sup>37</sup> Müller 1985; Benecke 1994.

<sup>38</sup> Levine *et al.* 1999: 51–52; 2000: 130–31; Derevyanko and Molodin 2000: 243–49.





<p>Horse A - male - 10,5 y.o.</p> <p>Chestnut</p>	<p>Horse B - male</p> <p>black</p>
<p>Horse C - male 19-20 y.o.</p> <p>Chestnut</p>	<p>Horse D - male - 16-17 y.o.</p> <p>Chestnut</p>
<p>Horse E - male - 19-20 y.o.</p> <p>Chestnut</p>	<p>Horse F - male - 18 y.o.</p> <p>bay</p>
<p>Horse G - male - 12 y.o.</p> <p>bay</p>	<p>Horse H - male - 11-12 y.o.</p> <p>Chestnut</p>
<p>Horse I - male - 10,5 y.o.</p> <p>bay cream</p>	<p>Horse K - male - 11,5 y.o.</p> <p>bay</p>
<p>Horse L - male - 10,5 y.o.</p> <p>Chestnut</p>	<p>Horse M - male - 19-20 y.o.</p> <p>spotted</p>
<p>Horse N - male - 13 y.o.</p> <p>bay</p>	

Figure 13. Position, age, sex and colour of the coat of the horses in Berel' 11

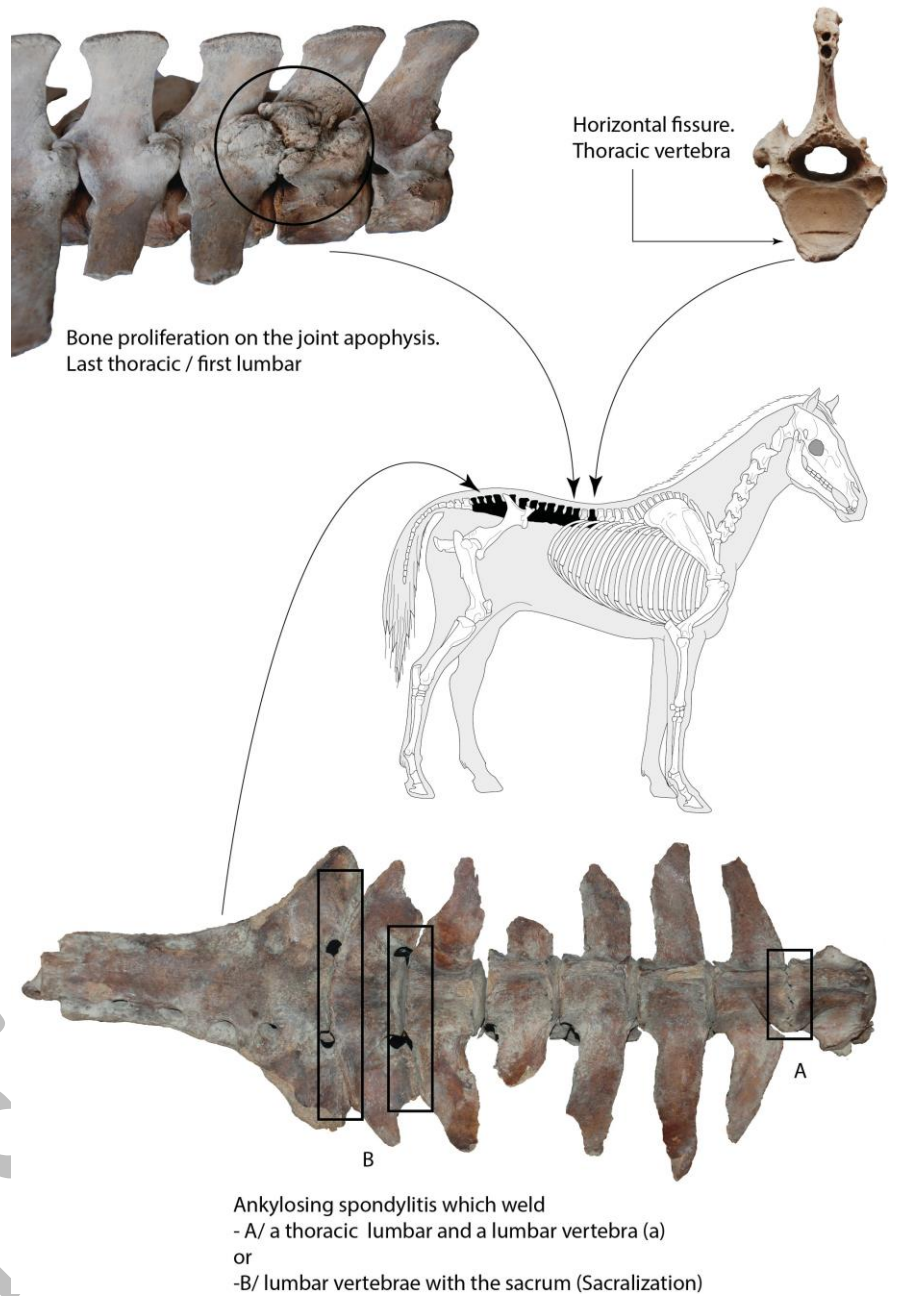


Figure 14. Bone pathology impacting the backs of horses

Site	Tomb	Horse	Spondylosis on vertebral bodies	Fusion of vertebral bodies	Bone proliferation on articular process (even fusion)	Fissure on vertebral epiphysis	Bone bridge or bone proliferation on spinous process	Other spinal pathologies	Other pathologies
Baga Turgen Gol 6	10			L5-L6	TH15-18 & L1-4			1st C	
Baga Turgen Gol 6	11	A	TH12-15	L5-L6	TH16-18				metacarpal injuries; patellofemoral arthritis (knee)
		B	TH13-14	L5-L6	TH16-18				
Baga Turgen Gol 6	12		TH18-L1 (L2)						
Tsengel Khairkhan 1	1			L5-L6	TH18-L1				
Tsengel Khairkhan 1	2				a little on TH			1st C	
Tsengel Khairkhan 1	3	B	L4-6		TH15-18 et L1-3	2 TH			
Syrgal 1	2		TH18-L1		TH				
		A	TH18-L1		a little on TH				
Syrgal 2	1	C					TH4 to TH10		proximal left tibia (knee); Bulge of nasal bones
		D		L5-L6			Th 13 to TH17		
Syrgal 3	1	3			L3-L4 (fusion)				
		4		L5-L6					proximal tibia (knee)
Khatuu 1	1			L5-L6					
Khatuu 1	2							1st C	
Khatuu 2	1			TH19-L1	TH16-18		TH14-TH15		dominant left premolar 2

C = cervical vertebrae; TH = thoracic vertebrae; L = lumbar vertebrae

Figure 15. Counting bone pathologies of Mongolian grave horses

it is possible to detect traces of rounded, square or elongated perforations on the frontal bone or temporals. These impacts are common on horses (as well as human individuals) buried in graves of this period. At Pazyryk, Rudenko reported that the horses had been killed by a blow to the top of the forehead which fractured and punctured the bone.<sup>39</sup> The holes have a diameter of 7–20 mm or a length of 23–36 mm. The weapon used is well known: it is an axe-pick with a pointed end and a flattened or rounded butt,<sup>40</sup> and is sometimes found *in situ* in graves at the hip level of the deceased individual, thus was worn at the waist as represented on contemporary Scythian and Achaemenid sculptures.<sup>41</sup> Nine horses were killed by a single blow (Figures 16–17), 11 others were struck twice; two definitely received three (BTG6,12) and one probably also received three (TSK1,1). In the majority of cases, the blow was carried by the rounded butt of the axe whereas in three instances the point of the weapon was used (BTG,11B and TSK1,1, Khatuu 6,2): the weapon struck the horse's forehead more or less perpendicularly, indicating that the person dealing it had their arms at the head of the beast and that both must have been standing. Generally, it is the back of the head which was affected and at the level of the temporal bones; sometimes the blow concerned the right temporal, in other cases it affected the left temporal, whereas in others the blow was centred. In three cases – in each time these are blows with the edge of the axe – the frontal was hit. This contrasts strongly with the cases recorded at Berel'. At this site the frontal was much more affected than the temporals, coinciding with the wearing by these horses of false horns or an ornament fixed at the top of the head, slightly backwards, which led to the blow being carried on a more anterior zone of the skull. It is likely that the ritual slaughter took place very shortly before the deposit in the grave. Since rigor mortis occurs quickly after the death of an animal or after a few hours at most, this would have prevented the animals from being placed on their stomachs with their legs flexed beneath them. It remains to be seen whether the sacrifice could have been made in the pit itself but this seems unlikely given their limited size and the difficulty of managing the reactions and stress of the horses under such conditions. In any case, to put down a horse dressed in ibex costume, as at Berel', was undoubtedly an act of great significance. This gesture echoes certain animal representations of the petroglyphs of central Asia where horned horses have sometimes been depicted with, in front of them, a character appearing to axe them and very good examples can be seen in Tamgaldy in Kazakhstan.<sup>42</sup>

<sup>39</sup> Rudenko 1970: 40; Vitt 1952.

<sup>40</sup> E.g., Simpson and Pankova eds 2017: 218, cat. 134 (State Hermitage Museum, inv. nr. 2917/19/1–3).

<sup>41</sup> E.g., Chugunov, Ryabkova and Simpson 2017: 198–200, figs 126–30.

<sup>42</sup> Francfort *et al.* 1995: fig. 9.

## Conclusion

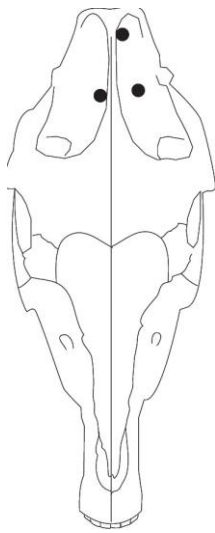
The age of the animals and the high frequency of bone pathologies in horses from Scythian tombs have sometimes been arguments advanced by some authors to explain their slaughter.<sup>43</sup> The idea was that the horses had been selected because they had become unfit for riding. However, if the animals are certainly old, only a few, the oldest, are carriers of bone pathologies and the paleo-parasitological study does not reveal serious diseases. The health of the horses is therefore not the cause of the sacrifice; moreover, the old are not the only ones to have been slaughtered as sometimes young animals, even very young ones, are also present. One can imagine that the horse and the human buried alongside had a link and the sacrifice of a rider's long-time companion would have been of high symbolic value. To slaughter such a mount is an important, serious and probably painful, gesture and which probably does not have as its origin a hypothetical will to find, in a practical way, an honourable outlet for a horse at the end of their life.

In the case where several horses are deposited, the genetic data indicate that, at least for Berel' Grave 11, they were animals bred in separate herds and that they were not only mounts belonging to the deceased but probably donations. There remain the intermediate cases of a human associated with three or four horses which could be the property of the deceased or of family members and future genetic analysis may answer this.

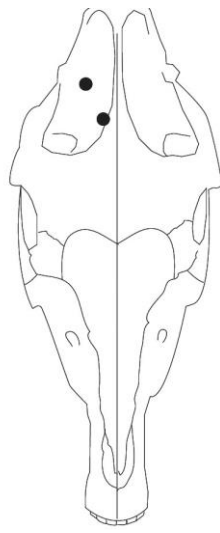
The care taken with the harnessing of the horses indicates that they had a primordial role and important value within the funeral ritual and in the eyes of the living. While the predominance of males probably reflects their frequency among mounted animals, the abundance of older animals should be related to their status. These animals were related to the Saka cosmology. They could be sacred animals, accompanying the deceased in the afterlife, constituting a support of beliefs or a vector of prayers destined for divinities, among many elements that death separates from experience. Horses were undoubtedly also a means for the living to pay homage to the dead. The reason for their presence is therefore polysemic and the complexity of these multiple meanings should be acknowledged.

However, this research can only be conceived within the framework of a precise archaeological approach which seeks to define the initial position of the corpses, the order of their deposition, understanding the movement of the bones, and the history of the body before its deposit and after, once it has been transformed into a skeleton. This is standard procedure for human

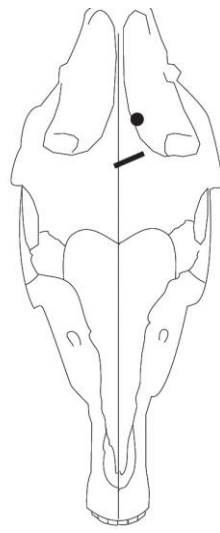
<sup>43</sup> Bökönyi 1968.



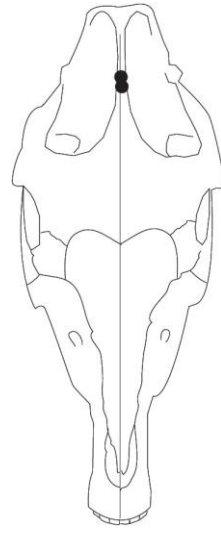
BTG 6 - tombe 12



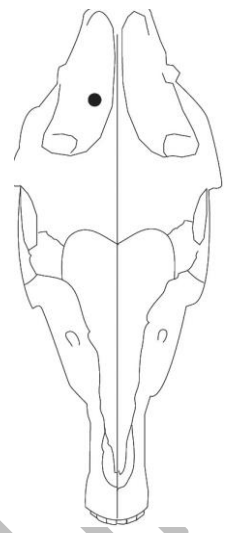
BTG 6 - tombe 11-A



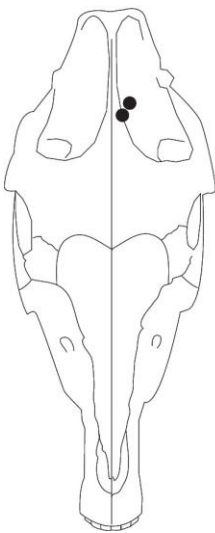
BTG 6 - tombe 11-B



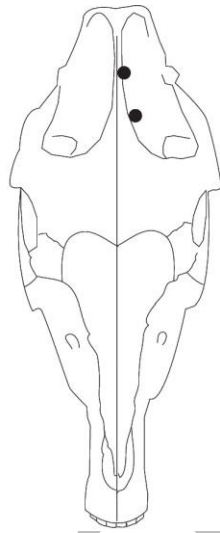
BTG 6 - tombe 13



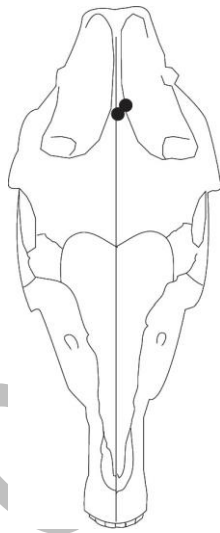
BTG 6 - tombe 3



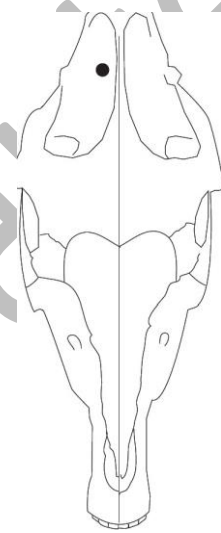
BTG 6 - tombe 10



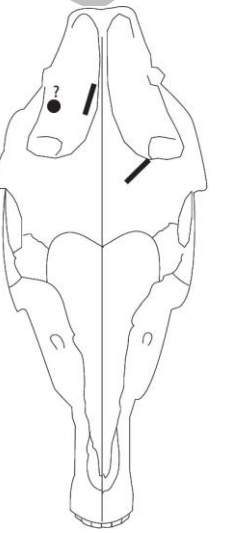
TSK 1 - tombe 2



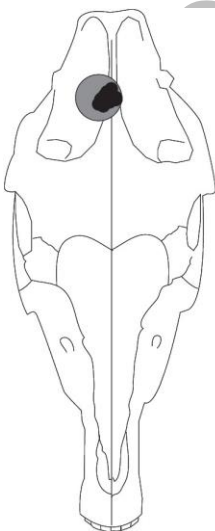
TSK 1 - tombe 3 - A



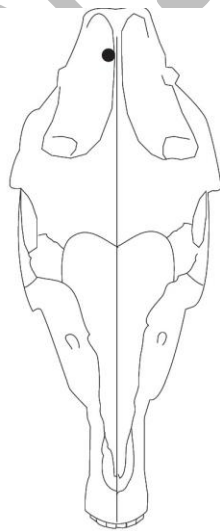
TSK 1 - tombe 3 - B



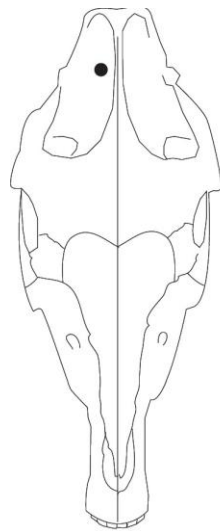
TSK 1 - tombe 1



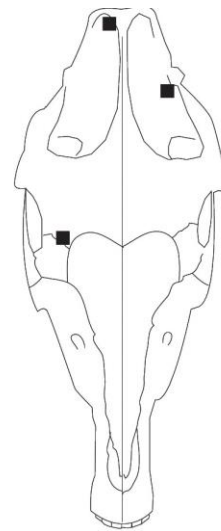
Syrgal 2 - tombe 1-B



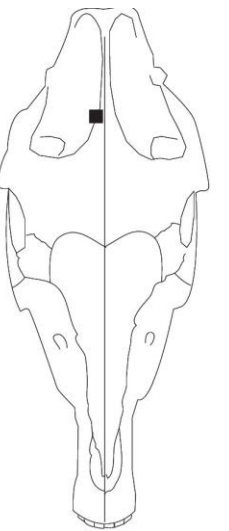
Syrgal 2 - tombe 1-C



Syrgal 2 - tombe 1-D



Khatuu 1 - tombe 1



Khatuu 1 - tombe 2

Figure 16. Position of slaughter impacts on Mongolian horses - 1

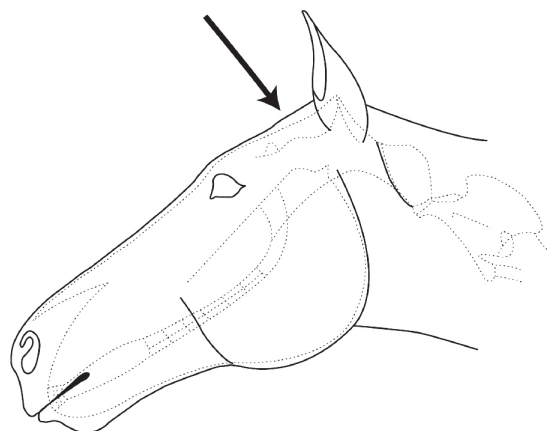
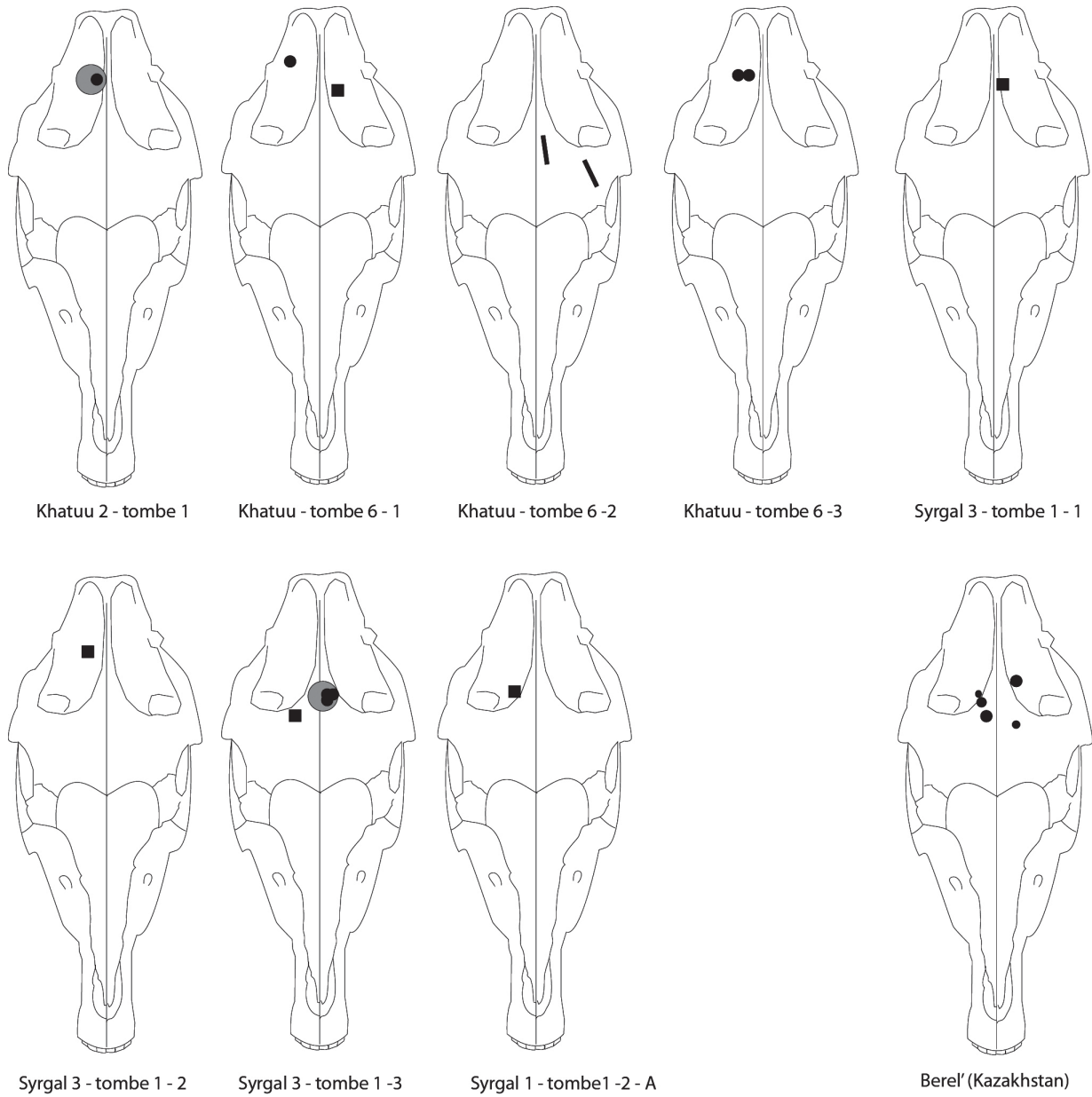


Figure 17. Position of slaughter impacts on Mongolian horses - 2

remains: the analysis must begin when the bones are excavated and removed, and not just when they arrive at a laboratory. It is only from recording in this manner that we will move beyond the stage of simple biological descriptions of the animals and refine the subject of the archaeology of ritual, including the history of the tomb from its initial excavation to its sealing, including the actions undertaken not only in the pit but also

around it. Within this perspective it is necessary to consider the tomb as part of a larger assemblage, based on a common cultural and ritual base: from this we will extract information which allows a more rounded recreation of society and viewing the tomb as a whole, with its own history. Excavations must be approached with greater precision, and are likely to produce better data and more insights.

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