PATHOLOGICAL CHANGES OF HORSE BONES IN THE MIDDLE AGES IN POLAND - PHOTOGRAPHIC RECORDS

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Abstract

The publication presents the pathological changes occurring in well-preserved excavated bones of horses from the Middle Ages in the form of photographs and analysis of visible pathologies in comparison to bone diseases observed nowadays. The material came from different areas of Poland and belonged to the Centre of Archaeological Research of Warsaw University, being at the same time a kind of unique exhibits in Poland. Most of the pathologically changed bones were limb bones.

Key words: horses, excavated bones, pathological changes.

The earliest excavation materials of pathologically changed horse bones came from the pre-historic period. This is the longest period in the history, lasting from the moment when a human appeared on the Earth until the development of writing, which provided us with the first bone material of horses, dated about 400 BC. However, osteological analysis of the excavation material did not start until about 100 years ago, with its particular development after the Second World War. In Poland, Wrzosek (23) was the first to deal with excavated bones of animals coming from old times. He emphasised that animal bones were a valuable material and because of that, they should be the subject of systematic research. Pioneering research into animal remains in Poland was also conducted by other archaeologists, such as Malinowski (19) or Węgrzynek (22). While analysing human remains, they also concentrated on animal remains. However, excavated animal bones were analysed on a large scale by Wyrost (24), Lasota-Moskalewska and Świeżyński (17), Bocheński and Nadachowski, Wolsan (3), Marciniak (20), Ablamowicz (1), Makowiecki (18), Kobryń (9, 10), Kubiak (12, 13), and others, starting at the same time a new scientific discipline – archaeozoology.

It is worth stressing that only some of the researchers occupied with animal skeletons from old times concentrated on those with pathological changes (4, 7, 10, 14). Thus, this publication is to present, in the form of photography, the well preserved exhibits of pathologically changed bones dating back to the Middle Ages and the beginning of the Modern Times, and then to analyse visible pathologies in reference to present bone diseases.

Material and Methods

The age of the bone material used in the analysis was known and estimated, depending on bones, between 4 and 15 century AD. Places of excavation of individual bones were specified. Exhibits came from different parts of Poland and belonged to the Centre of Archaeological Research of Warsaw University, being at the same time unique exhibit in Poland. The research material was made accessible by the courtesy of Professor A. Lasota-Moskalewska, whom I would like to hereby thank.

The excavated material was well preserved. Some of the bones remained as a whole, others were in fragments but big enough to be classified to a given species. Classification was made according to present methodical arrangements (11, 16). The basis of the interpretation of changes concerning excavated bones or their remains was the comparison of the changes with pathological lesions observed in horses living at present time.

Results

Out of the whole collection of excavated horse bones, only those with pathological changes were
analysed. The age of the exhibits was estimated as the Middle Age. All the bones were dug out in the present territory of Poland. Most of the pathologically changed bones of this species were limb bones.

The first presented exhibit is the left metatarsal bone III of a horse dating back to the 15th century BC and coming from the area of Pultusk (Figs 1-5).

At the base of the analysed bone, there are some visible pathological changes of a degenerative type. There is the evidence of intravital deformity (*arthropathia deformans*) and ankylosis of the tarsal joint (*arthropathia ankylopoetica*) also called spavin (*arthropathia deformans et ankylopoetica tarsi*).

Another presented bone, dating back to 4th century AD, is the left fetlock bone coming from the area of Tykocin (Poland). It is possible to see degenerative changes, which are typical for the ringbone (Figs 6-8). In another picture of the fetlock bone, degenerative changes can be observed, concerning also the neighbouring proximal metaphalangeal bone (Fig. 9). Both exhibits belong to the same thoracic limb. It is a typical picture of a ringbone of the proximal metaphalangeal joint.

Another presented bone is the left metacarpal III bone, dating back to 15th century AD, coming from the area of Pultusk (Figs 10, 11).

Unfortunately, not all of the presented bones were kept in whole until present times. Some of them are in parts. In the next pictures, we can see that it is an example of a fragment of the bone shaft of the left tibial bone of a horse coming from the area of Pultusk. The estimated date of origin is about 15th century AD (Figs 12-15).

Although most of the pathological changes concerned limb bones, other parts of horse skeleton changed pathologically were also found, such as fragments of the rib bones. They all came from the period between 11th and 14th century AD (Figs 16-19). In the collection of excavated bones, a pathologically changed horse vertebra was found. It was a part of the lumbar segment. The vertebra, dating back to the 14th century AD, comes from the area of Ciechanów.

Another bone with visible pathology was the left jaw of a horse dating back to the 13th century AD (Figs 23, 24). A hole in the side surface of the jaw body where premolar teeth roots were situated was a visible change. Both the type and the place of the hole suggest the presence of the intravital dental fistula. The place of the hole is typical for dental fistulas, which are the result of purulent pulpitis, spreading to periosteum and then to the surface of the bone. The changes are also visible on the surface of the medial body of the jaw.

![Figs 1 and 2. Excavated left metatarsus III of a horse. Left side – its dorsal surface, right side – plantar surface (photo. M. Dzierżęcka).](image)

![Figs 3, 4, and 5. The sight of the base of the analysed metatarsus with marked pathological changes (photo. M. Dzierżęcka).](image)

Fig. 9. Degenerative changes in the proximal metaphalangeal joint disease. The changes concern the fetlock bone – dorsal sight and the proximal metaphalangeal bone – plantar sight (photo. M. Dzierzęcka).

Figs 10 and 11. Excavated metacarpal III bone. Upper picture – dorsal surface, lower – palmar surface, with visible degenerative changes, located on the proximal end of the shaft of the bone and in the area where the splint bones are present intravitally (metacarpal bones II and IV) (photo. M. Dzierzęcka).
**Fig. 12.** A fragment of an excavated left tibial bone of a horse with visible large thickening of the shaft in the area of the distal end of the bone (photo. M. Dzierzęcka).

**Figs 13, 14, and 15.** Other photos of the above presented tibial bone of a horse (photo. M. Dzierzęcka).

**Figs 16 and 17.** A part of the rib bone coming from the period between 11th and 14th century AD. Visible thickening, which appeared after synostosis. Lower photo – visible fissure after a fracture (photo. M. Dzierzęcka).

**Figs 18 and 19.** A fragment of the rib bone of another horse, dating back to the period between 11th and 14th century AD. Also, visible mark after a fracture and a big thickening as a result of synostosis (photo. M. Dzierzęcka).
Discussion

Research concerning pathological changes of the skeleton of horses conducted on excavated material coming from early years of the Iron Age and the Middle Ages allowed characterising various pathologies (6, 10, 14). The most common was fracture (*fracturae ossium*), a half of which referred to limb bones. The authors emphasise that these fractures could be results of changed morphophysical properties of the bone tissue, occurring after domestication, which happened very late as far as horses were concerned, in the Bronze Age (9). It led to changes in nutrition and their use in comparison to their wild ancestors. Bones of domesticated animals, horses as well, have lower specific weight, smaller amount of the compact substance and a bigger bone marrow cavity. They are also characterised by a changed microscopic structure and lower index of the osteon surface (15, 16). Exostosis, periostitis, and osteomyelitis were also observed. Some cases of joint diseases with degenerative changes such as joint deformity (*arthropathia deformans*) and their ankylosis (*arthropathia ankylopoetica*) were found (10).

It is important to take into particular consideration the spavin, which occurs in contemporary horses, and is defined as a complex of clinical symptoms and lameness is among them. It is a result of painful, primary dry tarsal joint inflammation. Inflammation process is situated in the place where the medial tarsal bone is joined to III tarsal bone or in the place where I, II, and III tarsal bones are joined to the metatarsal bones. Except for lameness, a tumour in the lower part of the tarsal joint on the front medial side is another clinical symptom of spavin. This characteristic deformity is an effect of changes and is called clubfoot tumour. Similar changes concerning phalanges are called ringbones (21).

A research conducted on excavated horse bones coming from the La Tène culture in the Iron Age (from 400 BCE to the first century BCE) revealed that spavin was recognised during this period affecting tarsal bones and called a ringbone, which appeared as a kind of deformity and ankylosis of phalanx parts (*arthropathia deformans et ankylopoetica phalanges*) (5). Another research concerning bones coming from the Iron Age proved that spavin was also common. Furthermore, the above-mentioned pathological changes developed in undomesticated ancestors of horses as well (10).

Many researchers observed that, apart from the skull bones, most of the excavated bones were upper and lower limb bones, but there were also few chest and spine bones. Other bones were dug out sporadically (2). At the same time, researchers occupied with horse skeleton agreed that most of pathologically changed bone remains of the species concerned limb bones.
Research referring to excavated material coming from early years of the Iron Age (from 700 BC to 1200 AD) and the Middle Ages (5th–13th century AD) showed that pathological changes concerning horse skeleton are most common in limb bones (4, 6, 7, 10, 14).

There is a lot of evidence that pathological changes occurring in limb bones, especially in their autopodial parts were the results of overloading of animals. It is commonly known that from the late periods of the Bronze Age (about 700 BC) horses were used mainly to ride on. However, for those horses, whose population did not exceed 130 cm in the withers, weight of the riders dressed in heavy armours was a huge ballast (10). During this period, intravital dental fistulas, which appeared in horses living at present (especially young ones) were also common (21).

On the basis of the analysed material, it can be stated that pathologies concerning excavated bones of horses are not different from those we can find nowadays (8). Moreover, many pathological changes appearing in present horses can be observed in their wild ancestors. It proves that many orthopaedic diseases cannot be linked to domestication, way of keeping, or use of horses.

References


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