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1. Introduction

The economic, ritual and social significance of the horse (*Equus caballus*) in past societies is a topic that has attracted a lot of research interest. For example, the ritual use of the horse in Iron Age Scandinavia and the Baltics has been actively discussed.[4] The influence of

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[3] Natural Resources Institute Finland, Myllytie 1, FI-31600 Jokioinen, Finland.

[4] E.g. Audronė Bliujienė, Miglė Stančikaitė, Giedrė Piličiauskienė, Jonas Mažeika and Butkus Donatas, "Human-horse burials in Lithuania in the late second to seventh century AD: a multidisciplinary approach," *European Journal of Archaeology* 20 (4) (2017): 10.1017/eaa.2017.14. Kristina Jennbert, "Animal Graves. Dog, Horse and Bear," *Current Swedish Archaeology* 11 (2003): 139–152. Valter Lang, "Riding to the afterworld: Burying with horses and riding equipment in Estonia and the Baltic rim," in *Identity Formation and Diversity in the Early Medieval Baltic and Beyond*, ed. Johan Callmer, Ingrid Gustin and Mats Roslund (Leiden: Brill, 2017), 48–75. Ola Magnell, Adam Boethius and Johan Thilderqvist. "Fest i Uppåkra. En studie av konsumtion och djurhållning baserad på djurben från ceremonihus och vapendeposition [Feast in Uppåkra. A study of consumption and animal husbandry based on animal bones from a ceremonial building and weapons deposit]," in *Folk, fä och fynd* [*People, cattle and finds*], ed. Birgitta Hårdh and Lars Larsson. Uppåkrastudier 12, Acta Archaeologica Lundensia 8°, No. 64 (Lund: Instituionen för Arkeologi och Antikens historia, 2013), 85–132. Heidi M. Nistelberger, Albina Hulda

Christianity on the role of the horse, usually considered to have ended the consumption of horsemeat in Northern and Western Europe, is another key area of focus.[5] Overall, the ceasing of horse consumption is evident in the archaeological bone material dating from the medieval period that followed the adoption of Christianity, and the phenomenon has also been connected with urbanisation.[6] Thus, the Christianisation of society led to a significant change in the role of the horse, and this change is reflected in the archaeological faunal material.

This study focuses on the question of the horse's role in subsistence, rituals and beliefs as observed in Finnish zooarchaeological material during the local Middle Iron Age (ca. AD 375/400 – 800/825) and Late Iron Age (ca. AD 800/825 – 1200/1300) and the medieval (ca. AD 1200/1300 – 1520) and post-medieval periods (AD 1520 – ca. 1900).[7] These phases

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Pálsdóttir, Bastiaan Star, Rúnar Leifsson, Agata T. Gondek, Ludovic Orlando, James H. Barrett, Jón Hallsteinn Hallsson and Boessenkool Sanne, "Sexing Viking Age horses from burial and non-burial sites in Iceland using ancient DNA," *Journal of Archaeological Science* 101 (2019): DOI:10.1016/j.jas.2018.11.007.

[5] Rose-Marie Arbogast, Benoît Clavel, Sébastien Lepetz, Patrice Méniel and Jean-Hervé Yvinec. *Archéologie du Cheval. Des Origines à la Période Moderne en France* (Paris: Éd. Errance, 2002). Auli Bläuer, "Myöhäisrautakauden ja keskiajan koti- ja riistaeläimet sekä maatiaisrodut [Domestic and wild animals during the Late Iron Age and Medieval period and native domestic breeds]," in *Tursiannotko. Tutkimuksia hämäläiskylästä viikinkiajalta keskiajalle [Tursiannotko. Research from a village in Häme from the Viking Age to Medieval Period]*, ed. Kreeta Lesell, Marjo Meriluoto and Sami Raninen. Tampereen museoiden julkaisuja 148 (Tampere: Tampereen museot, 2017), 93–101. Liina Maldre, "Hobune Eestis muinais- ja keskajal [Horse in Estonia during the prehistory and Medieval period]," in *Loodus, inimene ja tehnoloogia [Animals, people and techonology*], ed. Jüri Peets and Valter Lang. Muinaisaja teadus 5 (Tallinn: Ajaloo Instituudiväljaanne, 1998), 203–220. Aleksander Pluskowski, Daniel Makowiecki, Mark Maltby, Eve Rannamae, Lembi Lõugas, Liina Maldre, Linas Daugnora, Stuart Black, Gundula Müldner and Krish Seetah, "The Baltic Crusades and ecological transformation: the zooarchaeology of conquest and cultural change in the Eastern Baltic in the second millennium AD," *Quaternary International* 510 (2019): 28–43. Kristopher Poole, "Horses for courses? Religious change and dietary shifts in Anglo-Saxon England," *Oxford Journal of Archaeology* 32 (3) (2013): 319–333. Birgitta Sigvallius, "Kött, ull och läder [Meat, wool and leather]," in *Land och samhälle i förändring. Uppländska bygder i ett långtidsperspektiv [Land and society in change. Settlements in Uppland in a long-time perspective]*, ed. Eva Hjärtner-Holdar, Håkan Ranheden and Anton Seiler (Uppsala: Societas Archaeologica Upsaliensis, 2007), 177–188. Auli Tourunen, *Animals in an Urban Context - A Zooarchaeological study of the Medieval and Post-Medieval town of Turku*. Annales Universitatis Turkuensis Ser B, Humaniora 308 (Turku: University of Turku, 2008).

[6] Brita Egardt, *Hästslakt och rackarskam: En etnologisk undersökning av folkliga fördomar [Horse butchery and knacker shame: An ethnological study of popular prejudices*], Nordiska Museets Handlingar 57 (Stockholm: Nordiska Museet, 1962). Chris Fern, "Horses in mind, in Signals of Belief in Anglo-Saxon England. Anglo-Saxon Paganism Revisited," ed. Carver Martin, Sanmark Alex and Semple Sarah (Oxford: Oxbow Books, 2010), 128–157. Pluskowski et al., "The Baltic Crusades." Poole, "Horses for courses?" Tourunen, *Animals in an Urban Context*. Maria Vretemark, *Från ben till boskap. Kosthåll och djurhållning med utgångspunkt i medeltida benmaterial från Skara. Del 1 [From bones to cattle. Diet and animal husbandry based on medieval bone material from Skara. Part 1]*. Skrifter från Länsmuseet Skara nr 25 (Skara: Skaraborgs Länsmuseum, 1997). However, also see Mark Maltby, Aleksander Pluskowski, Eve Rannamäe and Krish Seetah, "Farming, Hunting, and Fishing in Medieval Livonia: The Zooarchaeological Data," in *Environment, Colonization, and the Crusader States in Medieval Livonia and Prussia: Terra Sacra*, ed. Alexander Pluskowski. Environmental Histories of the North Atlantic World 2 (Brepols: Turnhout, 2019), 137–174 and Vretemark, "Från ben till boskap," 144 for evidence of some medieval consumption of horsemeat.

[7] Georg Haggrén, "Keskiajan arkeologia [Medieval archaeology]," in *Muinaisuutemme jäljet. Suomen esi- ja varhaishistoria kivikaudelta keskiajalle [Traces of our past. The prehistory of Finland from Stone Age to Medieval Period]*, ed. Georg Haggrén, Petri Halinen, Mika Lavento, Sami Raninen and Anna Wessman (Helsinki: Gaudeamus Oy, 2015), 379. Sami Raninen and Anna Wessman, "Rautakausi [Iron Age]," in

represent three different belief systems. At the beginning of the medieval period, Christianity gradually replaced the local ethnic religions. During the 16th century, at the beginning of the post-medieval period, Catholic Christianity in turn was replaced by Protestantism. To understand how these changes in belief systems affected the role of the horse, the deposition patterns of horse remains were examined in the light of their archaeological context, anatomical distribution and treatment. This data was then combined with ethnologic and folklore material relating to beliefs and attitudes that were associated with horses. It was assumed that the symbolic and social attributes connected with horses would be reflected in the materiality of what happened to the carcass after the horse was slaughtered or died, and that this would be manifested in the archaeological faunal material.

The deposition patterns of archaeological faunal remains can reflect values, attitudes, beliefs and habits that were connected to animal species. In archaeological contexts, access to these psychological phenomena is possible through the remains of ritual practices.[8] This is because, in the words of Ronald L. Grimes, "although rituals consist of actions, it's almost impossible to discover, or even imagine, a ritual without its attendant material culture."[9] Animal sacrifices and other forms of ritual use of animals and their remains have been common in many geographical areas and in many periods.[10] Although these are often discussed in pre-Christian contexts, it is important to remember that rituals involving animal remains were still practised long after the adoption of Christianity. Examples of this in the historical Finland include the ritual importance of the bear, the use of animal remains as building deposits, and lamb sacrifices connected to St Olav or Michaelmas.[11] However, in Finland, historical horse bones from contexts other than settlement sites have yielded little research interest. The general underlying assumption seems to be that the ritual use of animals ceased after the adoption of Christianity, and thus horse remains dating to the historical period are the result of non-ritual, domestic discarding of bones.[12]

Muinaisuutemme jäljet. Suomen esi- ja varhaishistoria kivikaudelta keskiajalle [Traces of our past. The prehistory of Finland from Stone Age to Medieval Period], ed. Georg Haggrén, Petri Halinen, Mika Lavento, Sami Raninen and Anna Wessman (Helsinki: Gaudeamus Oy, 2015), 288.

[8] E.g. Lars Fogelin, "The Archaeology of Religious Ritual," *Annual Review of Anthropology* 36 (1) (2007): 55–71. Timothy Insoll, *Archaeology, Ritual, Religion* (London: Routledge, 2004). Liv Nilsson Stutz, "The Many Archaeologies of Ritual," *European Journal of Archaeology* 13 (3) (2010): 389–392.

[9] Ronald L Grimes, "Ritual," *Material Religion* 7 (1) (2011): 77.

[10] E.g *The Ritual Killing and Burial of Animals. European Perspectives*, ed. Aleksander Pluskowski (Oxford: Oxbow Books, 2012).

[11] E.g. Sonja Hukantaival, *'For a Witch Cannot Cross Such a Threshold!' – Building Concealment Traditions in Finland c. 1200–1950*. Archaeologia Medii Aevi Finlandiae, XXIII (Turku: Suomen keskiajan arkeologian seura, 2016). Sonja Hukantaival and Auli Bläuer, "Ritual Deposition of Animals in Late Iron Age Finland: A Case-Study of the Mulli Settlement Site in Raisio," *Estonian Journal of Archaeology* 21 (2) (2017): 161–185. Matti Sarmela and Ritva Poom, "Death of the Bear: An Old Finnish Hunting Drama," *The Drama Review* 26 (3) (1982): 57–66.

[12] Cf. Pirjo Lahtiperä, "Luuaineiston analyysi [Osteological analysis]," in *Metallikautinen asutus Kokemäenjoen suussa II [Settlement in the Kokemäki River mouth during Metal Period, part two]*, ed. Unto Salo (Pori: Satakunnan kirjateollisuus osakeyhtiö, 1970), 198–219. Auli Tourunen, "Hämeenkosken Pyhän Laurin kirkon hautausmaan luut [Bones from the cemetery of Pyhä Lauri Church]," *Keski-Lahden seurakunnan julkaisuja* 2, (2005): 103–110. Ulla Tupala, *Eläinuhreja vai teurasjätteitä. Euran Luistarin rautakautisen ruumiskalmiston eläinluumateriaalin lähdekriittistä tarkastelua [Animal sacrifices or butchery waste. Study of animal bones from Iron Age cemetery of Eura Luistari*]. (Master's thesis, Archaeology, University of Turku, 1999). However, also see Hanna Kivikero, "Interpretations of Animal Bones from Inhumation Graves in Finland," *META Historiskarkeologisk tidskrift* (2015): 95–106.

A. *The use of horses in the Iron Age and the process of Christianisation*

Archaeological data indicates that the consumption of horsemeat was common in Northern and Western Europe, including Finland, during the periods called early medieval period and/or the Late Iron Age (ca. AD 500 – 1100). However, horsemeat played only a minor role in subsistence, and the proportion of horse remains among cattle, sheep, goat and pig bones is usually very small: only a few per cent.[13] In the Late Iron Age cultural sphere, complete horse carcasses were often cremated or buried with human bodies,[14] but cremated horse bones in burials are rare in Finland.[15] Unburnt horse bones recovered from burial contexts have been interpreted as remnants of funeral feasts, grave goods or remnants of later rituals.[16] It is common to find horse equipment, such as bits, in Middle Iron Age (ca. 375/400 – 800/825) cemetery sites.[17] These have been connected to the Scandinavian tradition of elite burials and with the belief that the soul of the deceased rides on horseback or in a wagon to the afterworld.[18]

Mostly in early research, the Christian aversion to the consumption of horsemeat was usually connected to the horse's status as a ritual animal in European pagan cultures.[19]

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[13] Arbogast et al., *Archéologie du Cheval*. Bläuer, "Myöhäisrautakauden ja keskiajan koti- ja riistaeläimet"; Magnell et al., "Fest i Uppåkra"; Maldre, "Hobune Eestis". Pluskowski et al., "The Baltic Crusades"; Poole, "Horses for courses?"; Sigvallius, "Kött, ull och läder"; Tourunen, "Animals in an Urban Context," however, also see Bengt Wigh, *Animal Husbandry in the Viking Age Town of Birka and its Hinterland. Excavations in the Black Earth 1990-95*, Birka Studies 7 (Stockholm: University of Stockholm, 2001), 118.

[14] E.g. Maeve Sikora, "Diversity in Viking Age horse burial: a comparative study of Norway, Iceland, Scotland and Ireland," *Journal of Irish Archaeology* 12 and 13, (2003–2004): 87–109. Sabine Sten, "Sacrificed animals in Swedish Late Iron Age monumental mound burials. Bones, behaviour and belief," in *The zooarchaeological evidence as a source for ritual practice in ancient Greece and beyond*, ed. Gunnel Ekroth and Jenny Wallensten (Athen: Svenska Institutet i Athen, 2013), 223–231. Maria Vretemark, "Evidence of animal offerings in Iron Age Scandinavia," in *The zooarchaeological evidence as a source for ritual practice in ancient Greece and beyond*, ed. Gunnel Ekroth and Jenny Wallensten (Athen: Svenska Institutet i Athen, 2013), 51–59.

[15] Paula Purhonen, "Mortuary practices, religion and society," in *Vainionmäki- a Merovingian Period Cemetery in Laitila, Finland*, ed. Paula Purhonen (Helsinki: National Board of Antiquities, 1996), 119–129. Anna Wessman, *Death, Destruction and Commemoration: Tracing Ritual Activities in Finnish Late Iron Age Cemeteries (AD 550-1150)*. Iskos 18 (Helsinki: Finnish Antiquarian Society, 2010), 93.

[16] Auli Bläuer, "Animal bones in old graves: a zooarchaeological and contextual study on faunal remains and new dated evidence for the ritual re-use of old cemetery sites in Southern and Western Finland," *Archaeological and Anthropological Sciences* 12 (206) (2020): DOI:10.1007/s12520-020-01165-4. Tuula Heikkurinen-Montell, "Distribution of the osteological material," in *Vainionmäki- a Merovingian Period Cemetery in Laitila, Finland*, ed. Paula Purhonen (Helsinki: National Board of Antiquities, 1996), 88–101. Pirkko-Liisa Lehtosalo-Hilander, *Luistari. 1, The Graves* (Helsinki: Suomen muinaismuistoyhdistys, 1982). Purhonen, "Mortuary practices." Eeva-Liisa Schultz and Hans-Peter Schultz, "Hämeenlinna Varikkoniemi – eine späteisenzeitliche-frühmittelalterliche Kernsiedlung in Häme. Die Ausgrabungen 1986–1990," *Suomen museo* 99 (1992): 41–85. Tourunen, *Animals in an Urban Context*. Wessman, *Death, Destruction and Commemoration*, 93.

[17] Raninen and Wessman, "Rautakausi," 288.

[18] Silke Eisenschmidt, "Burials with Wagon Bodies. The Female Perspective," in *Horse and Rider in the late Viking Age. Equestrian burial in perspective,* ed. Anne Pedersen and Merethe Schifter Bagge (Aarhus, Aarhus University Press, 2021). Lang, "Riding to the afterworld." Jussi-Pekka Taavitsainen, *Joitakin ajatuksia kuolaimista ynnä muista rautakautisista hevoskaluista [Some thoughts about bits and other Iron Age horse equipment]* Helsingin yliopiston arkeologian laitos moniste n:o 12 (Helsinki: University of Helsinki, 1976). Wessman, Death, Destruction and Commemoration, 93.

[19] E.g. Gustaf Näsström, *Forna dagars Sverige. Kulturhistorisk bilderbok om hedenhös och medeltid [Sweden of the past. A culture-historical picture book from time immemorial to the Middle Ages]* (Stockholm: Albert Bonniers

Although the significance of the horse in pre-Christian rituals has never been challenged,[20] the horsemeat taboo of early Christianity was later connected with the general food habits of Latin Christianity, given that the Romans did not traditionally consume horsemeat.[21] These cultural ideas of "pure" and "impure" shaped the wider context of food taboos of the Early Christian Church.[22] Horsemeat was by no means the only forbidden food; for example, dogs, cats and carcasses torn apart by wild animals were also considered as such. People who ate this impure food were "tainted" and needed to do penance.[23]

B. The role of the horse and the human–horse relationship in ethnologic and folklore material in Finland

In the absence of written sources, the evidence available for the study of the human–horse relationship in the Finnish Iron Age consists of archaeological material. The role of the horse during the medieval and post-medieval period can be studied through different written sources, but many details can best be understood by examining ethnologic and folklore material. The latter types of sources reveal that the living horse was associated with many positive attributes. The horse was the most valuable animal on the farm, and it needed and received better-quality fodder than, for example, cattle.[24] The stable was often the only shelter for farm animals that was situated close to the house (in *miespiha*, "man yard" in contrast to *karjapiha*, "cattle yard"). Horses sometimes even spent cold winter nights indoors with people.[25] In archived folklore accounts of customs and traditions related to horses dating from late nineteenth- and early twentieth-century Finland, the horse still has a special role among domestic animals. The horse was seen as an intelligent animal that could, for example, sense other-worldly activity and evil intentions. Thus, a horse would stop in its tracks if it sensed an other-worldly being or passed a person whose thoughts were evil.[26]

In mythology, of which the main source material in Finland is folklore collected in the nineteenth century, the horse also had an important role. In incantations, a mythical horse came from Hiisi (a mythical place) or a mountain, and it was fiery, red or black. While riding this horse, a shaman-like cunning person could travel to the heavens.[27] Hiisi is a complex mythical place: the word that gives it its name has been used to refer to a sacred grove, a

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Förlag, 1955), 25–27. Salomon Reinach, *Cultes, mythes et religions* (Paris: E. Leroux, 1908), 128–139. Frederick J. Simoons, *Eat Not This Flesh. Food Avoidances from Prehistory to the Present. Second Edition* (Wisconsin: The University of Wisconsin Press, 1994), 193. Summary in Egardt, *Hästslakt och rackarskam*.

[20] E.g. Bliujienė et al., "Human-horse burials in Lithuania"; Fern, "Horses in mind"; Jennbert, "Animal Graves"; Lang, "Riding to the afterworld"; Magnell et al., "Fest i Uppåkra"; Sikora, "Diversity in Viking Age horse burial"; Sten, "Sacrificed animals in Swedish Late Iron Age monumental mound burials"; Vretemark, "Evidence of animal offerings in Iron Age Scandinavia."

[21] Arbogast et al., *Archéologie du Cheval*. Egardt, *Hästslakt och rackarskam*, 91–92. Roel C G M Lauwerier, "Eating horsemeat: the evidence in the Roman Netherlands," *Archaeofauna 8* (1999): 101–113. Rob Meens, "Pollution in the Early Middle Ages: The Case of the Food Regulations in the Penitentials," *Early Medieval Europe* 4(1) (1995), 18.

[22] Egardt, *Hästslakt och rackarskam*. Meens, "Pollution in the Early Middle Ages."

[23] Meens, "Pollution in the Early Middle Ages."

[24] Ilmari Talve, *Finnish Folk Culture*, Studia Fennica Ethnologica 4 (Helsinki: Suomalaisen Kirjallisuuden Seura, 1997), 69–70.

[25] Kustaa Vilkuna, "Zur Geschichte des finnischen Pferdes," Studia Fennica XIII (1967): 5–49.

[26] *Finlands svenska folkdiktning (FSFD) VII, 3. Folktro och trolldom: Människan och djuren. [Folk belief and witchcraft: The human and animals]*, ed. Gunnar Landtman, Vilhelm E. V. Wessman and Wilhelm Forsblom (Helsinki: Svenska litteratursällskapet i Finland, 1952), 100, 135.

[27] Anna-Liisa Siikala, *Suomalainen samanismi. Mielikuvien historiaa [Finnish shamanism. History of visions]* (Helsinki: Suomalaisen kirjallisuuden seura, 1994), 199.

cemetery, a rocky area in the forest, and even the Christian Hell,[28] and these meanings are discussed further below. The horse's connection to Hiisi is also mentioned in the type of folklore that documents everyday beliefs. For example, when a horse needed to be swum across a lake, special rituals were needed to soothe the water spirit, which disliked the horse because it came from Hiisi.[29]

Although the living horse was treated as special, there were strong negative associations with killing and skinning a horse and with handling horsemeat. Thus, people who practised horse-skinning and other tasks that involved handling horse carcasses were treated with fear and disgust. It is said that even the doorframes were washed after the horse-skinner had left the house, and the plates he had touched were broken and thrown away.[30] In addition, horsemeat was still considered impure and tainting, even though Protestantism had abandoned the related Catholic penances.[31] Perhaps the repulsion to a dead horse was also behind the custom of spitting in the place where a horse had rolled around, which was thought to protect a person from sickness.[32] Nevertheless, there is plenty of evidence that horse remains were still used; for example, in crafts and rituals.

C. The materiality of the dead horse

Even though the consumption of horsemeat, the slaughtering of horses and the slaughterer were abhorred in Finland during the medieval and post-medieval period, the horse carcass was still used for various purposes. Once slaughtered, a horse was skinned and its mane and tail were collected. Most of the bone skates found in archaeological excavations and in museum collections in Finland are made up of horse metapodials.[33] There is little evidence in Finland of large-scale manufacturing of bone artefacts requiring the focused collection of raw material or of horsemeat being used to feed animals.[34] In addition, horse carcasses and horse

[28] E.g. Frog, "Practice-Bound Variation in Cosmology? A Case Sudy of Movement between Worlds in Finno-Karelian Traditions," in *Between the Worlds. Contexts, Sources, and Analogues of Scandinavian Otherworld Journeys*, ed. Matthias Egeler and Wilhelm Heizmann (Berlin: De Gruyter, 2020), DOI:10.1515/9783110624663-018. Mauno Koski, "A Finnic Holy Word and Its Subsequent History," *Scripta Instituti Donneriani Aboensis* 13 (January) (1990): 404–440. Risto Pulkkinen, Marko Salmenkivi, Antti Leino and Heikki Mannila, "What Was the Finnish Hiisi?: Applying Computational Methods to the Study of Folk Religion," *Temenos: Studies in Comparative Religion* 39–40, (2004): 209–223. Anna Wessman, "Iron Age Cemeteries and Hiisi Sites: Is There a Connection?," *Folklore: Electronic Journal of Folklore* 42 (2009): 7–23.

[29] *Karjataikoja 2 [Livestock magic 2]*, ed. Rantasalo Aukusti V. Suomen Kansan Muinaisia Taikoja IV (SMKT) (Helsinki: Suomalaisen Kirjallisuuden Seura, 1933), XIII §963. Sonja Hukantaival, "Vital Scrap – The Agency of Objects and Materials in the Finnish 19th-Century World View," in *Entangled Beliefs and Rituals: Religion in Finland and Sápmi from Stone Age to Contemporary Times*, ed. Tiina Äikäs and Sanna Lipkin. MASF 8 (Helsinki: The Archaeological Society of Finland, 2020), 185.

[30] SKMT IV, 2 1933, XIV §161. FSFD VII, 3 1952, 617–618

[31] Egardt, "Hästslakt och rackarskam."

[32] FSFD VII, 3 1952, 45.

[33] FINNA-database of Finnish museum collections, www.finna.fi, using the search word *luuluistin* (bone skate), Egardt, *Hästslakt och rackarskam.* Jenny Katajisto, *Turun kaupunkialueen luuluistimet. Tarkasteltuna osteologiselta ja historialliselta kannalta [Bone skates from the town of Turku. Historical and osteological perspective]* (Seminar thesis, Archaeology, University of Turku, 2002). Cf. Arthur MacGregor, "Bone skates: a review of the evidence," *Archaeological Journal* 133 (1976): 57–74.

[34] Auli Bläuer, Janne Harjula, Maija Helamaa, Heli Lehto and Kari Uotila, "Zooarchaeological evidence of large-scale cattle metapodial processing in the 18th century in the small town of Rauma, Finland," *Post-Medieval Archaeology* (2) (2019): DOI:10.1080/00794236.2019.1654737. Mari Koskinen, *Historiallisen ajan luuesineet. Luuesineistä, luumateriaalin työstämisestä, käsityöläisistä ja käsityöläisyydestä Aboa Vetus -museon*

bones were used for ritual purposes, such as in building concealments, as evident in folklore accounts and archaeological finds.[35] One folklore account tells that the informant, as a young boy, had been sent to fetch the skull of a stallion from a neighbouring farm so that it could be concealed under a new hearth.[36] In this case, the skull of a dead horse was kept in case of a future need. More recent accounts from the early twentieth century describe dead horses being buried as complete carcasses near or in fields, in bogs and in other places where it was easy to dig a large pit.[37] Thus, these horses were not utilised in any way after their death. Their skeletons are sometimes accidentally discovered and reported to museums, but they are not usually studied further or recorded in detail. For example, a horse skeleton from Teuva Pappilankangas was found during forest logging.[38]

A large amount of variation is exhibited in the treatment and use of animal carcasses. Horse remains from archaeological sites have been through different pre-burial treatments, such as skinning, butchering, food preparation and selection for certain body parts. For example, horses might have been buried as complete carcasses, or their remains might be found as disarticulated and butchered fragments of bone and teeth among the settlement debris. This has influenced the anatomical distribution of the horse remains and the articulation of the bones. The pattern of archaeological context, anatomical distribution, cut marks and articulation of the horse remains can be used as a tool for understanding the physical treatment of the dead horse and, in turn, the material and immaterial values and attitudes reflected in that treatment.

2. Material and methods

Although the earliest horse bone from Finland has been dated to the Late Bronze Age, ca. 830 – 540 BC, no horse bones found in sites from the Early Iron Age (ca. 500 BC – AD 400) that followed have been securely dated.[39] More substantial zooarchaeological horse material is available from the Middle Iron Age (ca. AD 375/400 – 800/825) onwards. The horse faunal material in Iron Age and historical period settlement material has been discussed by Tourunen[40] in the context of South-West Finland and by Salmi[41] in relation to Northern Finland. The ritual use of horses has been studied by Hukantaival[42] with regard to the historical period and Bläuer[43] in the context of the Iron Age.

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löytöjen valossa [Bone artefacts from the historical period. Artefacts, material, craftsmen and craftsmanship in the Aboa Vetus-museum finds] (Master's thesis, Archaeology, University of Turku, 2004).

35 Hukantaival, *'For a Witch Cannot Cross Such a Threshold!'*

36 *Hukantaival, 'For a Witch Cannot Cross Such a Threshold!'*, 86.

37 Matti Oijala, "Arrajoen Morgonlähteen tarina [Story of Morgon Spring in Arrajoki]," *Päijät-Hämeen tutkimusseura* (2013): 104–111. Tupala, *Eläinuhreja vai teurasjätteitä.*

38 Pers.comm. Janne Rantanen.

39 Auli Bläuer and Juha Kantanen, "Transition from hunting to animal husbandry in Southern, Western and Eastern Finland: new dated osteological evidence," *Journal of Archaeological Science* 40 (2013): 1646-1666.

40 Tourunen, *Animals in an Urban Context*.

41 Anna-Kaisa Salmi, "Man's best friends? The treatment of the remains of dogs, cats and horses in early modern northern Finland," in *Archaeology of social relations: ten case studies by Finnish archaeologists*, ed. Tiina Äikäs, Sanna Lipkin and Anna-Kaisa Salmi. Studia Humaniora Ouluensia 12 (Oulu: University of Oulu, 2012), 33–50.

42 Sonja Hukantaival, "Horse Skulls and "Alder-Horse": The Horse as a Depositional Sacrifice in Buildings," in *The Horse and Man in European Antiquity. Worldview, Burial Rites, and Military and Everyday Life*, ed. Audronė Bliujienė. Archaeologia Baltica 11 (Klaipėda: Klaipėda University Press, 2009), 350–356. Hukantaival, *'For a Witch Cannot Cross Such a Threshold!'*.

43 Bläuer, "Animal bones in old graves."

Fig. 1. Sites used in this study. Data in Supplementary Appendix 1. 1) Hattula Myllymäki 2) Hämeenlinna Riihimäki 3) Laitila Kylämäki 4) Nokia Pääskylä 5) Nokia Tapanila 6) Nokia Pappila 7) Nokia Viik 8) Pälkäne Hylli 9) Sastamala Kalliala 10) Sastamala Ristimäki 11) Eura Luistari 12) Raasepori Domargård 13) Raasepori Hönsåkerskullen 14) Laitila Vainionmäki 15) Lieto Ylipää 16) Mikkeli Kyyhkylä 17) Mikkeli Visulahti 18) Paimio Spurila 19) Raisio Siiri 20) Vöyri Pörnullbacken 21) Hämeenlinna Varikkoniemi 22) Janakkala Virala 23) Lahti Paakkolanmäki 24) Mikkeli Latokallio 25) Mikkeli Porrassalmenpelto 26) Pirkkala Tursiannotko 27) Raisio Mulli 28) Sysmä Ihananiemi 29) Hartola Uusi-Ruskeala c 30) Vesilahti Tonttimäki 31) Raisio Mahittula 32) Isokyrö Levänluhta 33) Turku Kärsämäki 34) Espoo Mankby 35) Espoo Puustellinmäki 36) Hanko Gunnarsängen 37) Kaarina Kuusiston linna 38) Sastamala Kaukola 39) Turku town 40) Ulvila town 41) Vantaa Gubbacka 42) Rauma town 43) Kemiö Tjuda 44) Nakkila Puosi 45) Hämeenkoski Pyhän Laurin Kirkko 46) Taipalsaari Vaateranta 47) Kotka Kyminlinna 48) Helsinki town 49) Kruunupyy Dårholmen 50) Lahti village 51) Masku Krouvila 52) Nurmijärvi Gunnari 53) Oulu Pikisaari 54) Pietarsaari Lassfolk 55) Pori town 56) Raahe town 57) Salo Melkkilä kartano 58) Tornio town.

Data on horse faunal remains was collected from 58 archaeological sites using the literature and the zooarchaeological reports held in the archives of the Finnish Heritage Agency and the Archaeological Department of the University of Turku. The 58 sites were within the area of modern Finland but the Åland islands were excluded (Fig. 1). The cultural connections of Åland diverge from those on the mainland, so it was not included in this study.

The data was divided further into 78 separate entries according to more exact find contexts and dating (the detailed site and material data is found in Supplementary Appendixes 1 and 2).

In most of the zooarchaeological reports, the species, element and context of the analysed material were mentioned, but data on cut marks was not consistently recorded. The Number of Identified Specimens (NISP) refers simply to the number of "specimens" (e.g. bones, teeth or their fragments) of certain species in the material. Thus, in this article, it means the count of horse bones and teeth identified from the faunal samples. It was used because most of the materials available had been quantified by this method, only exception being Laitila Vainionmäki, where material was quantified by weight. The anatomical distribution of the sample was also studied, meaning the identification and counting of different skeletal elements (e.g. molar tooth, tail bone, pelvis). Fragmentary vertebrate and rib fragments could have been categorised as "large mammal" or "large ungulate," consisting potentially of horse, cattle (Bos taurus), European elk (Alces alces) and wild forest reindeer bones (Rangifer tarandus fennicus). Thus, small numbers of bones identified as horse trunk elements (vertebrae except tail bones, ribs, sternum) could have resulted from the identification process.

The archaeological context of the finds was also studied. The type of site (e.g. settlement, cemetery) and the closer find context within the site were examined. However, especially in the case of the settlement sites, the exact context was sometimes difficult to interpret due to the mixing of the deposits, the presence of layers with uncertain interpretations, or the use of context-unspecific excavation methods. Additional factors affecting the comparability of the samples include variations in the preservation and recovery methods. Poor preservation may enhance the proportion of durable elements (such as teeth or bones of larger mammals). The study material has been recovered with varying methods from fine mesh sieving to hand picking, which is likely to affect the species composition. However, as horse bones are large in size, this is likely to have a minor effect to their recovery.

A. Horse remains in the Iron Age

The data shows that horse remains are found in domestic refuse on Late Iron Age settlement sites in almost every analysed assemblage. Horse remains as a proportion of all domestic mammal bones (cattle, sheep, goat and pig) range from 3% to 9% (Table 1).[44] In terms of the anatomical distribution, elements from the head are often dominant, but limbs and bones from the trunk are also present (Fig. 2). On the Hämeenlinna Varikkoniemi and Janakkala Virala sites, tooth fragments form the majority of the material. This reflects the generally poor preservation of the faunal material. In Hämeenlinna, the material from the first excavation year is in a better state of preservation, and this has been used for anatomical distribution

[44] Sirpa Nummela, "Liite 3. Luulöydöt, osa vuoden 1988 aineistosta [Zooarchaeological report]," in *Hämeenlinna 58 Varikkoniemi Myöhäisrautakautisen ja varhaiskeskiaikaisen asuinpaikan kaivaus [Hämeenlinna 58 Varikkoniemi. Excavations on a Late Iron Age and Early Medieval settlement site]*, by Eeva-Liisa Schultz and Hans-Peter Schultz (Helsinki: Archives of The Finnish Heritage Agency, 1991). Sirpa Nummela, "Osteologinen analyysi [Zooarchaeological report]," in *Janakkala Virala Taurula. Kaivauskertomus 1989-1990 [Virala Taurula. Excavation report 1989-1990]* by Hans-Peter Schultz (Helsinki: Archives of The Finnish Heritage Agency, 1991). Schultz and Schultz, "Hämeenlinna Varikkoniemi". Juha-Matti Vuorinen, *Rakennukset ja rakentajat Raision Ihalassa rautakauden lopulla ja varhaisella keskiajalla. [Buildings and builders in Raisio Ihala during the Late Iron Age and Early Medieval period]* Annales Universitatis Turkuensis C 281 (Turku: University of Turku, 2009), with discussion and reinterpretation in Hukantaival and Bläuer, "A Case-Study of the Mulli Settlement Site in Raisio." Bläuer, "Myöhäisrautakauden ja keskiajan koti- ja riistaeläimet."

analysis.[45] However, loose teeth are abundant also in samples from other sites. On the Pirkkala Tursiannotko site, cut and knife marks indicative of carcass dismemberment (atlas, radius) or meat removal (scapula) have been recorded on horse bones. Bone breakage, presumably for marrow extraction, has also been observed (tibia, humerus).[46]

Table 1. Proportion of horse (%Horse) bones among domestic mammal bones (cattle, sheep, goat and pig, NISP). Only sites with an NISP greater than 100 are included. Source data in Supplementary Appendix 3.

Settlement sites	Sites	%Horse
Late Iron Age	4	5.92
Medieval rural	3	0.49
Medieval town	2	0.11
Post-medieval town	7	0.17

Unburnt and burnt remains of horses have been found on several Finnish Iron Age burial sites; for example, at Eura Luistari.[47] Moreover, there are reports of teeth from large animals, sometimes tentatively identified as cattle or horse, on many Iron Age burial sites.[48] However, many of these findings lack modern osteological verification and analysis, so they are not included in this study. Furthermore, a recent study of unburnt animal bones in Iron Age burial contexts places their deposition in the post-burial phase of the site. Findings on Iron Age burial sites include horse remains: mainly elements from the head and limbs, which were placed in sacrificial cairns or directly on the unused cemetery. The earliest record of this practice dates to the Middle Iron Age, but the latest record dates to the historical period.[49] In addition, domestic waste, including burnt and unburnt bones, was redeposited onto old burial sites in rituals.[50] Furthermore, some sites show evidence of use during the modern period, possibly as waste dumps, such as Vesilahti Tonttimäki, where cattle bone was dated to modern period.[51] Thus, without radiocarbon dating, horse remains in burial contexts should be interpreted with care. Burnt horse bones have also been identified in at least five cremation cemeteries: a phalanx from Vöyri Pörnullbacken; tail bones from Lieto Ylipää, Raisio Siiri and Hattula Retulansaari Myllymäki, and unspecified bone from Raasepori Hönsåkerskullen (see

[45] Stella From and Jukka Jernvall, "Liite V. Osteologinen analyysi" [Zooarchaeological report], in *Hämeenlinna (58) Varikkoniemi. Kaivauskertomus 1986-1989 [Hämeenlinna (58) Varikkoniemi. Excavation report 1986-1989]*, by Eeva-Liisa Schultz and Hans-Peter Schultz (Helsinki: Archives of The Finnish Heritage Agency, 1989)

[46] Auli Bläuer, *Pirkkala Tursiannotko (2012 ja 2013). Luuraportti. KM 39258, KM 39785. [Zooarchaeological report]* (Tampere: Pirkanmaa Regional Museum, 2015). Bläuer, "Myöhäisrautakauden ja keskiajan koti- ja riistaeläimet."

[47] Lehtosalo-Hilander, *Luistari*, 38–39.

[48] Leena Salmio, *Tyrvään Kaukolan, Tyrväänkylän ja Liekosaaren rautakautiset kalmistot. [Iron Age Cemeteries in Tyrvää Kaukola, Tyrväänkylä and Liekosaari]* Karhunhammas 6 (Turku: University of Turku, 1980). Wessman, *Death, Destruction and Commemoration*.

[49] Bläuer, "Animal bones in old graves."

[50] Most likely explanation for the diversity of the archaeological material found in the cairn is redeposition of domestic waste. Henrik Asplund, Jussi Moisio, Sanni Salomaa and Auli Bläuer, "Digging deeper into an Iron Age cairn – rethinking Roismala Ristimäki in Sastamala, Finland," *Fennoscandia Archaeologica* XXXVI (2019): 83–104. Bläuer, "Animal bones in old graves."

[51] Auli Tourunen, "Burnt, fragmented and mixed: identification and interpretation of domestic animal bones in Finnish burnt bone assemblages," *Fennoscandia Archaeologica* XXVIII (2011): 57–65.

Supplementary Appendix 1 for details). These are likely to relate to burial rituals; however, at the time of writing, no radiocarbon dates are available to confirm this interpretation.

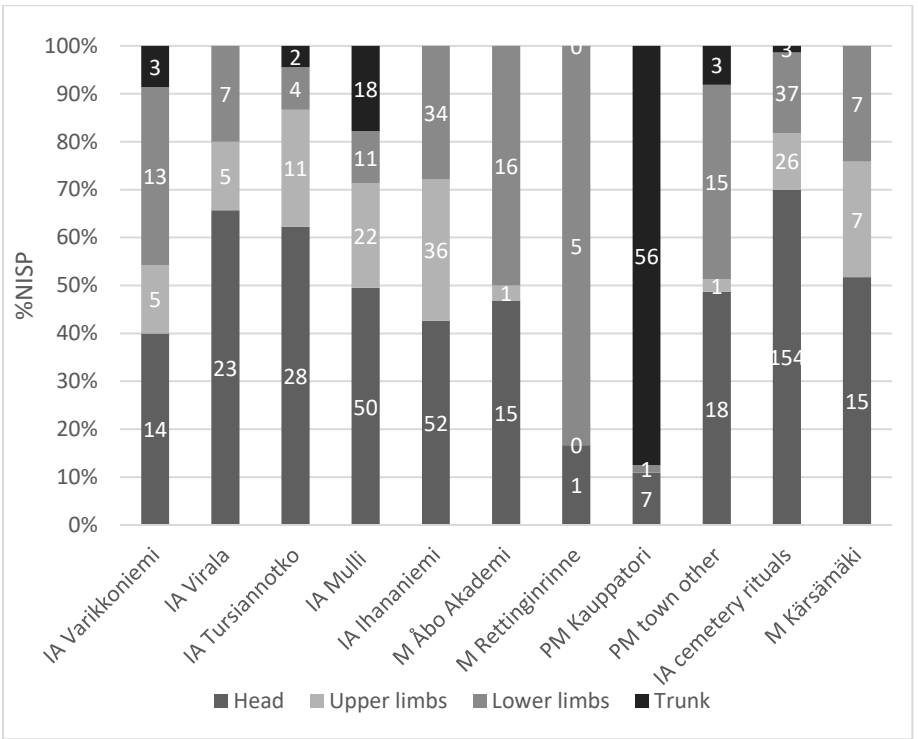

Fig. 2. Anatomical distribution of the horse remains in archaeological settlement and ritual sites. Source data and references in Supplementary Appendixes 1 and 2. IA= Iron Age, M= Medieval, PM= Post-medieval.

B. Medieval horse remains

Horse remains are occasionally present on the settlement sites for the medieval period. Their prevalence is much lower than in the data from the Late Iron Age sites, with horse remains usually representing less than 1% of all domestic mammal remains identified (Table 1). There are also medieval sites where no horse bones are identified, and those sites are not included in the figures. Thus, the total percentage of horses is even lower in the material as a whole. Only loose teeth have been recorded for the rural settlements, but in Espoo Puustellinmäki, femur and metapodial fragments and calcaneus have been identified (Supplementary Appendix 1).[52] In the medieval towns of Turku and Ulvila, horse bones consist mostly of teeth, skulls and mandibular elements in addition to bones from the lower legs, with the exception of one complete scapula.[53] There are also six identified fragments of horse bone

[52] Hanna Kivikero, "Liite 8. Osteologisen tutkimuksen raportti ja luettelo tunnistetuista luista," in *Mäkkylän Puustellinmäen kylätontin arkeologiset kaivaukset 2015 [Archaeological excavations in Mäkkylä Puustellinmäki village 2015]* by Ynnilä Heini (Helsinki: Archives of The Finnish Heritage Agency, 2016).
[53]Heli Lehtonen and Kim Krappala, *Turku II/1/3 Rettigin tontti/ Aboa Vetus & Ars Nova -museon alue Konsulinna. [Turku II/1/3 Rettig plot/ Aboa Vetus & Ars Nova -museum Konsulinna]* (Helsinki: Archives of The Finnish Heritage Agency, 2017). Tourunen, "Animals in an Urban Context."

from Kaarina Kuusisto, which was a Bishop's castle. These include mandibular elements, metapodials and thoracic vertebrae.[54]

Horse remains radiocarbon-dated to the medieval period have been found in ritual contexts similar to those of the Iron Age, in cairns[55] and in the Iron Age water burial site of Isokyrö Levänluhta.[56] Horse bone from Hattula Myllymäki cairn have been dated to medieval or post-medieval period (Ua-59123, 394±39, AD1430-1530, 1550-1640). Medieval horse remains have also been recovered from the Turku Kärsämäki site, where they were buried at the top of, or near to, oblong grave-like pits, and these have been interpreted as ritual deposits.[57] There are some indications that animal remains, including those of horses, could have been used in burial or remembrance rituals during the medieval period;[58] however, directly dated evidence is so far absent.

C. Post-medieval horse remains

Horse bones are sometimes present, but never abundant, on post-medieval settlement sites (Supplementary Appendix 1). Some horse bones from rural sites have been found in the context of buildings or structures, such as radius-ulna from Hartola Uusi-Ruskeala C, a horse skull, mandible and atlas in Masku Krouvila, and lower leg bones in Nurmijärvi Gunnari.[59] Horse bones from urban sites include disarticulated bones, articulated anatomical units and disarticulated material. Horse skeletons have been found in the village of Lahti and the town of Turku. The Lahti skeleton was found under building remains, and it has been interpreted as a building deposit.[60] The horse skeleton from Turku Kauppatori was recovered from inside a well. Its left radius has been cut through at the distal end of the bone, probably in order to detach the lower leg. Also from Turku Kauppatori, a partial articulated spine (cervical and thoracic vertebrae and ribs) was found.[61] These articulating finds affect anatomical distribution in Fig. 2. Most of the horse remains from other post-medieval urban sites consist of teeth, head and mandibular bones, and lower leg bones found among domestic waste in non-specific layers or in layers without clear interpretation (Appendix 1). One exception is the cervical vertebrae (one with cut marks) recovered from Pietarsaari Lassfolk.[62]

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[54] Marja Mutikainen, *Djurben från Kustö slott. En osteologisk analys av djurben från Kustö, S:t Karins sn., Finland [Animal bones from Kustö castle. An osteological analysis of animal bones from Kustö/Kuusisto, S:t Karins/Kaarina, Finland]* (Seminar paper in Osteo-Archaeology, Stockholm University, 1989).

[55] Bläuer, "Animal bones in old graves."

[56] Tarja Formisto, *An Osteological Analysis of Human and Animal Bones from Levänluhta* (PhD thesis, University of Stockholm, 1993).

[57] Sonja Hukantaival, Auli Bläuer, Maija Helamaa and Kari Uotila, "Late Medieval Animal Remains in Grave-like Pits: A case study on rituals in 15th-century Finland." Submitted manuscript.

[58] Kivikero, "Interpretations of Animal Bones from Inhumation Graves."

[59] Auli Bläuer, *Masku Krouvila TYA 954 Luuanalyysi [Masku Krouvila TYA 954 Zooarchaeological report]* (University of Turku: Archives of Archaeology, 2018). Kristiina Mannermaa, "Arkeologisen luuaineiston anayysi," in *Hartola Uusi-Ruskeala c. Historiallisen ajan asuinpaikan kaivaus [Uusi-Ruskeala c. Excavation of historical settlement site]* by Petro Pesonen (Helsinki: Archives of The Finnish Heritage Agency, 2009).

[60] Hukantaival, *'For a Witch Cannot Cross Such a Threshold!'*.

[61] Auli Bläuer, "Turku Kauppatori (TMK23509): hevoset. [Turku Kauppatori (TMK23509): horses]," in *Turun kauppatorin arkeologiset kaivaukset (TMK23509). [Turku Kauppatori excavation report (TMK23509)]* by Kari Uotila (Turku: Archive of the Turku Museum Center, 2019).

[62] Anna-Kaisa Puputti, "Pietarsaaren Lassfolkin 2008 kaivausten eläinten luut. Eläinosteologinen raportti [Zooarchaeological report]," in *Pietarsaari 2/2/7-10, Lassfolkin kortteli. Kaupunkiarkeologinen pelastuskaivaus 19.5.-8.8.2008. [Pietarsaari 2/2/7-10, Lassfolk block. Rescue excavations19.5.-8.8.2008]* by Teija Oikarinen. (Helsinki: Archives of Finnish Heritage Agency, 2009).

Horse remains radiocarbon dated to the post-medieval period have also been recovered from several archaeological sites that date to earlier periods. Horse humerus, radius and hoof bones found in an Iron Age cairn in Nakkila Puosi and a sesamoid bone found in a Bronze and/or Iron Age cairn in Kemiö Tjuda have been radiocarbon-dated to the post-medieval period (Poz-76490, 155 ± 30 BP and Poz-76485, 190 ± 30 BP). Post-medieval horse bones have also been excavated from the medieval church site Hämeenkoski Pyhän Laurin kirkko, where burial activity ceased in the 17th century. The disarticulated bones had been deposited into the ruins of the sacristy with the bones of other domesticates, among them pelvis bones from at least three different horses.[63] An unburnt horse carpal bone from Taipalsaari Vaateranta was recovered from a sandy beach area by the lake during the excavation of a prehistoric settlement and burial site.[64]

3. Discussion

The deposition of horse remains in archaeological sites reflects new social attitudes and beliefs, as well as long-standing traditions that were present in society. To aid understanding of the complex network of beliefs and habits that shaped the materiality of the dead horse, a multisource approach combining archaeological and folk-belief material over an extensive period has proven to be useful (Figs. 3 and 4).

This study confirms the previous finding that the consumption of horsemeat ceased in Finland due to Christianisation at the beginning of the historical period. The change in the use of the horse is reflected in the deposition patterns of the material in the settlement sites. Compared with Iron Age assemblages, during the historical period the abundance of horse remains in the faunal assemblages decreases, the number of articulating remains increases, and the place of deposition is more often related to buildings (Figs 3 and 4). In terms of the anatomical distribution, the remains of upper legs become less frequent in the settlement sites. Taking into consideration that the preservation is generally better in the historical sites this difference is likely to be significant. However, there is little difference in the frequency of trunk elements, even if they form part of a consumed animal. It is likely that any elements of horse trunk, especially when fragmented, will have been identified at a more general level as "large mammal" or "large ungulate." Horse heads, legs and skeletons recovered from under buildings are most likely to have been used as building deposits. The bone skates indicate that some bones were used as raw materials. Thus, the horse remains in the historical settlement sites are more likely to derive from their use as raw materials or in rituals than to derive from consumption.

One multi-period assemblage with evidence of horsemeat consumption, Sysmä Ihananiemi, located in inland Finland, is interesting because while the site was mainly used during Late Iron Age, a cattle bone included in it has been dated to as late as the Middle Ages: the 13th or 14th century.[65] A total of 24% of the main farm animals bones (cattle, sheep, goat, pig and horse) belonged to horse.[66] Given that the layers are mixed and the horse bone material has not been dated,[67] it is not known when horsemeat consumption ceased on this site. Although many details of the process of Christianisation in Finland are not known, it has

[63] Tourunen, "Hämeenkosken Pyhän Laurin kirkon hautausmaan luut."
[64] Tourunen and Kantanen, "Transition from hunting to animal husbandry."
[65] Kristiina Mannermaa, *Sysmä 21 Ihananiemi KM 32291/Hannu Poutiainen. Luuanalyysi. [Sysmä 21 Ihananiemi KM 32291/Hannu Poutiainen Zooarchaeological report]* (Lahti Provincial museum: Lahti, 2002). Tourunen, "Burnt, fragmented and mixed."
[66] Mannermaa, "Sysmä 21 Ihananiemi."
[67] Tourunen, "Burnt, fragmented and mixed."

been assumed that the old customs could have persisted for longer in rural areas located far away from the nearest towns.[68]

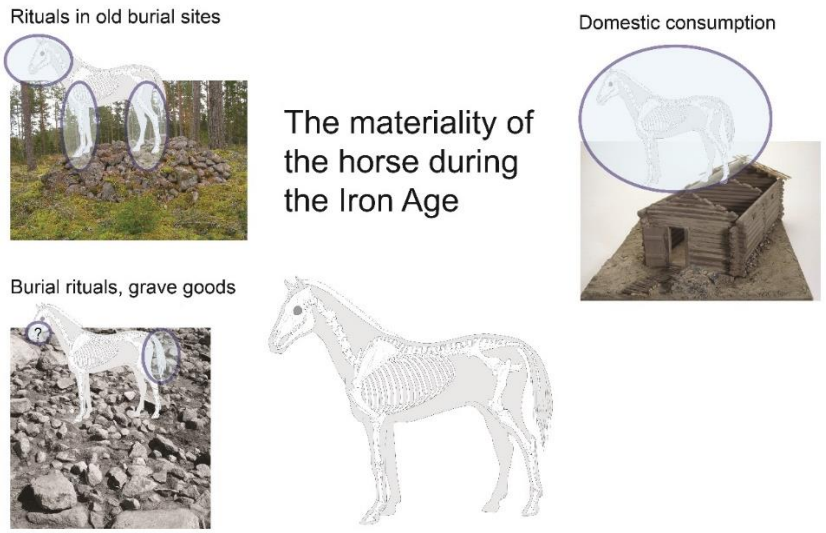

Fig. 3. Deposition pattern for horse remains during the Iron Age. Sources: Drawing: ArcheoZoo.org / Michel Coutureau (Inrap), en collaboration avec Vianney Forest D'après : Barone (Robert). — Anatomie comparée des mammifères domestiques, Tome I : Ostéologie - atlas. Paris: Vigot, 1976, pl. 6 (p. 21). Photos: Finna-database (www.finna.fi). Cairn of Enkelinmäki, photo by Johanna Enqvist, Finnish Heritage Agency. Hätilä cremation cemetery, photo by Jyri Saukkonen, Finnish Heritage Agency. Varikkoniemi house, photo by Ritva Bäckman, Finnish Heritage Agency. CC BY 4.0.

During the Iron Age, horses were likely to have been used as part of burial rituals in Finland; however, dated evidence is not yet available. Horse tails were probably included in the cremation rituals at times, but there are no signs of burial offerings of complete horses, similar to the Scandinavian tradition and the practices on the Åland Islands.[69] It is possible that some unburnt horse teeth found in burial contexts belong to grave rituals, but radiocarbon dates are needed to confirm the deposition context of these bones. Nevertheless, horse bits are common in Iron Age burial contexts in Finland, and this may link to a wider tradition of horse burials practised in the Baltic Sea Region.[70]

[68] Haggrén, "Keskiajan arkeologia," 379. cf. Vretemark, "Från ben till boskap."
[69] E.g. Lehtosalo-Hilander, "Luistari," 38–39. Sten, "Sacrificed animals in Swedish Late Iron Age monumental mound burials." Jan Storå, Jessica Hillborg, Josefina Kennebjörk, Robin Lindblad, Johan Lindeberg, Jennie Mosseby and Rudolf Gustavsson, "Late Iron Age Subsistence in the Åland Islands in light of Osteoarchaeology," in *Stones, bones & thoughts: festschrift in honour of Milton Núñez*, ed. Sirpa Niinimäki, Anna-Kaisa Salmi, Jari-Matti Kuusela and Jari Okkonen (Oulu: Milton Núñezin juhlakirjan toimituskunta, 2012).
[70] Lang, "Riding to the afterworld"; Taavitsainen, *Joitakin ajatuksia kuolaimista*.

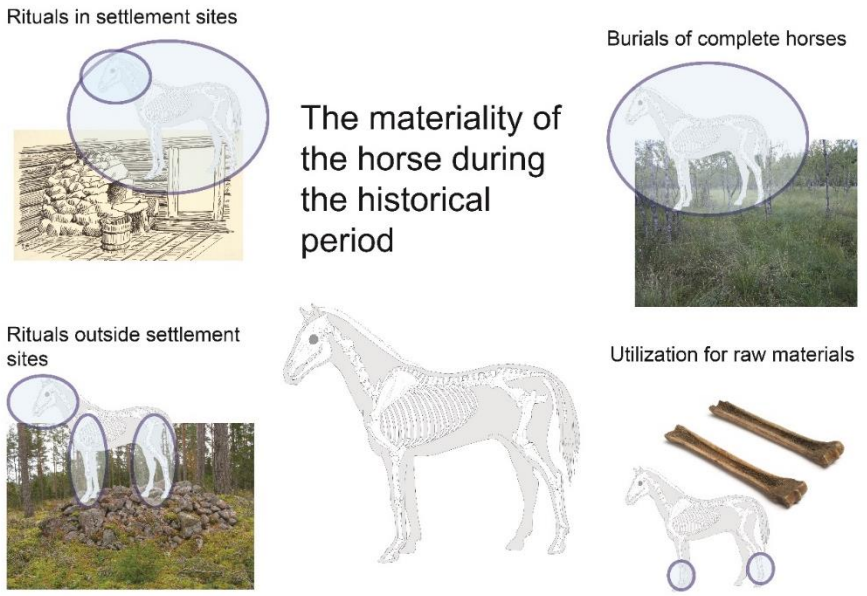

Fig. 4. Deposition pattern for horse remains during the medieval and post-medieval periods. Drawings: ArcheoZoo.org / Michel Coutureau (Inrap), en collaboration avec Vianney Forest D'après : Barone (Robert). — Anatomie comparée des mammifères domestiques, Tome I : Ostéologie - atlas. Paris: Vigot, 1976, pl. 6 (p. 21). Stove in Nuutinen house, drawing by Samuli Paulaharju, National museum. Photos: Finna-database (www.finna.fi). Cairn of Enkelinmäki, photo by Johanna Enqvist, Finnish Heritage Agency. Bone skates, National museum. CC BY 4.0.

So far, no horse remains have been found in contexts interpreted as remains of ritual on Iron Age settlement sites, although this may be due to the small number of well-preserved sites. Thus, the question remains open as to whether the use of horse remains as building deposits was a new practice adopted during the historical period. Interestingly, there seems to be little temporal change in the horse material deposited outside the settlements in ritually significant sites. Some parts of the horse, most often the head or legs, were used in rituals in old cemetery sites.[71] There seems to be a continuation in the deposition of horse bones in stone and stone-and-earth mixed cairns, and a connection between horse bone deposits and burial sites. This observation could be connected with the mythological idea that the horse originated in or belonged to Hiisi. As noted previously, the word *Hiisi* has referred variously to a sacred grove, a cemetery, a rocky area in the forest, and even Hell. The first three meanings are connected, given that sacred groves and cemeteries might have been found in the same places and considering that Iron Age cremation cemeteries were usually situated in rocky areas. Cairns are likewise rocky, as are other ritual contexts where horse bones are found, such as hearths. The fourth meaning may have its origin in the belief that people who had been buried in pre-Christian times were in Hell. Thus, there seems to have been a psychological connection between horses and burial sites. As mentioned, horses were also believed to be able to see invisible beings, such as ghosts. Perhaps, Hiisi, where the horse was believed to have originated in, was seen as the land of the dead.

[71] Bläuer, "Animal bones in old graves."

It has been suggested that horses buried in pre-Christian cemeteries were supposed to carry the deceased to the land of the dead.[72] Although there is less evidence of the deposition of horse remains as an aspect of burial rituals in Iron Age Finland, horse and cattle heads and legs were being deposited in old cemeteries during this period.[73] Thus, the mythological ideas found in later folklore may have their roots in this practice. This connection would then have been re-interpreted in later traditions, where key parts (skulls, legs) of a horse were returned to their believed origin: the old cemetery. A similar idea is present in the cult of the bear, where the skull was put on a pole or a branch of a tree in order to return the animal to its believed celestial origin, the Big Dipper.[74] Another sign that the horse might have been connected with death is the previously mentioned notion that the water spirit disliked horses and would try to drown a horse being swum across a river if soothing offerings had not been made. In Finnish folk magic, water was not compatible with elements connected with death; for example, cemetery soil used in magic would lose its power if it became wet.[75]

The deposition patterns described in the more recent ethnographic sources from the early 20th century, in which horses were no longer used in rituals or as raw materials, would make horse remains exceedingly rare in the archaeological material. Even though horses were not consumed during the pre-modern historical period in Finland, they are still present in the archaeological faunal material. Thus, despite the strong prejudices against horsemeat and the slaughter of horses, the materiality of the dead horse during the pre-modern historical period was complex. The body of a horse was a source of raw material – leather, hair and bone – and thus it was present and accepted in everyday life in this form. A horse carcass was also a source of ritual material. Horse heads or legs were detached and used, for example, in rituals of building concealment, leading to archaeological deposits of articulating head and leg elements. We could not find evidence for the use of the horse trunk, such as the one found in the Turku Kauppatori pit. Most of the horse remains found in the medieval and post-medieval settlement sites seem to have been brought to the site for manufacturing bone artefacts or for ritual deposits, and the disarticulated remains may also include disturbed ritual deposits in secondary contexts due to the mixing of archaeological layers in the dynamic urban space.

4. Conclusions

Horse remains are present on many archaeological sites in Finland, but they are never abundant. The sporadic nature of the material makes it challenging to interpret the horse remains found on any one site. However, by collecting a large temporally and spatially diverse dataset from Finland and carefully considering the find contexts and the anatomical distribution, it is possible to see patterns of deposition rather than isolated curiosities. Although the consumption of horses in Finland ceased after Christianisation, the change from the Catholic to the Protestant era is not evident in the material, given that the deposition of horse remains follows the same pattern for the medieval and post-medieval periods. The assumed ceasing of using horse bones in rituals and as raw materials could be studied if large, well-stratified and well-documented assemblages were available from the 19th century and the early 20th century, but unfortunately these are still rare in Finland.

[72] Lang, "Riding to the afterworld."
[73] Bläuer, "Animal bones in old graves/"
[74] Sarmela and Poom, "Death of the Bear."
[75] Katri Ratia, *Taikojen väkevät ainekset. Tutkielma väestä ja sen ilmenemisestä esineissä ja materiaaleissa vanhassa pohjois-suomalaisessa taikaperinteessä. [The powerful substances of magic. A study on väki and its manifestation in objects and materials in the old northern Finnish magic tradition]* (Master's thesis, University of Jyväskylä, 2009), 100.

Horses were – and, in many ways, still are – considered apart from other farm animals. Our multisource data aids the understanding of the complexity of the traditions and beliefs regarding dead horses. If studied through the lens of folk-belief material only, it would appear that during the historical period, horse remains were handled only for the purpose of rituals. In the ethnographic material, which often dates to a more recent period, the role of horses in raw material or as non-utilised animals is evident. However, combining these perspectives with the zooarchaeological material makes it possible to see multi-layered systems of beliefs, attitudes and practices that changed over time, often retaining elements of the earlier systems as they shifted.

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Appendix 1. Supplementary data for 'The materiality of the horse in Iron Age and historical Finland as observed in zooarchaeological and folk-belief material 'List of sites and horse remains (NISP) used in this study. Site number refers to Figure 1. Reference list in Appendix 2. B = burnt, UB=unburnt.

Nr	1	1	2	3	3	4	5
Period	IA	IA	IA	IA	IA	IA	IA
Site	Hattula Myllymäki	Hattula Myllymäki	Hämeenlinna Riihimäki	Laitila Kylämäki	Laitila Kylämäki	Nokia Pääskylä	Nokia Tapanila
Catalogue nr	KM 19704, 19874	KM 17291	KM 30304	KM 16165: 215–346	KM 16852: 1–122	TYA 485	TYA 498/580
Disarticulated/ Articulated/ Skeleton	D	D/A	D	D	D	D	D
NISP Burnt	3						
B anatomy	vert caudale						
NISP UB	41	62	5	14	11	4	6
Head	32	42	3	13	10	3	1
Upper limbs	5	4		1	1		3
Lower limbs	4	16	2			1	2
Trunk							
Find con-text	Cairn	Cairn	Cairn	Cairn	Cairn	Cairn	Cairn
Labcode	Ua-60258	Ua-62587		Ua-59125			Ua-58342
Dating	1370±32	1043±30		1084±34			1 122 ± 32
Cal	600–760 AD	900–1030 AD		890–1020 AD			770–1000
Other data							
Reference	Andors 1977	Koli 1969	Seppälä 1998	Bläuer 2020	Bläuer 2020	Bläuer 2020	Bläuer 2020

12	2	11	10	9	8	7	6	**Nr**
IA	IA	IA	IA	IA	IA	IA	IA	**Period**
Raasepori Domargård 1	Hämeenlinna Riihimäki	Eura Luistari	Sastamala Ristimäki	Sastamala Kalliala	Pälkäne Hylli	Nokia Viik	Nokia Pappila	**Site**
KM 21634, 21683	KM 30304	KM 18000	TYA 177	TYA 82	KM 14545	TYA 337, 426	TYA 586, 602	**Catalogue nr**
D	D	D	D	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
					1			**NISP Burnt**
					carpi			**B anatomy**
1	13	N/A	8	14	20	2	11	**NISP UB**
1	13		2	14	12	2	2	**Head**
			2		1		8	**Upper limbs**
			4		7		1	**Lower limbs**
								Trunk
Cemetery	Cemetery	Cemetery	Cairn	Cairn	Cairn	Cairn	Cairn	**Find con-text**
					Ua-59124		Ua-58343	**Labcode**
					848±38		910 ± 33	**Dating**
					1040–1090 or 1120–1270 AD		1030–1210AD	**Cal**
					Burnt bone is charred.			**Other data**
This study	Seppälä 1998	Lehtosalo-Hilander 1982:	Asplund et al. 2019	Vormisto 1985, Bläuer 2020	Bläuer 2020	Vormisto 1991	Bläuer 2020	**Reference**

20	19	18	17	16	15	14	13	**Nr**
IA	IA	IA	IA	IA	IA	IA	IA	**Period**
Vöyri Pörnull-backen	Raisio Siiri	Paimio Spurila	Mikkeli Visulahti	Mikkeli Kyyhkylä	Lieto Ylipää	Laitila Vainion-mäki	Raasepori Hönsåkers-kullen	**Site**
KM 30332, 31395	TYA 413, 454, 494, 544,546	TYA 211	KM 13679	KM 10629, 10862	KM 6366, TYA 596	NA	KM 11138	**Catalogue nr**
D	D	D	D	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
1	7				7		1	**NISP Burnt**
phal 2	vert caudale, vert				vert caudale		N/A	**B anatomy**
		25	3	39		N/A		**NISP UB**
12		23	3					**Head**
		1						**Upper limbs**
		1						**Lower limbs**
								Trunk
Cemetery	Cemetery	Cemetery	Cemetery	Cemetery	Cemetery	Cemetery	Cemetery	**Find con-text**
		Ua-59126						**Labcode**
		1080±20						**Dating**
		890–1020 AD						**Cal**
						Weight, no NISP data		**Other data**
Hårding 1997, 2000	Liira 2013	Bläuer 2020	Kivikero 2010	Ukkonen 1996	Korkeakoski-Väisänen &	Formisto 1996: 82	Kivikero 2008	**Reference**

20	27	26	25	24	23	22	21	**Nr**
IA	IA	IA	IA	IA	IA	IA	IA	**Period**
Vöyri Pörnull-backen	Raisio Mulli	Pirkkala Tursiannotko	Mikkeli Porras-salmenpelto	Mikkeli Latokallio	Lahti Paakkolanmäki 1	Janakkala Virala	Hämeenlinna Varikkoniemi	**Site**
KM 30332, 30282	TYA 619, 631, 642, 667	KM 39258, 39785, 41313	KM 10629	KM 28014	KM 21967, 23237, 23602	KM 24745, 26065	KM 23703, 24264, 24744, 26058, 27424	**Catalogue nr**
D	D	D	D	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
						2		**NISP Burnt**
						tibia, femur		**B anatomy**
2	101	45	3	2	2	35	82	**NISP UB**
2	50	28	2	2	2	23	59	**Head**
	22	11	1			5	10	**Upper limbs**
	11	4				7	22	**Lower limbs**
	18	2					5	**Trunk**
Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	**Find con-text**
								Labcode
								Dating
								Cal
						Exluding topsoil and modern	Schultz & Shultz report 96 equus, but	**Other data**
Hårding 1996, 1997	Tupala 1999	Bläuer 2017	Kirkinen 1994	From 1993	This study	Nummela 1991b	From & Jernvall 1989; From 1991 a,	**Reference**

34	33	33	32	31	30	29	28	**Nr**
M	M	M	M	IA/PM	IA/PM	IA/M/PM	IA/M	**Period**
Espoo Mankby	Turku Kärsä-mäki	Turku Kärsämäki	Isokyrö Levän-luhta	Raisio Mahittula	Vesilahti Tontti-mäki	Hartola Uusi-Ruskeala c	Sysmä Ihana-niemi	**Site**
KM 2009044, 39160	KM 41326	KM 41326	NA	NA	TYA 335, 393	KM 37985	KM 32291	**Catalogue nr**
D	D/ partially D	S	D	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
								NISP Burnt
								B anatomy
3	29	81	91	1	5	1	122	**NISP UB**
3	15		57		1		52	**Head**
	7		12	1	2	1	36	**Upper limbs**
	7		6		2		34	**Lower limbs**
			16					**Trunk**
Settlement site	Ritual	Ritual	Cemetery	Mixed layer	Cairn	Settlement site	Settlement site	**Find con-text**
			St 9856					**Labcode**
			649 ± 70 BP					**Dating**
			1289–1384 AD					**Cal**
Structure R9-13		Foal						**Other data**
Kivikero 2009, 2013, 2016a	Hukantaival et al. Submitted	Hukantaival et al. Submitted manuscript	Formisto 1993: 138	This study	This study	Mannermaa 2009	Mannermaa 2002	**Reference**

41	40	39	39	38	37	36	35	**Nr**
M	M	M	M	M	M	M	M	**Period**
Vantaa Gubbacka	Ulvila town	Turku town (Åbo Akademi)	Turku town (Aboa Vetus)	Sastamala Kaukola	Kaarina Kuusiston linna	Hanko Gunnarsängen	Espoo Puustellinmäki	**Site**
KM 2010077	SatM 18055, 18142, 18415,	TMM 21816,	KM 41180	KM 39899	KM 86083, 86084	KM 2006008	KM 40409	**Catalogue nr**
D	D	D	D	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
								NISP Burnt
								B anatomy
5	4	32	1	1	6	1	3	**NISP UB**
5	1	15	1	1	1	1		**Head**
		1					1	**Upper limbs**
	3	16			2		2	**Lower limbs**
					3			**Trunk**
Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	**Find con-text**
				NA				**Labcode**
				NA				**Dating**
				1220–1320 AD				**Cal**
Y605(2), Y603/R601 (3)			Under floor			Mixed layer, uncertain		**Other data**
Kivikero 2011b	This study	Tourunen 2008	Lehtonen & Krappala 2016.	Karhu 2014	Mutikainen 1989	Jansson et al. 2010	Kivikero 2016b	**Reference**

46	45	45	44	43	39	42	1	**Nr**
PM	PM	PM	PM	PM	M/PM	M/PM	M/PM	**Period**
Taipalsaari Vaateranta	Hämeenkoski Pyhän Laurin Kirkko	Hämeenkoski Pyhän Laurin Kirkko	Nakkila Puosi	Kemiö Tjuda	Turku town (Rettiginrinne)	Rauma town (Kalatori)	Hattula Mylly-mäki	**Site**
NM 19239: 223	KM 2000064	TYA 795	KM 13245: 3	KM 2503A: 19b	TMM 22196	KM 2009037, 2010034	KM 13244	**Catalogue nr**
D	D	D	A?	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
								NISP Burnt
								B anatomy
1	54	2	3	1	2	8	2	**NISP UB**
	41					6	1	**Head**
	12		2			1	1	**Upper limbs**
1	1	2	1	1	2	1		**Lower limbs**
								Trunk
Cemetery	Cemetery	Cemetery	Cairn	Cairn		Settlement site	Cairn	**Find con-text**
	Ua-24044, Ua-24045		Poz-76490	Poz-76485			Ua-59123	**Labcode**
	180±35, 80±40		155 ± 30 BP	190 ± 30 BP			394±39	**Dating**
1680–1940 AD	1650–1960 AD, 1670–1960 AD		NA	NA			1430–1530, 1550–1640 AD	**Cal**
	From ruined sacristy among	From cemetery topsoil		Human bone dates to Bronze				**Other data**
Fortelius 1980; Bläuer & Kanta-	Kehusmaa 2000; Tourunen	Tourunen 2002a	Lahtiperä 1970, 211	Formisto 1987; Tuovinen &	Tourunen 2002b	Koivisto et al. 2011.	This study	**Reference**

50	50	50	50	49	48	29	47	**Nr**
PM	PM	PM	PM	PM	PM	PM	PM	**Period**
Lahti village (Torikatu)	Lahti village (Tori)	Lahti village (Kauppatori)	Lahti village (Kauppatori)	Kruunupyy Dårholmen	Helsinki town (Senaatintori)	Hartola Uusi-Ruskeala c	Kotka Kymin-linna	**Site**
LHME 2015014	NA	KM 97092	KM 97092	TYA 881, 897	KM 39256	KM 37985	KM 200562, 2006060	**Catalogue nr**
D	A	D	S	D	D	D	D	**Disarticulated/ Articulated/ Skeleton**
								NISP Burnt
								B anatomy
24	11	2		1	1	1	2	**NISP UB**
23	3	1			1			**Head**
1	2					1		**Upper limbs**
	4	1		1			1	**Lower limbs**
							1	**Trunk**
Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Military	**Find con-text**
								Labcode
								Dating
								Cal
Pit	Pit, also bones from large							**Other data**
Liira 2016	Liira 2014; Seppänen 2016	Poutiainen 1999b	Poutiainen 1999a,b;	Tourunen 2012; Fagerström	Kivikero 2013	Mannermaa 2009	Lahti 2006; Salo 2007	**Reference**

42	42	56	55	54	53	52	51	**Nr**
PM	PM	PM	PM	PM	PM	PM	PM	**Period**
Rauma town (Kauppatori)	Rauma town (Itäkatu)	Raahe town (Pekkatori)	Pori town (Taidemuseo)	Pietarsaari Lassfolk	Oulu Pikisaari	Nurmijärvi Gunnari	Masku Krouvila	**Site**
KM 2006091	KM 41320	KM 39587	KM 99012	KM 2007103	NA	KM 2008081	TYA 954	**Catalogue nr**
D	D	D	D	D	D	D	A	**Disarticulated/ Articulated/ Skeleton**
								NISP Burnt
								B anatomy
1	5	3	5	11	5	2	3	**NISP UB**
1	5	2	5	3	1		2	**Head**
		1						**Upper limbs**
				5	4	2		**Lower limbs**
				3			1	**Trunk**
Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	**Find con-text**
								Labcode
								Dating
								Cal
	Wasteland						Skull, mandibles,	**Other data**
This study	Bläuer et al. 2019	Nurminen 2013	Tourunen 2000	Salmi 2012	Salmi 2012	This study	This study	**Reference**

39	39	39	39	58	57	**Nr**
PM	PM	PM	PM	PM	PM	**Period**
Turku town (Rettiginrinne)	Turku town (Kauppatori)	Turku town (Kauppatori)	Turku town (Aboa Vetus)	Tornio town (Keskikatu)	Salo Melkkilä kartano	**Site**
TMM 22196	TMK 23509: 5359	TMK 23509: 4654	KM 95032	NA	KM 94065	**Catalogue nr**
D	S	A	D	D	D	**Disarticulated/ Articulated/ Skeleton**
						NISP Burnt
						B anatomy
6	97	64	1	5	1	**NISP UB**
1		7				**Head**
						Upper limbs
5		1	1	5		**Lower limbs**
		56				**Trunk**
Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	Settlement site	**Find con-text**
						Labcode
						Dating
						Cal
	Well, one front leg cut off.	Waste pit			Cellar	**Other data**
Tourunen 2002b	Bläuer 2019	Bläuer 2019	Tourunen 2008	Salmi 2012	Söderholm 1995	**Reference**

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Appendix 3. Supplementary data for 'The materiality of the horse in Iron Age and historical Finland as observed in zooarchaeological and folk-belief material '. Reference list in Appendix 2.

Site	Cattle	Sheep/goat	Pig	Horse	Total	%	Reference
Pirkkala Tursiannotko	326	265	343	31	965	3,2	Bläuer 2017
Hämeenlinna Varikkoniemi	461	414	502	96	1473	6,5	From & Jernvall 1989; From 1991 a, b; From 1994; Nummela 1991a; Schultz & Schulz 1992
Raisio Mulli (East complex)	156	117	169	37	479	7,7	Tupala 1999; Vuorinen 2009
Janakkala Virala (excluding topsoil)	101	108	88	28	325	8,6	Nummela 1991b
Site	**Cattle**	**Sheep/goat**	**Pig**	**Horse**	**Total**	**%**	**Reference**
Vantaa Gubbacka	232	28	15	5	280	1,8	Kivikero 2011b
Espoo Mankby	1364	252	119	3	1738	0,2	Kivikero 2009, 2013, 2016a
Espoo Puustellinmäki	109	70	25	3	207	1,4	Kivikero 2016b

Site	Cattle	Sheep/goat	Pig	Horse	Total	%	Reference
Turku Åbo Akademi, Aboa Vetus	17076	12488	3577	32	33173	0,1	Tourunen 2008
Ulvila Isokartano	512	164	132	4	812	0,5	This study
Site	**Cattle**	**Sheep/goat**	**Pig**	**Horse**	**Total**	**%**	**Reference**
Turku Åbo Akademi, Aboa Vetus	4078	3646	1712	1	9437	0,0	Tourunen 2008
Pori Taidemuseo	451	166	181	5	803	0,6	Tourunen 2000
Helsinki Senaatintori	68	19	15	1	103	1,0	Kivikero 2013
Rauma Kauppatori	469	326	189	1	985	0,1	This study
Raahe Pekkatori	868	169	98	3	1138	0,3	Nurminen 2013
Pietarsaari Lassfolk	1890	609	302	12	2813	0,4	Salmi 2012
Tornio Keskikatu	1168	550	194	7	1919	0,4	Salmi 2012