

THEY DIDN'T SHOOT HORSES: FRACTURE MANAGEMENT IN A HORSE OF THE 5TH CENTURY BCE FROM SINDOS, CENTRAL MACEDONIA, GREECE

Theodore G. Antikas
University of Washington History Department, Seattle, Washington

Summary. Five horses and two dogs buried in a human cemetery of the 4th-7th c. BCE were unearthed in 2003-5, during a rescue archaeology project at Sindos, southwest of the city of Thessalonike. One of the five horses was juxtaposed to a human and a dog burial and was an adult mare dating to the 5th c. BCE. Extensive lower leg pathology suggested use as a pack or cart horse. The presence of an old, compound fracture of mc-3 in her left foot that had sufficiently healed, as shown by macroscopic and X-ray evaluation, indicates that management of fractures was practiced as early as, or earlier than the 5th c. BCE. The animal survived the compound fracture for more than 3-4 years, although the fractured metacarpal shows a considerable post-treatment angle coupled with osteomyelitis. It is postulated that the lame mare may have carried her loving owner's cart to the grave, then sacrificed in situ and laid next to him. This archaic burial habit first mentioned by Homer in the 8th c. BCE (*Iliad* 171-74) has been substantiated by several man-and-horse burials found in northern Greece. In one of such burials a young stallion was found in proximity to a young man at the archaic cemetery of Polykastro. The stallion's exceptional height, lower leg pathology and a dentition retaining 50% of its deciduous teeth is as rare as the case of fracture treatment of the Sindos mare. More analyses of human and horse remains are necessary in this cemetery including archaeo-DNA genetic profiles, so as to provide data on morbidity and dietary patterns of the *Dorian* people and horses in the Northern Greek region. We would also gain information on neonate, infant, sub-adult and adult mortality and the percentage of men to women burials in this cemetery. Such ratios would relate to the equine find and mark the importance of horse burials with humans in NW Macedonia during the Late Iron and Archaic Ages.

Key words: Horse, bone fracture, Greece.

JIE NEUŽMUŠINĖJO ARKLIŲ: GRAIKIJA, CENTRINĖ MAKEDONIJA, SINDOSAS, V a. pr. Kr. – ARKLIO KAULŲ LŪŽIAI

Theodore G. Antikas
Vašingtono universitetas, Istorijos katedra, Sietlas, Vašingtonas

Įvadas. Penkių arklių ir dviejų šunų kaulai, rasti žmonių kapuose, datuojamuose IV–VII a. pr. Kr., iškasti archeologijos paminklų gelbėjimo metu 2003–2005 m. Sindose, į pietvakarius nuo Thessalonike miesto. Viena tarp penkių arklių buvo kumelė, datuojama V a. pr. Kr. Jos griaučiai gulėjo šalia žmogaus ir šuns kapo. Užpakalinių kojų kaulų patologija rodo, kad kumelė buvo naudojama traukiamiesiems darbams. Senas kairės kojos trečiojo plaštakos kaulo lūžio suaugimas, įvertintas makroskopiškai ir rentgenų, rodo, kad kaulai galėjo būti atstatomi nuo V a. pr. Kr. ir anksčiau.

Gyvūnai su įvairiais lūžiais išgyvendavo daugiau nei 3–4 metus, nors plaštakų lūžiai komplikavosi osteomielitu. Tai leidžia daryti prielaidą, kad šluba kumelė turėjo vežti savo mylintį šeimnininką į kapines, ir ten ji buvo aukojama – paguldoma šalia mirusiojo. Ši archajišką paprotį pirmą kartą paminėjo Homeras VIII a. pr. Kr. (*Iliada*, 171–74), tą patvirtino ir Šiaurės Graikijoje rasti keli žmogaus ir arklio kapai (Polikastro kapinynas). Šiame kapinyne iškasto jauno erzilo (ūgis ties gogu >145 cm) užpakalinių kojų patologijos ir pieninių bei nuolatinių dantų kaitos anomalija retai sutinkama to laikotarpio medžiagoje.

Norint išsiaiškinti Šiaurinės Graikijos regiono žmonių ir arklių sergamumą ir mirštamumo modelį, būtina atlikti išsamesnę žmonių ir arklių palaikų analizę, įskaitant ir DNR genetinius tyrimus. Norime gauti informacijos apie naujagimių, kūdikių, vaikų ir suaugusiųjų mirtingumą, vyrų ir moterų kapų procentinį santykį. Šis santykis leistų nustatyti palaidotų arklių skaičių, išskirti žmonių su arkliais kapus, datuojamus vėlyvuoju geležies ir archajiniu amžiumi Šiaurės Vakarų Makedonijoje.

Raktažodžiai: arkliai, kaulų lūžiai, Graikija.

Introduction. A rescue dig at the I.Z of Thessalonike at Sindos has revealed the presence of five horse and two dog burials in a cemetery containing 47 human graves (archaeologist Mr. A. Keramaris, 16th Ephorate, Thessalonike-Fig. 1). The estimated number of adult men burials is under 17, indicating that the ratio of men to horses is 3:1. Such ratios have not been found in Macedonia (e.g., in Akanthos the ratio is 150-250:1). This leads to the postulate that Sindos was a city from which riders were re-

cruited for the Macedonian cavalry in the Classical and Hellenistic times. This postulate is substantiated by the fact that all horses, from the 7th to the 4th century BCE, bear signs of leg pathology caused by fast movements on level ground, which is typical of warhorses. Two of the horses are depicted on Figs. 2-3 as their stature and burial position are of special interest. *Hippos-5* was the tallest of all, probably of Thessalian origin, and was buried on a north-south axis on its right amidst two men in an ex-

panded pose, as if people did not wish to economize in space. Interestingly, a dog buried at the horse's hind feet was laid in the east-west axis, on its right side, semi-crescent and facing east (Fig. 2). *Hippos-4* was buried in the embryonic position on its left side and faced east. Its proximity (c. 50 cm) to a wreathed man's grave in a head-to-head burial may indicate a twin burial of an *asthetairoi* (companion) and his mount (Fig. 3). The most touching scene however, was *Hippos-3*, a 12-year old yoke mare with a compound fracture in the left metacarpal-3 (Figs. 4-5). The fracture was healed by immobilization at least 4-5 years prior to death but its evident deformation indicates that the animal was constantly lame pre mortem. It is postulated that she may have driven the funeral cart of her dead owner to his grave so as to be sacrificed and buried next to him. Her case is dealt in a follow up paper at this year's ICAZ meeting.

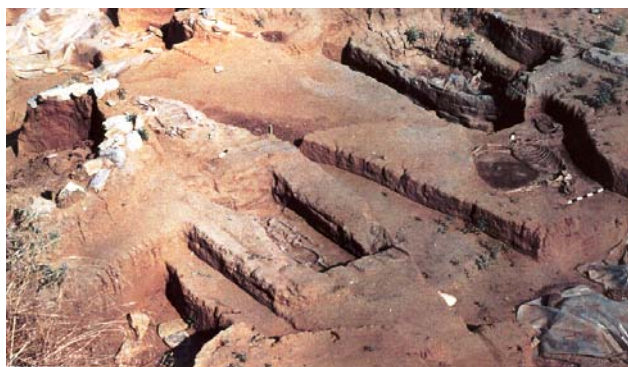


Fig. 1. East view of the Sindos human cemetery



®Fig. 2. Common burial of *Hippos-5* and *Dog-2*



®Fig. 3. *Hippos-5* buried across a man (see #1)

Materials and Methods. The 47 humans, five horses and two dogs unearthed at Sindos date from the 7th to the 3rd century BCE. As the Minimal Number of Individuals (MNI) of adult men was estimated to be 17, the high ratio of horses per man (1:3) suggests that Sindos may have been a city where cavalry men (*asthetairoi*) were recruited for the necessities of wars during the mid-4th century BCE (Philip's era). Sindos lies between the rivers Axios and Gallikos in Central Macedonia, and so does Polykastro, site of the second horse described in this paper. Both sites are rich in alluvial deposits and this may explain the reason for which the skeletal remains of horses were in very good state of preservation. Bones and teeth were handled with gloves, cleaned with distilled water, photographed, X-rayed, packed in acid free and/or aluminum paper, and those found in perfect condition were selected for radiocarbon and stable isotope analyses following standard techniques (Antikas, 1999). Samples for carbon-14 dating were sent to the "Democritos" Nuclear Research Ctr. in Athens, Greece.

Results.

1. Sindos, *Hippos* #3: fracture management

Adult mare aged 11-12 years, measuring 130-135 cm (13 hands), dating to the 4th century BCE, and perhaps the most touching discovery at the Sindos necropolis. The mare had a compound fracture of the left metacarpal bone, but she had not been killed, as is the custom in our days. The fracture was found to have healed at least two years before her death (Figs. 4, 5). Apparently her front leg had been immobilized and press-banded for at least a period of 3 to 4 months. However, with no antibiotic treatment the bone must have been infected (by osteomyelitis?) thus forming an incomplete *callus* and a significant change of angle in the healed metacarpal. It is also probable that the change of angle was due to her returning to work before completion of the bone healing process.



®Fig. 4. *Hippos* 3 with visibly fractured mc-3

In either case it is certain that the significant change in angle caused a shortening of the front leg resulting in constant pain and chronic lameness, hence it is not surprising that she was sacrificed. Additional pathology in her hind legs suggests that she was used as a carthorse. Therefore one can visualize the very touching scene of an old, lame, slow cart horse driving its loving master to his grave; and

then being sacrificed and buried with him so as to share with the master their after life on the Elysian Fields.



®Fig. 5. Left and right mc-3

The mare's good state of preservation coupled with the postulate that she may have been fed with fish supplement(s) so as to help her fracture heal faster made her a top candidate for stable isotope sampling (see relevant paper of this author at the ICAZ meeting in Kaunas).

2. Polykastro, Central Macedonia: one young stallion, one young man

Male horse unearthed by archaeologist Mrs. Thomi Savopoulou (16th Ephorate of Classical Antiquities, Thessalonike) from a rescue dig at Polykastro, ten miles south of the Greek border to FYROM and 30 miles upstream of the Axios River (Fig. 6). The stallion dates to the 7th-6th centuries BCE and was studied both *in situ* and at the Lab of Anatomy-Physiology of the Agricultural College at the Aristotelian University. It may well be related to one of the young men buried in the cemetery as indicated by its young age (Fig. 7), leg pathology and non-fusion of the atlas and long bone epiphyses (Figs. 8, 9). Its height of over >145 cm and its close proximity to the grave of a young adult male suggest strongly that the four-year-old stallion might have become *hippos polemikos* (warhorse) for use by *hetairos* (cavalry officer) despite its surprisingly abnormal dentition most probably due to genetic defects. The majority of deciduous teeth were present along with the permanent ones of which eight incisors showed signs of attrition. The retained incisors accompanied by pitting and lysis of the maxillary and mandibular bones and dispersed calcifications appear to be the signs of a premature colt with developmental problems. Lower leg pathology was also noted in his front feet further indicating a warhorse, or perhaps a competitive horse. Its ly-

ing on the right side is a common burial position, and so is the semi-crescent posture on the north-south axis with the head facing north. As to the multi-fragmented state of its skull, it may indicate euthanasia by sharp blow on its frontal bone, a routine sacrificial technique used in ancient Greece.



®Fig. 6. The Polykastro horse burial, 7th c. BC



®Fig. 7. Dentition and maxillary pitting



®Fig. 8. Non-fusion of the atlas



®Fig. 9. Non-fusion of olecranon and two humeri

Discussion and Conclusions

Management of luxations and/or fractures in humans was practiced in Greece long before the 5th century BCE, as the *Bank of Hippocrates* used to manage luxations of the coxo-femoral joint and fractured bones bears the ancient doctor's name until today. However, there has been no case report of fracture treatment in horses whose skeletal remains were found in Greece, and we wonder if the case of the Sindos *Hippos-3* could be the first found in bibliography. As to the Polykastro stallion, the analyses of one horse and one human skeleton has not yielded enough key data to determine the health (including trauma), or dietary, or demographic patterns of the Early Iron and Archaic Age population at Polykastro. Should more skeletons be analysed in this archaic cemetery, they could offer a chance of studying the morbidity and dietary patterns of the *Dorian* people in Northern Greece. We would also gain information on neonate, infant, sub-adult and adult mortality rates and the percentage of men to women burials in this cemetery. Such ratios would relate to the equine find and mark the importance of horse burials with humans in NW Macedonia during the Late Iron and Archaic Ages. The multi-fragmented condition of the horse's skull may be due to either the pH of the soil or its young age but we believe that it may also be due to the classical Greek technique of euthanizing sacrificial horses

by a sharp hit of a pickaxe on the frontal bone, a common find in several Greek *necropoleis* (Antikas, 1999). Its height, which is significantly greater than that of the local Greek breeds, suggests that the stallion may have been imported from Central/Northern Europe or Italy. Such importations of *agonistic* (competitive) and *polemic* (war) horses were quite fashionable in Greece as early as the 6th or 5th centuries BCE. For instance, the Spartan Leon who won the *quadriga* race at the 89th Olympics of 428 BCE had imported his four chariot horses from Venice (*Polemon 22: ΛΕΩΝ ΛΑΚΕΔΑΙΜΟΝΙΟΣ ΙΠΠΟΙΣΙ ΝΙΚΩΝ ΕΝΕΤΑΙΣ ΑΝΤΙΚΑΕΙΔΑ ΠΑΤΗΡ*); Antikas 2004).

An equally important find was the Polykastro stallion whose dentition retained 14 deciduous teeth out of 24 at the age of four, a rare find in either human or horse skeletons, known to be of genetic origin. Retention of one or two deciduous teeth occurs in humans and animals, but to my knowledge there have been no case reports of deciduous retention exceeding 50%. Unfortunately, the condition of the stallion's remains did not allow any genetic analysis for ancient DNA to allow the identification of abnormal genes. Given that the bone marrow of flat bones is the source of erythrocytes, maxillary pitting and lysis coupled with dispersed areas of calcification suggest erythrocyte endoparasitism (e.g., babesiosis, piroplasmosis) leading to *trophopenia* of this stallion at a young age. Parasitism of this type is not surprising in river and lake areas as that of Polykastro. As to the noted lower leg pathology, it may be due to hard training before maturity.

References

1. Antikas T. G., *Comparative Mammalian Osteology and Methods of Identification in Archeological Excavations*. Aristotelian U Press, 1999 (in Greek; 2nd ed, 2002).
2. Hippocrates, *Peri Arthron 72*, Mochlikos 25.
3. Antikas T. G., The honour to be buried with horses from Mycenaean Nemea to Macedonian Vergina. In: *Les Equides dans le Monde Mediterranee Antique*, A Gardeisen (ed). CNRS 143-51, 2005.
4. Polemon, 22.
5. Antikas T. G., *Olympica Hippica*. Euandros ed., Athens 2004.
6. Antikas T. G., *The Ancient Greek Olympionikai*. Eundros ed., Athens 2004.

Received 12 November 2007

Accepted 25 April 2008