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Pets or functional animals: dogs and cats in medieval and early modern Estonia

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ABSTRACT

The role of dogs and cats in the history of the human-animal relationship has been variable. They have served as pets, working animals, useful commensals, subjects of worship and sacrifice, and providers of resources, such as skin and meat. These roles have also been more or less visible in Estonian archaeological material. Here, our focus is on the Middle Ages and Early Modern Period (13th to 18th centuries), which was the time of urbanisation and widening contacts as well as wars and famines. During this time of change, also the roles of dogs and cats as companion and commensal species changed. With over 700 specimens from all over Estonia, we aimed to explore the presence of dogs and cats in archaeological material, their keeping conditions, and their economic use. For dogs, essential questions also involved the different (morpho)types and their possible roles. The study confirmed that new dog types emerged in Estonia from the early 13th century. Furthermore, different site types, specifically castle and urban material, contained dogs with significantly diverse sizes, possibly due to their functionality. There is evidence of the economic value of both cats and dogs in the expression of cut marks that could be related to food waste and fur trading. Stable carbon and nitrogen isotope analysis confirmed the assumption that dogs mainly ate food scraps and leftovers, including freshwater and marine resources. Documented pathologies were rare, leaving the question of caring for or neglecting these animals open.

KEYWORDS

withers height, paleopathology, skinning, human-animal relationship, morphotype.

Introduction

In medieval and early modern times, dogs and cats were an inseparable part of urban and rural environments. Their presence has been recorded in zooarchaeological material and historical sources. Dogs have been shown to fulfil the roles of companion and working animals, while cats have been regarded as pets or practical means for controlling the rodent population (Thomas 2005; Driscoll et al. 2009; Poole 2015; Holmes 2018). Their economic use was less relevant, i.e. they were not regarded as providers of primary or secondary products. Clear evidence of that is a usually low presence of dog and cat remains in the zooarchaeological material of different kinds of waste. In Estonia, their remains have been found in various contexts. In general household layers, these are usually single finds from one or two specimens that form up to 2% of the identified faunal material (e.g. Maldre 1997a; Luik & Maldre 2003; Maldre 2007; Haak et al. 2012; Maldre 2012; Lõugas et al. 2019a; Rannamäe & Lõugas 2019; Lõugas & Maldre 2022; Randoja et al. 2022). In the cesspits, on the other hand, the character of the faunal remains is different from other deposits, including, among other waste material, also partial skeletons and juveniles (e.g. Maldre 1997b; Õunapuu & Maldre 2010, 5; Haak et al. 2022).

Although dogs and cats have been briefly studied in Estonia together with other faunal remains, broader spatiotemporal analyses of zooarchaeological material have not yet been conducted. On the one hand, dog and especially cat remains are scarce in zooarchaeological material. On the other hand, the osteological material is still sufficient to analyse their presence and skeletal morphology, and gather hints of how they were kept. In this article, we draw together zooarchaeological information on dogs and cats from the Middle Ages (1220–1558) and Early Modern Period (1558–1800) in Estonia. Since the skeletal material of dogs is more abundant compared to that of cats, most of our aims focus on dogs: 1) to discuss the possibility and extent of the use of dog meat and hides by analysing butchering marks and bone fragmentation in osteological material; 2) to explore the morphological variation, i.e. different types of dogs, by using morphometrics, and to discuss the possible roles those types might have had in different social strata; 3) to study the keeping and well-being of dogs by stable isotope analysis (as compared to the human stable isotope data) and paleopathology; and 4) to analyse the roles of cats in urban and rural environments by studying their remains in different archaeological contexts.

Although this article does not aim to give an exhaustive overview of dogs and cats in medieval and early modern Estonia, it describes the current state of zooarchaeological studies and opens new challenges for future research.

Material and methods

The zooarchaeological material analysed in the Estonian Research Council project PRG29 and presented here comes from 28 archaeological excavations in Estonia conducted between 1986 and 2021 (Fig. 1). A total of 773 specimens – bones, teeth and fragments thereof – were studied for this article. Among them, 441 were identified as the dog (*Canis familiaris*) and 280 as the cat (*Felis catus*). Additionally, 42 specimens could belong to either the dog or the wolf (*Canis* sp.) because of their size and morphology. However, owing to the overall scarcity of wild mammals in the total number of analysed zooarchaeological specimens (see Rannamäe & Aguraiuja-Lätti, this issue, table 2) and the contextual information surrounding the specimens of the recorded *Canis* sp., there is no reason to consider (most of) those specimens other than dogs and thus they were all included in the present analysis. Ten specimens that could not be identified to species or genus – either canids (Canidae: fox, wolf, or dog) or carnivores (Carnivora: canids, cats, or mustelids) – were excluded from the analysis.

The primary counting method was the Number of Identified Specimens (NISP). However, there are several instances where NISP includes specimens that belong to the same individual. That is the case, for example, in the medieval rural settlement of Sargvere, where the partial skeletons of a cat (NISP = 45) and a dog (NISP = 114) were found. Because these two individuals make up almost the whole material from rural areas, they create a heavy bias compared to other sites. To mitigate this bias, the Minimum Number of Individuals (MNI) is used in the respective analyses, i.e. for partial skeletons, the size calculations for each element are given as averaged values.

The analysis mainly consisted of standard osteological and zooarchaeological procedures. Taxa were identified using the anatomical reference collection at the Department of Archaeology, University of Tartu, and bone atlases (Schmid 1972; Ernits & Saks 2004). Other recordings included the skeletal element and fracturing, body side, age, butchering and gnawing marks, pathologies, and measurements.

FIG. 1. Map of archaeological sites in Estonia with dog and/or cat remains analysed in this study. The numbers correspond to the site numbers in Tables 1 and 3.

In one case, morphological identification was confirmed via Zooarchaeology by Mass Spectrometry (ZooMS) (Buckley et al. 2009). This was the anomalous cat fibula from Kastre Castle (TÜ-1014/AZ-145:3132, from the 15th to the first half of the 16th c.), possibly with a recovered bone fracture (Lõugas et al. 2019a).

The dogs' withers height was calculated using Harcourt's (1974) formulas for the main long bones and Clark's (1995) formulas for metapodials. To expand the number of long bones for withers height calculations, the material studied by Nuut (2021; 2023) was added to the project dataset, resulting in a total of 72 individuals (Nuut et al. 2023, table 1).

For the project, four dog skulls were analysed for morphotype calculations. Another six skulls from Nuut's previous work (2021) were included to expand the dataset (Nuut et al. 2023, table 2). The metrical data consisted of nine measurements by von den Driesch (1976), which were used to calculate five indices: the cephalic index, the muzzle index, the muzzle width index (Harcourt 1974), the cranial index (Alpak et al. 2004, 325), and the foramen magnum index (Onar et al. 2013, 138). The cephalic index was used to categorise dogs into morphological groups based on their head morphology: dolichocephalic (long-headed), mesaticephalic (medium-headed), and brachycephalic (short-headed) (as defined by Evans & Lahunta 2013, 113). Although the number of analysed skulls is small, combining the craniometric data with the withers height data allows for a more comprehensive interpretation of the findings.

The stable carbon – δ^{13}C – and nitrogen – δ^{15}N – isotope data presented here are based on 26 dog specimens (Nuut et al. 2023, table 3) and come from two separate studies. Firstly, fourteen samples were prepared and analysed for a Master's thesis by Nuut (2023).[1] Collagen extraction was conducted in the Archemy laboratory of the Institute of Chemistry, University of Tartu, using the modified Longin method (Brown et al. 1988; Morrone 2022, 64). To check sample quality, routinely used criteria were followed (van Klinken 1999). All samples had atomic C:N ratios within the generally acceptable range of 2.9 to 3.6 (DeNiro 1985; van Klinken 1999). For carbon and nitrogen concentrations, most samples were above 30% for %C and above 10% for %N, indicative of good quality collagen (van Klinken 1999). One sample (VM-11090/AZ-8:63) had both values (9.7% for %C and 3.2% for %N) below the accepted lower limits of 13% for %C and 5% for %N (Ambrose 1990) and was therefore excluded from the analysis. The second set of data are thirteen samples previously published by Aguraiuja-Lätti et al. (2022). The sample context,

1 Sampling permission was granted by the Archaeological Research Collection at Tallinn University (sampling protocols AI PP Nos 592–594) and the Institute of History and Archaeology at the University of Tartu (sampling protocols TÜ PP Nos 114–119). To avoid unnecessary destruction of bone finds, specimens were preferably already fragmented and any areas useful for osteometric analysis were left intact.

quality indicators, and methodology are available from the respective publication.[2] To compare the diet of dogs with that of humans, data by Aguraiuja-Lätti & Lõugas (2019) and Aguraiuja-Lätti & Malve (this issue) were used.

For a wider contextual interpretation, the find assemblages were divided between five site types – monastic (NISP = 4), castle (NISP = 216), urban (NISP = 184, including 115 from cesspits), suburban (NISP = 194), and rural (NISP = 165) – with a presumption that the different roles of both dogs and cats would be reflected in where they lived or who might have owned them. The analysed specimens from each site were assigned to two temporal groups of the Middle Ages (1220–1558) and Early Modern Period (1558–1800) by their archaeological context. In some cases, assigning the assemblage to one or the other period was not possible, and in some cases, assemblages could include material from the Modern Period (1800 – beginning of the 1900s). In the withers height analysis, regional groupings of northern and southern Estonia were formed, following the historical and cultural division of Estonia and Livonia (e.g. Pajusalu et al. 2020, 71–75). In the stable isotope analysis, groupings followed environmental differences between coastal and inland regions (as in Aguraiuja-Lätti et al. 2022).

To determine whether there were significant differences between the data groups, statistical analysis was applied where possible. Given the existence of outliers and non-normally distributed data (as determined by the Shapiro-Wilk test of normality), the preferred approach was to use a non-parametric Mann-Whitney U test run in the PAST software v. 4.09 (Hammer et al. 2001).

All raw identification data have been published in Rannamäe et al. (2023). Sample data and detailed results for the withers height calculations, craniometrics, and stable isotope analysis have been published in Nuut et al. (2023).

The dog

PRESENCE OF DOGS IN MEDIEVAL AND EARLY MODERN MATERIAL

In the total number of the analysed mammal remains, dogs (including *Canis* sp.) form 1% (NISP = 483) (Table 1; Rannamäe & Aguraiuja-Lätti, this issue, table 2). They are found in each site type and from the whole study period. Almost half of the specimens come from eleven somewhat articulated skeletons. By their context, the partial skeletons seem occasional in their nature, i.e. opportunistic deposits (Quinlan 2021). Dog carcasses have been recovered from, for example, a tower shaft (Haapsalu Castle) (Lõugas et al. 2019b) and a fill layer next to a castle wall (Viljandi Castle) (Haak & Pärnamäe 2003). But some specimens, such as the dog burial in the Sargvere settlement site (Saage et al. 2021), could also be meaningful

2 The dataset by Aguraiuja-Lätti et al. (2022) includes three samples from Otepää Hill Fort, dated to the Iron Age. However, medieval dating for these specimens cannot be excluded, and therefore, we decided to keep the three individuals to increase the sample size.

deposits (Quinlan 2021), i.e. buried intentionally. The other half of the material consists of individual bones, which also refer to occasional deposits, disturbed and mixed in time. Whether these remains could be related to food waste or other processing activities depends much on the particular context, fragmentation of the specimens, and their taphonomy.

TYPES OF DOGS

The body type of the dog is often linked to the dog's function, such as a hunting dog (with all the different adaptations for different hunts), sheepdog, or a guard dog. Today, we refer to the different populations bred for specific functions and looks as *breeds*. In the past context, however, we talk about *types* instead, since we cannot be sure whether breeding activities were deliberate.

Although different types of dogs are characterised by various features, including the size and shape of the body, the shape of the head (especially the snout), the colour and type of hair, and the dog's temper, here we focus only on those deriving from skeletal features. One method to assess the type and function of the dog is its height. The withers height for all calculated individuals (n = 72) is between 23 and 71 cm. Most of the dogs are in the range of 30–40 cm (n = 28) and 40–50 cm (n = 20), which could be considered small-/middle-sized dogs (Fig. 2). The size variation was compared between temporal groups (the Middle Ages vs the Early Modern Period), but no patterns emerged. Comparison between northern and southern Estonia, on the other hand, revealed statistically significant differences ($p < 0.05$): the material from the north includes significantly more small-sized dogs. However, this result could be affected by the large number of small dogs in one of the analysed locations: out of the 21 individuals in northern Estonia, 15 small dogs come solely from urban Tallinn.

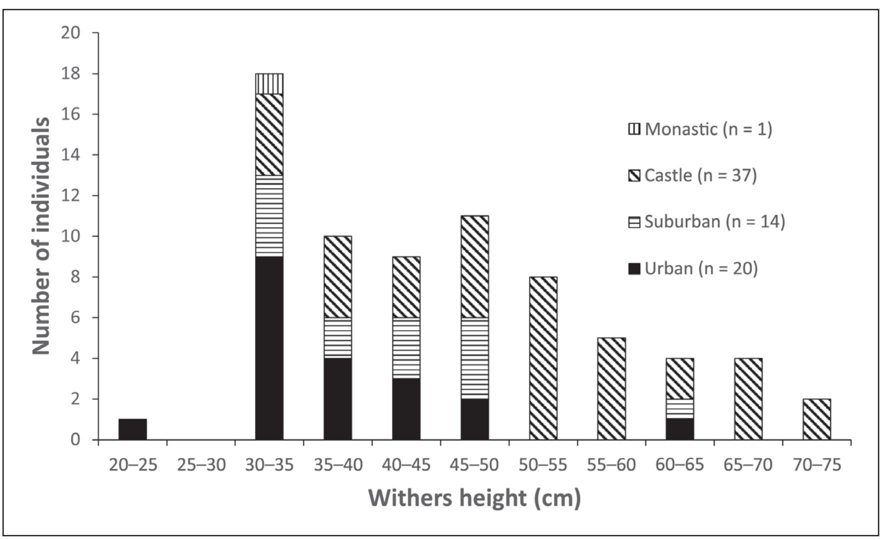

FIG. 2. Distribution of the analysed dogs (MNI = 72) by withers height and site type in medieval and early modern Estonia.

TABLE 1. Overview of archaeological sites with dog specimens analysed in this study. NISP – number of identified specimens. MA – Middle Ages, EMP – Early Modern Period, MP – Modern Period

Location	No. on Fig. 1	Archaeological site and excavation year(s)	Collection ID	Period	Site type	NISP
Käku	1	Käku smithy, 2008, 2013–2014	AI 6845	MA, EMP	Rural	3
Haapsalu	2	Haapsalu Castle, 2017	AI-HM 9206	EMP	Castle	83
Tallinn	4	Estonia pst 7, 2019	AI 8013	EMP, MP	Suburban	1
	5	Roosikrantsi 9/11, 1996	AI 6109	MA, EMP	Suburban	28
	6	Tartu mnt 1, 2011	AI 7032	MA	Suburban	60
	7	Tatari 13, 2017	AI 7863	MA	Suburban	2
		Tatari 1, 2021	AI 8352	EMP	Suburban	1
	8	Vabaduse väljak 1, 2008	AI 6917	MA/MP	Suburban	1
Rakvere	9	Pikk St and St Michael's church-yard, 2019	AI 8183	EMP	Urban	10
Sargvere	10	Sargvere settlement, 2019	TÜ 2821	MA, EMP	Rural	1
		Sargvere settlement, 2020	TÜ 2881	MA	Rural	113
Pärnu	12	Malmö 15, 1992	AI-PäMu A 2509	MA, EMP	Urban	19
Põltsamaa	14	Põltsamaa Castle, 1998	TÜ 714	MA	Castle	3
Viljandi	15	Pikk 4, 1991	TÜ 3007	MA	Urban	4
	16	Viljandi Castle, 2003	VM 10922	EMP	Castle	20
		Viljandi Castle, 2004	VM 11041	MA	Castle	1
	19	Vaksali 4, 1999	VM 11090	MA	Suburban	47
Karksi	21	Karksi Castle, 2011–2012	TÜ 1929	MA, EMP	Castle	12
Tartu	22	University of Tartu Botanical Gardens (Lai 38/40), 1989	TM A-43	MA	Urban	1
	24	Lutsu 12, 2016	TM A-244	MA	Urban (including cesspit)	2
	25	Oa St, 2021	TM A-283	MA, EMP, MP	Suburban	3
	26	Ülikooli 15, 2005, 2007	TM A-141	MA	Urban (cesspit)	19
Lohkva	27	Lohkva settlement, 2012	TÜ 2004	EMP	Rural	1
Kastre	28	Kastre Castle, 2001	TÜ 1014	MA	Castle	48
				Subtotal	Castle	167
					Urban (including cesspit)	55 (20)
					Suburban	143
					Rural	118
					Total	483

There is a significant size difference between the castle and urban/suburban dogs ($p < 0.05$), specifically between the castle and urban dogs. In the castle, the shoulder height of the dogs is 31–71 cm (avg 51 cm), while in the urban contexts it is 23–48 cm (avg 38 cm, including an outlier of 63 cm), and in suburban contexts 33–61 cm (avg 42 cm) (Fig. 3). A wider size variation in castles could suggest the presence of multiple types of dogs: for work, guarding, hunting, and as companions (or lapdogs). The latter two are more associated with wealthier households and luxury (as, for example, in the Roman Mediterranean or medieval England and Novgorod) (MacKinnon 2010; Zinoviev 2012; O'Connor 2017, 221; Martínez Sánchez et al. 2020). A higher number of small dogs in urban and suburban contexts, on the other hand, could be explained by the higher density of urban areas and easier upkeep of smaller dogs. The smallest dog in the archaeological material in Estonia so far is a 23 cm high individual from Viljandi (VM-11272/AZ-1), found in 2009 in the early 14th-century fill of the town wall (Tvauri 2009; see more below). In addition to small individuals, medium-sized dogs from all three contexts could have been typical stray village dogs. Although with no vital role in expressing social status, wealth, or companionship, stray dogs might have played a part in cleaning the streets of waste (see Lepiksaar 1963, 130).

The study of skull morphology revealed that the medieval and early modern individuals were typically dolichocephalic (long-headed) and mesocephalic (medium-headed). Some of the studied dogs display a morphological feature of a keyhole-shaped foramen magnum in the occipital region of the skull, a common characteristic in present day meso- and brachycephalic dog breeds (Onar et al. 2013, 140; Nuut 2021, table 2). Assessing the probability that these medium-headed dogs represent stray dogs with medium-sized bodies based solely on their skulls is limited, even though they may resemble strays.

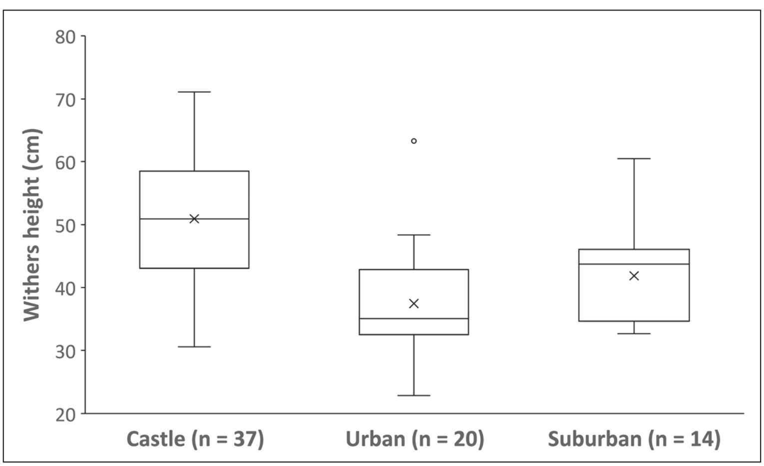

FIG. 3. The withers height of dogs by site type in medieval and early modern Estonia. The single find from the monastic site is not included here. Each boxplot represents 50% of a group's data (box) with an average (x), median (line), and extended whiskers for upper and lower quartiles. The urban group includes an outlier.

To conclude the discussion about the types of dogs, the Middle Ages in Estonia witnessed a larger variation in the body size and morphology of dogs compared to the Iron Age (here, from the 3rd to the 13th c.). While in the Iron Age, the withers height of dogs ranged from 44 to 57 cm, with the exception of one individual of 75 cm (Nuut 2021, 30), at the start of the Middle Ages in the 13th century, the size variation increased from 23 to 71 cm. Today, this variation could include breeds from Dachshund- to Mastiff-like dogs. One of these novel types was the lapdog that emerged elsewhere in Europe already in the Roman Period (De Grossi Mazzorin & Tagliacozzo 2000).

PATHOLOGIES ON DOG REMAINS

Like with other domesticates, dog remains, mainly from urban areas, have shown pathological changes. In Estonian material, the more frequent ones are oligodontia and other genetic anomalies (Maldre 2008). In the study material here, specimens with recorded pathologies were found in castle, urban, and suburban contexts. Although rural and monastic material did not reveal any pathological cases, this result could be biased because of the scarce material from these contexts. Pathological changes were recorded for a relatively small number, constituting nearly 4% of the dog specimens. For some of these cases, we cannot say the cause (Fig. 4: A). Almost half of the cases, however, were antemortem tooth loss or oligodontia (Fig. 4: C). The former could be related to old age, trauma (Losey et al. 2014, 13) or periodontal disease (Kuehn 2014) and the latter to genetic deviation (Butković et al. 2001). Antemortem tooth loss could indicate that dogs lived a relatively long

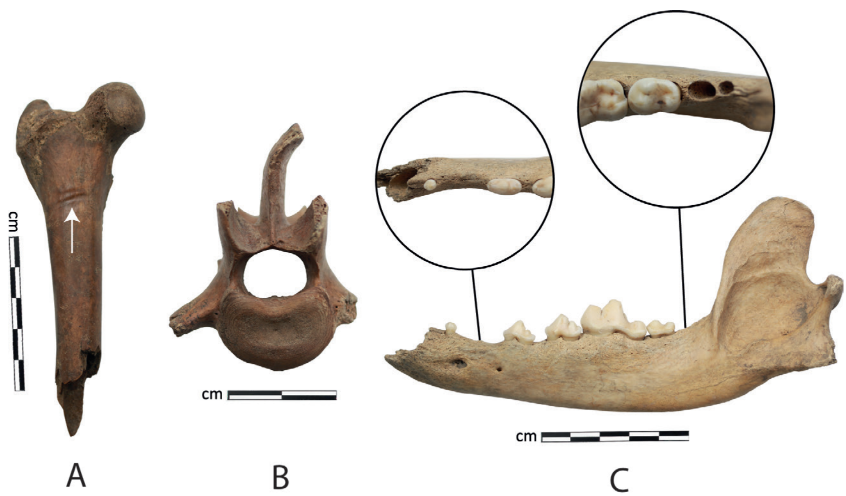

FIG. 4. Examples of pathologies on dog specimens. A – anomalous grooves on the proximal cranial surface of a femur diaphysis from Viljandi (VM-11090/AZ-2:1591, 14th–16th c.). B – spinous process of a lumbar vertebra with a severe deviation to the left from Karksi Castle (TÜ-1929/AZ-43:15, beginning of the 14th to the mid-16th c.). C – mandible with an antemortem second premolar loss and an extra tooth alveolus from Kastre Castle (TÜ-1014/AZ-145:2293, 15th to the first half of the 16th c.).

life but with poor oral hygiene – probably related to the quality and texture of the food (Losey et al. 2014, 11) – that precipitated periodontal disease and, finally, tooth loss. Another pathology presented here is the curved spinous process of the vertebra (Fig. 4: B). The aetiology of this kind of pathology is not clear. The most accepted interpretation is that of genetic deviation, but trauma and physical overload (e.g. in sled dogs) could also play a role in the formation of lateral curving of this part of the bone (Lawler et al. 2016).

No pathologies of neglect or physical abuse were recorded. Only one tibia (from a suburban area of medieval Tallinn) was documented with a healed bone fracture (which could have many aetiologies).

The work by Nuut (2023) on two medieval and early modern dog skeletons found in Viljandi town and Haapsalu Castle has shown several different pathologies. The dog skeleton from Lossi 21 in Viljandi is currently the smallest known specimen in Estonian archaeological material (see above), characterised by brachymelic limbs. The analysis has revealed that this adult male (identified by the presence of baculum) suffered from poor oral health, most likely parodontitis, resulting in the loss of several teeth before death and the dissolution of one of the maxillary second molar tooth cavities. Although stable isotope data (sample VM-11272/AZ-1:1) (Nuut et al. 2023, table 3) provides insight into the general trend of particular food consumption, no conclusions can be made about the correlation between the diet and the observed periodontal disease on this dog's skeleton.

A wider range of pathological changes was observed throughout the skeleton of a dog discovered at Haapsalu Castle. Specifically, the dog was missing an upper incisor, and the proximal joint of the left ulna showed evidence of bone remodelling and osteophytes, which could be linked to traumatic injury, such as elbow dislocation. However, since the humerus and radius were missing, no definitive conclusions could be drawn about the pathology and its possible causes. Additionally, the diaphysis of the left femur exhibited a healed sub-periosteal new bone formation, and the dorsal surface of a metacarpal diaphysis had a large dispersion of exostosis, which could be due to an infection of the bone or the periosteum. It is worth noting that the bone in question may belong to another dog of the same size found in the tower shaft (see Lõugas et al. 2019b; Nuut 2023).

FEEDING THE DOGS

As human companions, dogs and cats often consume scraps or leftovers. Dogs scavenging on the butchering and kitchen remains or being deliberately fed scraps of human food is a presumption for studying their diet by stable isotope analysis, where the expectation is usually to see a similar diet between humans and dogs (the so-called Canine Surrogacy Approach, cf Guiry 2012). However, some authors have cautioned against using dogs as direct analogues to humans, since dogs have distinct dietary habits (such as regular consumption of faeces), which may affect their stable isotope values (e.g. Guiry 2012; Hart 2023).

When comparing the isotopic values of dogs from coastal Estonia to those from inland Estonia, a statistically significant difference was found in the δ^{13}C values ($p < 0.01$), while no significant difference was observed in the δ^{15}N values. This disparity could be explained by differential access to various types of protein consumed by dogs, for example, marine vs freshwater resources. This explanation is further supported by the presence of several outliers whose isotopic values reflect significant aquatic resource consumption. In the coastal region, these include two dogs from Tallinn Old Town (AI-4061/AZ-15:1, AI-4061/AZ-34:1) with an evident marine influence: δ^{13}C of –17.9‰ and –18.3‰ (see also Aguraiuja-Lätti et al. 2022). In the inland region, data from two dogs from Viljandi (VM-10922/AZ-61:16, VM-10872/AZ-18:3) suggest a freshwater influence: values of –22.9‰ and 11.8‰, and –21.8‰ and 12.9‰ for δ^{13}C and δ^{15}N, respectively. However, if some of the dogs were stray, their high δ^{15}N values could also possibly result from starvation (e.g. Fuller et al. 2005).

When comparing δ^{13}C and δ^{15}N values of dogs with human isotopic data, the results generally showed statistical homogeneity between the two species, confirming the hypothesis that dogs were fed leftovers and scraps (Table 2, Fig. 5). Although inland dogs show a visual overlap in their carbon isotope values with humans from the same region, they are statistically significantly different in their δ^{13}C values ($p < 0.01$). This remains true even if the two outliers mentioned above are removed ($p = 0.02$). This difference could be due to the smaller dataset of dogs than humans, or because dogs consumed slightly different food. Although the human isotopic dataset suggests that freshwater fish constituted only a minor part of the diet for populations living in inland Estonia, dogs from this region seemed to consume proportionally much more freshwater resources compared to their masters. Furthermore, dogs may have only been fed certain types of leftovers (e.g. meat and fish), whereas chickens and pigs could have been given more plant-based food scraps (Aguraiuja-Lätti et al. 2022), which could further explain the difference of carbon isotope values between dogs and humans.

TABLE 2. Summary statistics of δ^{13}C and δ^{15}N isotope data of analysed dog and human samples from coastal and inland Estonia: number of samples that produced results (n), minimum (Min) and maximum (Max) values, average (Avg), 1-sigma standard deviation (SD), and range. Human data are from Aguraiuja-Lätti & Malve (this issue) and Aguraiuja-Lätti & Lõugas (2019). Dog data are from Aguraiuja-Lätti et al. (2022) and Nuut (2023)

Group (n)	δ^{13}C (‰)					δ^{15}N (‰)				
	Min	Max	Avg	SD	Range	Min	Max	Avg	SD	Range
Coastal dogs (11)	–21.2	–17.9	–19.9	1.0	3.3	7.5	11.7	10.1	1.4	4.2
Coastal humans (122)	–20.8	–18.5	–19.8	0.4	2.3	8.6	14.2	10.8	1.1	5.6
Inland dogs (15)	–22.9	–19.8	–21.3	0.7	3.1	8.0	12.9	10.5	1.3	4.9
Inland humans (53)	–21.7	–19.8	–20.8	0.4	1.9	8.2	13.1	10.2	0.8	2.9

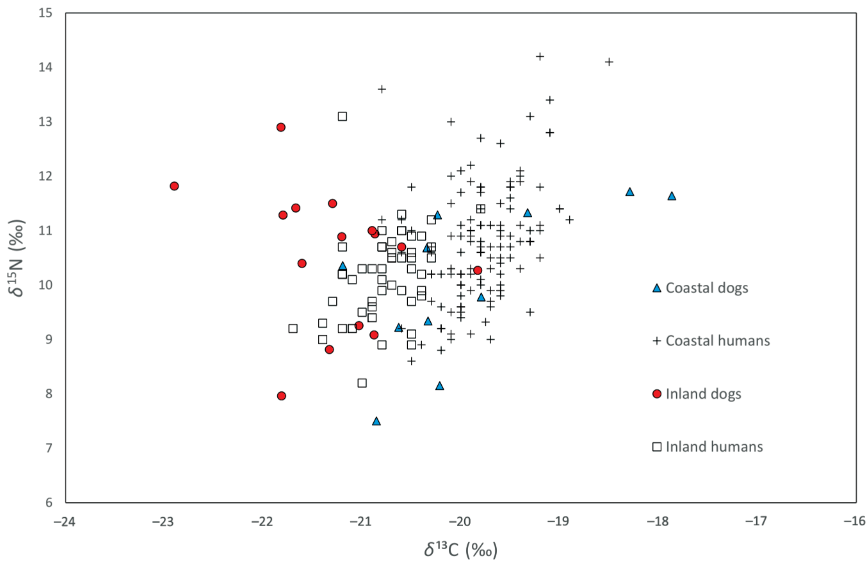

FIG. 5. Scatterplot of $\delta^{13}C$ and $\delta^{15}N$ isotope values for dogs and humans analysed in this study. Note the outliers in the dog $\delta^{13}C$ values both from coastal and inland regions. Human data are from Aguraiuja-Lätti & Malve (this issue) and Aguraiuja-Lätti & Lõugas (2019). Dog data are from Aguraiuja-Lätti et al. (2022) and Nuut (2023).

ECONOMIC USE OF DOGS

In archaeological material, the presence of dogs is usually proportionally very low and yet somewhat regular. Usually, it is not a sign of intensive dog utilisation but just a representation of occasional activities and redeposition of archaeological contexts (see O'Connor 2017, 222). Considering that the nature of most of the zooarchaeological material analysed in the project is food remains, the modest representation is not surprising, i.e. dogs were not part of the usual food source. Despite the relatively small number of dog specimens, the evidence of butchering cannot be overlooked. In our study material, cut marks appear on a tenth of the dog specimens (NISP = 47). Bones with cut marks constituted similar proportions (12%) among the dog remains in both medieval (NISP = 41) and early modern (NISP = 9) contexts. Interestingly, the highest proportion of dogs with cut marks was found from castle contexts (NISP = 27; 16% out of all dog specimens in castle sites).

Cut marks appear on almost all parts of the dog's skeleton and include those from dismembering (heavy chopping marks, including those that have cut through the bone) and skinning or filleting (on bone surfaces) (Fig. 6; for categorisation of butchering activities, see Lyman 2008, 279–283 and references therein). In our study material, there are no clear skinning marks, i.e. those on the surfaces of crania or lower limb bones. However, skinning could also be performed without leaving any cut marks on the skeleton (Zinoviev 2012, 154). Dismembering and filleting marks, on the other hand, are present on vertebrae, hipbones, and legs (both upper and lower parts) (see photos of the finds in Lõugas et al. 2019a, fig. 7; Malve et al. 2020, fig. 13; 2022, fig. 8).

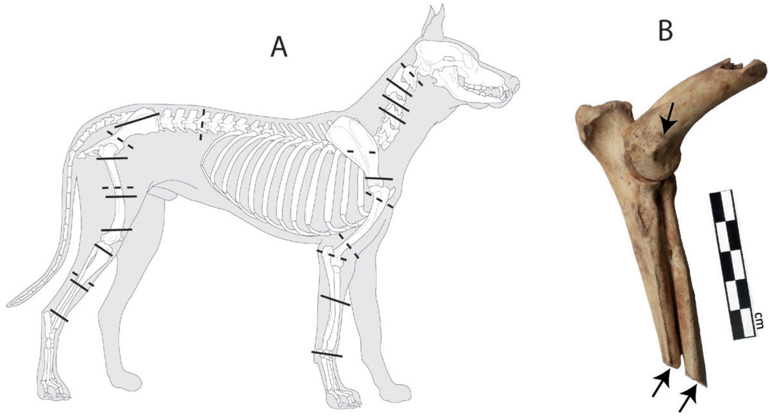

FIG. 6. Butchering marks on dog specimens. A – approximal locations of different types of cut marks (NISP (number of identified specimens) = 47); dashed lines indicate cut marks on the surface of the bones, and continuous lines represent cut marks that have cut through the bones (figure after Michel Coutureau (Inrap), Vianney Forest (Inrap) – ©1996 ArchéoZoo.org). B – a dog's forelimb from Viljandi Castle that expresses a cut mark on the medial epicondyle of the humerus and has been cut through from the radius and ulna (VM-10922/AZ:61-14,15,16, mid-16th to the beginning of the 17th c.).

Based on the presented evidence, we can confidently state that at least some of the dog remains in the study material are related to food waste. The question is whether dog meat was meant for human consumption or to feed other dogs (see discussion in e.g. Albarella 1999, 872–973; Tourunen 2008, 110, 144). It could be theorised that the individuals studied here were either being eaten during famines or intentionally butchered for population control, or that the primary products of a dog, like meat and skin, were part of a larger economic and social sphere (see McCormick 1991, 44–45, 49; Murphy 2001). Also the marrow fat could have been exploited for cosmetic or other uses (Gidney 1996). Dog meat consumption, and also skinning dogs, seems to have been predominantly an urban trait, for example, in medieval and post-medieval Ireland (Murphy 2001; McCormick & Murray 2007, 49–50) or in post-medieval urban centres in England, where at times, dog meat was even considered a 'dainty dish' (Gordon 2017).

The cat

PRESENCE OF CATS IN MEDIEVAL AND EARLY MODERN MATERIAL

The cat (NISP = 280) is represented with partial skeletons and single specimens, the former making up a prominent amount of the analysed material (Table 3). The highest number of cat specimens comes from medieval urban cesspits in Tartu, but this number also includes partial skeletons. The remaining urban sites and the suburban and castle areas also have a relatively large quantity of cat specimens, but with very few partial skeletons. Among rural sites, Sargvere settlement alone includes 45 specimens, but these are all from one individual. Padise Monastery is represented by a few specimens.

TABLE 3. Overview of archaeological sites with cat specimens analysed in this study. NISP – number of identified specimens. MA – Middle Ages, EMP – Early Modern Period, MP – Modern Period

Location	No. on Fig. 1	Archaeological site and excavation year(s)	Collection ID	Period	Site type	NISP
Käku	1	Käku smithy, 2012	AI 6845	EMP	Rural	1
Haapsalu	2	Haapsalu Castle, 2017	AI-HM 9206	EMP	Castle	44
Padise	3	Padise Monastery, 2010–2011	AI 0003	MA	Monastic	4
Tallinn	4	Estonia pst 7, 2019	AI 8013	MA, EMP, MP	Suburban	9
	5	Roosikrantsi 9/11, 1996	AI 6109	MA, EMP	Suburban	8
	6	Tartu mnt 1, 2011	AI 7032	MA, EMP	Suburban	8
	7	Tatari 13, 2017	AI 7863	MA	Suburban	5
	8	Vabaduse väljak 1, 2008	AI 6917	MA/MP	Suburban	2
Rakvere	9	Pikk St and St Michael's churchyard, 2019	AI 8183	EMP, MP	Urban	11
Sargvere	10	Sargvere settlement, 2019	TÜ 2821	MA/EMP	Rural	45
Pärnu	11	Põhja St, 2002	PäMu A 2570	EMP	Urban	1
	12	Malmö St, 1992	AI-PäMu A 2509	MA, EMP	Urban	19
Kärevere	13	Kärevere settlement, 1986	AI 5390	MA, EMP	Rural	1
Viljandi	15	Pikk 4, 1991	TÜ 3007	MA	Urban	1
	16	Viljandi Castle, 2002	VM 10875	EMP	Castle	1
	17	Laidoneri väljak 10, 1991	VM 10326	MA	Urban	1
	18	Laidoneri väljak 10, 1994–1995	VM 10942	MA	Urban	1
	19	Vaksali 4, 1999	VM 11090	MA	Suburban	5
	20	Tartu St, 1996	VM 11117	MA	Suburban	1
Karksi	21	Karksi Castle, 2011	TÜ 1929	MA	Castle	3
Tartu	23	Küütri 1, 2006	TM A-162	MA	Urban (cesspit)	27
	24	Lutsu 12, 2016	TM A-244	MA	Urban (cesspit)	1
	25	Oa St, 2021	TM A-283	MA, EMP	Suburban	13
	26	Ülikooli 15, 2005, 2007	TM A-141	MA	Urban (cesspit)	67
Kastre	28	Kastre Castle, 2001	TÜ 1014	MA	Castle	1
				Subtotal	Castle	49
					Urban (including cesspit)	129 (95)
					Suburban	51
					Rural	47
					Monastic	4
					Total	280

These unequal representations of cat remains could be explained in different ways. First, the relatively high number of cat remains from urban and suburban contexts are due to the high concentration of excavations in these areas, resulting in larger quantities of zooarchaeological material. At the same time, rural and monastic material is poorly represented and analysed. Second, densely populated areas had a favourable environment for uncontrolled growth of the cat population, possibly resulting in higher specimen numbers.

ECONOMIC USE OF CATS

To our knowledge, unlike dogs, cats have never been regarded as a potential food resource, not even in times of hardship. Their primary role, which could also be regarded as economically efficient, would be catching rodents. Thus, their very low presence among food remains versus their relatively higher presence in cesspits (where often whole carcasses of animals were disposed of) is expected. This does not necessarily mean that cats were kept as pets rather than (semi)feral commensal animals (O'Connor 2017, 221). Among the partial skeletons found in a medieval cesspit at Ülikooli 15, Tartu (dated to the end of the 13th up to the beginning of the 15th c.), a clear indication of the economic use of cats has been revealed: cut marks on at least two individuals, an adult and a juvenile, that unambiguously indicate skinning (Fig. 7; Haak et al. 2022). Other cat remains from the same cesspit, representing at least four individuals, both juvenile(s) and adult(s), did not have visible cut marks but hypothetically could also be related to the skinning waste.

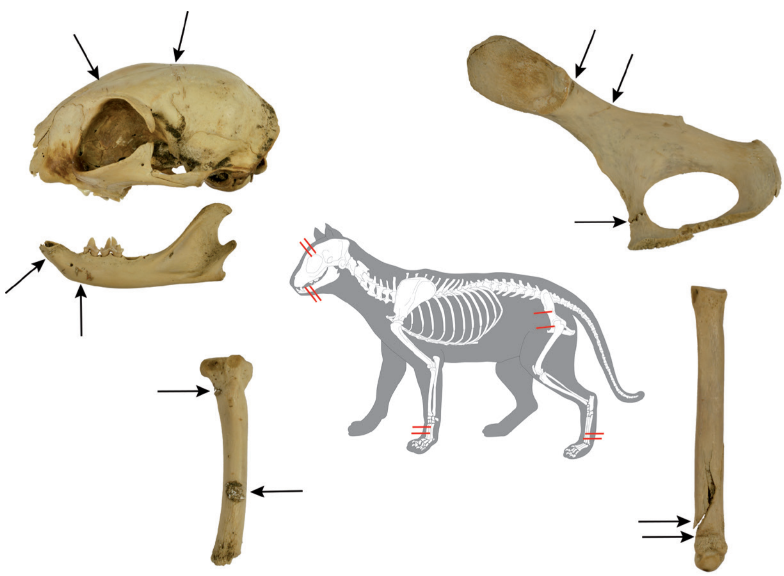

FIG. 7. Cat specimens of adult individual(s) with cut marks (indicated with arrows). Whether all adult specimens with cut marks belong to one or more individuals cannot be determined. The adult individual(s) had cut marks on the cranium (TM-A-141/AZ-631:228), mandible (:229), third metacarpal (:250), third metatarsal (:268), and hipbone (:252). Cut marks on the hipbone are assumed to relate to the same carcass processing activity as skinning. The figure was first published by Haak et al. (2022, fig. 7).

To our knowledge, this evidence of cat skinning is the first in Estonia.[3] Of course, this unique find is not proof of extensive trade in cat fur; on the other hand, it is probably not purely incidental (Haak et al. 2022, 41). Similar finds of the utilisation of cat skins are known from close regions, such as medieval/post-medieval Turku in Finland (Tourunen 2008, 109) and medieval Novgorod in Russia (Zinoviev 2018, 116). Contemporaneous examples also come from early Christian Ireland (McCormick & Murray 2007, 49–50) and post-medieval York in England (O'Connor 2017, 220).

Conclusions

The zooarchaeological analysis of medieval and early modern material from Estonia has provided insights into the presence, use, and treatment of dogs and cats during this period. From the 13th to the 18th centuries, various types of dogs were present, acting in different roles in different parts of society. In addition to the most expected roles of working dogs or just stray mongrels, the possible lapdog from medieval Viljandi hints at dogs being pets or companions. Moreover, although not intensively utilised, there is evidence of occasional dog meat consumption. Whether it was done during times of hardship or as part of a larger economic and social sphere remains open in current research. The diet of the dogs themselves was similar to the human diet in both coastal and inland regions of medieval and early modern Estonia.

Cats, on the other hand, proved to provide an occasional source of fur. The first known evidence of skinning cats in Estonia is not a novel feature European-wise, but still a thought-provoking find in the Livonian history. Overall, the lives of dogs and cats were clearly intertwined with the lives of humans. While the present study provided valuable insights into the use and treatment of those two species in historical Estonia, it also provoked further research questions. For example, a detailed focus on pathologies could give a better understanding of the human-dog and human-cat relationships; inclusion of archival data, for which there was no space in this article, could benefit in defining the types and roles of dogs; and a comparison with material from the Late Iron Age would place these two species in a broader historical and cultural context.

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3 Based on the Master's thesis by Rannamäe (2010, 84, table 1), two medieval cat specimens in the assemblage from Vaksali 4, Viljandi, 1999 (VM 11090) carried cut marks. These specimens were reinvestigated for the current study, but no cut marks were observed. Therefore, the author of this work would like to point out the analyst bias in Rannamäe 2010.

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Lemmikud või tööloomad – koerad ja kassid kesk- ja varauusaegses Eestis

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RESÜMEE

Kesk- ja varauusajal olid koerad ja kassid lahutamatu osa ühiskonnast nii linnas kui ka maal. Kui koerad olid pigem kaaslased ja tööloomad ning kassid kasulikud näriliste tõrjumisel, siis majanduslikku väärtust (nii nagu kariloomadel) neil kahel liigil väga ei teata olevat. Siiski leidub koerte ja kasside luid ja hambaid nii toidujäätmete hulgas kui ka jäätmekastide materjalis ning suhteliselt vähesest hulgast hoolimata võivad need luuleiud olla üpris kõnekad. Selles artiklis koondatakse koerte ja kasside zooarheoloogiline materjal Eesti kesk- (1220–1558) ja uusaegsetest (1558–1800) muististest (joonis 1) eesmärgiga arutada koerte ja kasside rollide üle mineviku ühiskonnas. Kokku uuriti 483 koeraluud ja 280 kassiluud (tabelid 1 ja 3). Kasutatud meetodid hõlmasid luuleidude kvantitatiivset analüüsi, morfomeetriat ning stabiilsete isotoopide (süsinik ja vesinik) analüüsi. Omavahel võrreldi eri perioodide ja regioonide vahel jagatud gruppe. Artiklis esitatakse Eesti Teadusagentuuri projekti PRG29 tulemusi.

Koeraluude hulgas on pooled üksikleiud ja pooled kuuluvad osalistele skelettidele. Viimaste puhul võib tegemist olla nii juhuslikult mattunud loomadega kui ka tahtlike matmistega, kuigi selgelt rituaalsest kontekstist ei ole neist teadaolevalt ükski. Milleks koeri kasutati, võib näidata nende n-ö morfotüüp (tänapäevases kontekstis tõug) ehk kehakuju ja -suurus. Kesk- ja varauusaegses materjalis on väga erineva suurusega koeri (joonised 2 ja 3), kusjuures võrreldes rauaajaga koerte turjakõrguste varieeruvus keskajal suurenes. Kui rauaaegne materjal annab koerte turjakõrguseks 44–57 cm (lisaks üks 75 cm erand), siis kesk- ja varauusaegse materjali põhjal on see 23–71 cm. Enamik Eesti kesk- ja varauusaegsetest koertest olid väikese või keskmise suurusega, turjakõrgusega 30–50 cm. Märkimisväärsed erinevused ilmnevad linnuste ja (ees)linnade materjali võrdluses: linnustes varieerub koerte suurus rohkem, mis võib viidata eri tüüpi koerte, nagu jahi-, valve- ja sülekoerad, kasutamisele. Oma rolli võisid koerad mängida ka lihaloomana. Lõikejälgi esineb 10% kõikidest uuritud koeraluudest ning need viitavad selgelt nii tükeldamisele kui ka liha eemaldamisele (joonis 6). Millist elu koerad elasid, on keerulisem hinnata. Sagedasemad patoloogiad on eluajal välja langenud hambad ja oligodontia, mis võivad viidata kõrgele eale, mõnele traumale, haigusele või geneetilisele kõrvalekaldele (joonis 4). Koerte toitumisanalüüsid kinnitasid, et neile visati tihtipeale ette inimeste toidujäätmeid. Siiski ei olnud inimeste ja koerte toidulaud päris identne,

sest koerad on söönud rohkem kala (Põhja-Eestis eelistati merekala ja Lõuna-Eestis pigem mageveeliike) (joonis 5, tabel 2).

Kassid on esindatud nii kesk- kui ka varauusaegses materjalis; suurim hulk analüüsitud kassiluid pärineb Tartu keskaegsetest jäätmekastidest. Võrreldes koertega on kasside kohta saadav teave napp. Millised nad välja nägid ja kuidas neid peeti, jääb siinkohal zooarheoloogilise materjali vähesuse tõttu vastamata. Küll aga oli neil lisaks hiirepüüdjale veel teinegi roll: Tartu keskaegsest jäätmekastist leitud lõikejälgedega kassiluud viitavad üheselt nahanülgimisele (joonis 7). Kui laialdane võis olla kassinahakaubandus keskaegsel Liivimaal, jääb tulevasteks uuringuteks.

Uurimus annab ülevaate koertest ja kassidest kesk- ja varauusaegsel Liivimaal ning tõstatab ka uusi küsimusi. Detailsem paleopatoloogiline ekspertiis võiks veelgi rohkem avada inimeste ja koerte-kasside vahelist suhet. Võrdlus rauaajaga annaks aga laiema kultuurilise tähenduse koerte ja kasside ajas muutuvatele rollidele. Samuti oleks oluline kõrvutada zooarheoloogilist materjali kirjalike allikatega, et saada parem ülevaade koerte ja kasside välimusest, eluolust ja olulisusest kunagises ühiskonnas.