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RESEARCH ARTICLE

In search of the 'great horse': A zooarchaeological assessment of horses from England (AD 300–1650)

Carly Ameen[1] | Helene Benkert[1] | Tamsyn Fraser[2] | Rebecca Gordon[3] | Matilda Holmes[4] | Will Johnson[5] | Malene Lauritsen[1] | Mark Maltby[6] | Karina Rapp[1] | Tess Townend[1] | Gary Paul Baker[7] | Laura May Jones[1] | Camille Vo Van Qui[1,8] | Robert Webley[1] | Robert Liddiard[7] | Naomi Sykes[1] | Oliver H. Creighton[1] | Richard Thomas[4] | Alan K. Outram[1]

[1]Department of Archaeology, University of Exeter, Exeter, UK
[2]Department of Archaeology, University of Sheffield, Sheffield, UK
[3]Brereton Road, Bedford, UK
[4]School of Archaeology and Ancient History, University of Leicester, Leicester, UK
[5]University of Leicester Archaeological Services, University of Leicester, Leicester, UK
[6]Department of Archaeology and Anthropology, Bournemouth University, Bournemouth, UK
[7]School of History, University of East Anglia, Norwich, UK
[8]Department of History, University of Exeter, Exeter, UK

Correspondence
Carly Ameen, Department of Archaeology, University of Exeter, Laver Building, North Park Road, Exeter, UK.
Email: cameen7@gmail.com

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Abstract

Popular culture presents a deep-rooted perception of medieval warhorses as massive and powerful mounts, but medieval textual and iconographic evidence remains highly debated. Furthermore, identifying warhorses in the zooarchaeological record is challenging due to both a paucity of horse remains relative to other domesticates, and the tendency of researchers to focus on osteological size, which makes it difficult to reconstruct in-life usage of horses and activity related changes. This paper presents the largest zooarchaeological dataset of English horse bones ($n = 1964$) from 171 unique archaeological sites dating between AD 300 and 1650. Using this dataset alongside a modern comparative sample of known equids ($n = 490$), we examine trends in size and shape to explore how the skeletal conformation of horses changed through time and reflected their domestic, elite and military roles. In addition to evidencing the generally small stature of medieval horses relative to both earlier and later periods, we demonstrate the importance of accurately exploring the shape of skeletal elements to describe the morphological characteristics of domestic animals. Furthermore, we highlight the need to examine shape variation in the context of entheseal changes and biomechanics to address questions of functional morphology and detect possible markers of artificial selection on past horses.

KEYWORDS
biometry, conformation, England, horse, medieval, warhorse, zooarchaeology

1 | INTRODUCTION

The significance of the horse to English social, cultural and economic life in the Middle Ages cannot be overstated. Their importance has seen horses become a research focus for both historians and archaeologists, serving to increase their longstanding popular public appeal. In particular, the warhorse is central to our understanding of medieval English society and culture as both a symbol of status closely associated with the development of aristocratic identity and as a weapon of war famed for its mobility and shock value, changing the face of battle (Clark, 2004; Hyland, 1994). Historical records indicate that fortunes were spent on developing and maintaining networks for the breeding, training and keeping of horses used in combat (Ameen et al., 2021; Davis, 1989) further emphasizing the key economic and political roles of these animals. Contemporary written and iconographic sources emphasise the significance of horses within the Norman and later medieval periods, with almost 200 horses appearing throughout the Bayeux Tapestry serving to reinforce the image of the Norman army as one with a significant proportion of cavalry (Davis, 1987). To the pioneering French military historian Philippe Contamine, medieval warfare was, quite simply, the 'age of the horse', and this long tradition of scholarship is echoed in some modern accounts that continue to stress the primacy of the mounted warrior as the battle-winning weapon par excellence of the Middle Ages (Contamine, 1986).

Yet, even with the immense volume of historical scholarship and contemporary written sources, there is no clear indication of what physical qualities were preferred in the ideal 'warhorse'. Indeed, it is important to remember that the term 'warhorse' covers animals with a whole range of conformations. By the broadest definition, the term encapsulates horses used for a variety of different martial purposes, from the destriers and coursers of the nobility to the rouncies of the mounted archer, though it is most often used as a synonym for the Late Medieval destrier. It is almost certain that different equine characteristics were sought depending upon the intended martial function of the horse. A large destrier intended for display or the tournament required very different physical characteristics compared with the rouncies and trotters needed to cover long distances on the *chevauchée* (mounted military raiding campaigns). Although it is realistic to assume that the majority of horse bones recovered from archaeological excavations are not from warhorses, there remains a lack of evidence for what types of morphology and conformation to expect from a warhorse, meaning that the positive identification of warhorses has remained elusive from a zooarchaeological perspective.

These issues are exacerbated by the relative paucity of horse bones in medieval assemblages compared with those from the Roman and Iron Age periods across England (Albarella, 2019). The lower relative frequency of horse bones from medieval sites is partially the result of distinctive depositional processes for horses, including the standardised postmortem processing of their carcasses away from domestic sites at tanneries and knackers' yards (MacGregor, 2012; Velten, 2013). The analytical approach to the analysis of horse bones is also traditionally different from that applied to other animal remains, focussing on gross size (through estimated withers height), which requires the recovery of complete long bones, rather than a series of metrics from different anatomical planes (Thomas et al., 2018). This has resulted in emphasis on the overall height of horses, rather than allowing for an examination of both size and shape change through time to explore the varied and dynamic roles of horses, including in warfare, during this crucial period of equine history.

Due to this combination of factors, and in spite of the well-known connection between the Later Middle Ages and use of horses in warfare, the medieval warhorse has seen minimal zooarchaeological study, though some work on continental site-specific assemblages has examined this (Hanot et al., 2020; Pluskowski et al., 2009, 2018). This study addresses this gap by compiling and analysing ~2000 individual horse bones dating between the 4th and 17th centuries AD from archaeological sites across England. By undertaking a diachronic review of horse morphology and conformation, we investigate shifts in the trajectories of size and shape related change, with an emphasis on those attributed to the medieval period, to explore how this changing physiology and appearance relates to horses' domestic, elite and military roles.

2 | MATERIALS AND METHODS

This paper presents the largest known dataset of archaeological equid bone metrics from England, spanning the Late Roman through post-medieval periods (AD300–1650), and consisting of 1964 archaeological bones, alongside 490 modern fully adult equids (Tables 1A,B and S2). The archaeological specimens come from 171 unique sites (Figure 1, Table S1). Metrics for 10 postcranial elements are provided here (Table 1B), including metrics collected for this study and from published sources following the protocols set out by von den Driesch (von den Driesch, 1976). Metric data of this synthetic nature are regularly presented, analysed and compared, though could potentially be influenced by collection across multiple observers (Lee Lyman & VanPool, 2009). We feel that the size of this dataset outweighs any potential influence from multiple observers but the nature of the compiled dataset does not allow for a direct comparison of this.

Withers heights were estimated from Greatest Length (GL) measurements following May (1985). The dataset also includes the withers height measurements from 95 living horses of known breed. Living horse withers heights were recorded by authors KR and TT using a traditional calibrated measuring stick and a Coburn horse & pony height-weight tape (Curtis et al., 2010). A variety of modern equid species, as well as horses of varying breed-types, are also included in the dataset as a comparison against the archaeological materials. Although the majority of archaeological specimens are likely to be horses (*Equus caballus*), given the known morphological similarly between horses and donkeys (*Equus asinus*) or horse-donkey hybrids (mules and hinnies), the possibility exists that some have been misidentified (Johnstone, 2004). Although it is well documented that sex plays a significant role in the size and morphology of animal bones (Scott, 1990), its impact is limited in horses (Johnstone, 2004), and our focus on disarticulated horse bones meant that sex could not be assessed here given the difficulty of sexing postcranial elements (Cross, 2018). Furthermore, we recognise that factors beyond chronology could (and will) affect the size, shape and conformation of horses through time. We also looked at regional variation through time but found no regional trends distinct from the broader chronological ones, likely in part due to the small sample sizes and necessarily broad chronological categories. Here, we report the results only for questions of chronological variation.

Changes in horse size were assessed using size-index scaled Log Standard Index (LSI) values (Meadow, 1999). Length and width LSI were calculated using the standard logarithm in the package 'zoolog'

TABLE 1 Details of the bone dataset including sample sizes for each cultural period (A) and per element (B)

A			B		
Period	**Date**	***N***	**Unique sites**	**Element**	***N***
Late Roman	300–410 AD	312	42	Astragalus	257
Early Saxon	410–700 AD	210	31	Calcaneum	132
Late Saxon	700–1066 AD	219	17	Femur	169
Norman	1066–1200 AD	187	25	Humerus	284
High Medieval	1200–1350 AD	208	43	Metacarpal	280
Late Medieval	1350–1500 AD	475	32	Metatarsal	282
Post Medieval	1500–1650 AD	356	43	Radius	387
Donkey	Modern	90		Scapula	164
Pony	Modern	22		Tibia	363
Przewalski	Modern	141		Ulna	47
Light riding horse	Modern	44			
Mule	Modern	88			
Draft	Modern	13			

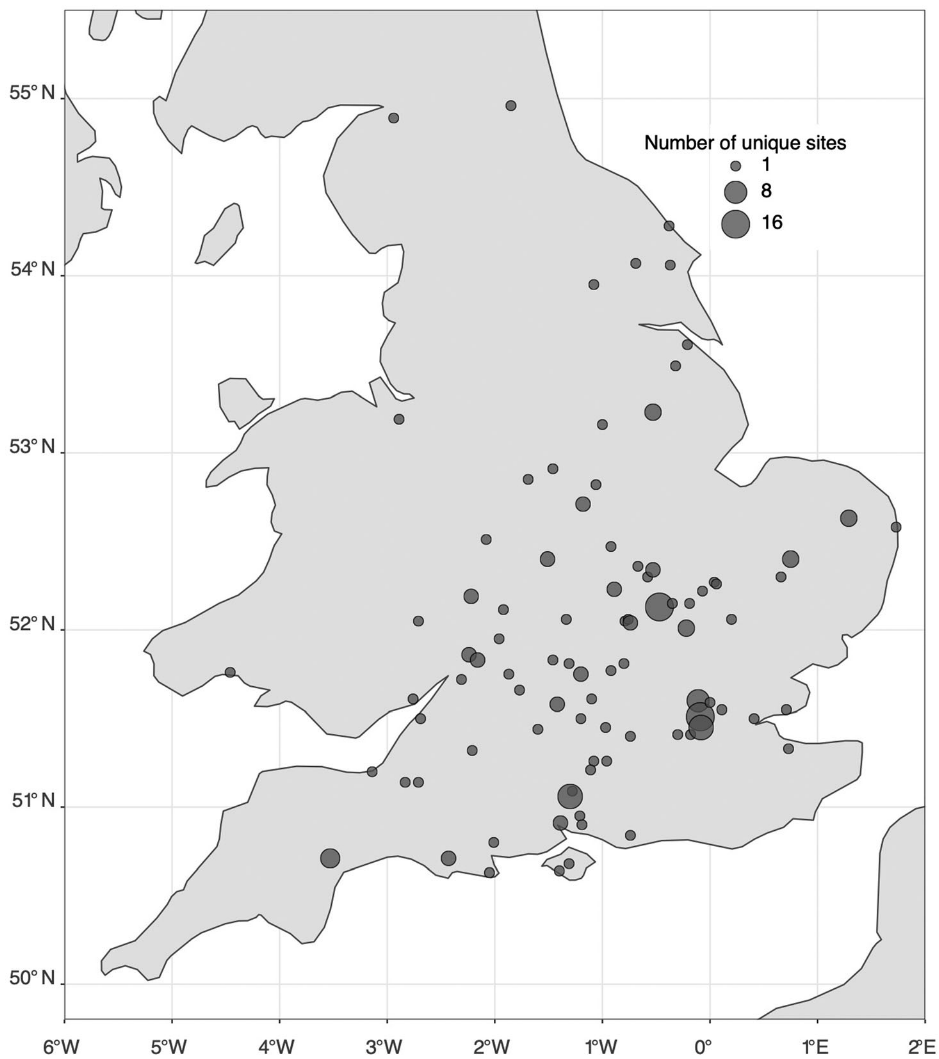

FIGURE 1 Map of archaeological sites included in this analysis. Due to their close geographic proximity some locations have been combined, with unique sites represented by point size in each region. Individual site information and mapping coordinates can be found in Table S1

(Pozo et al., 2021; Trentacoste et al., 2018). Because depth measurements are not recorded routinely compared with length and width measurements, there was insufficient data to document changing bone depth. The standard used to calculate LSI values of post-cranial bones was an Icelandic pony (Johnstone, 2004) (Table S3) which is included as a reference in 'zoolog'. One length and one width log ratio value from each specimen were included in the analysis, with values selected following the default zoolog 'priority' method (Trentacoste et al., 2018): length values—GL, GLl, GLm and HTC; width values—Bd, Bp, SD, Bfd and Bfp (Table S4). Differences in withers height and LSI values were examined using a pairwise comparisons Wilcoxon rank sum test with resulting *p*-values adjusted for multiple comparisons using the Bonferroni correction. Some elements were excluded from the LSI analysis (scapula, ulna and astragalus) and withers height estimates (scapula, ulna, astragalus and calcaneus), though the raw data are provided for all elements in Table S2. All analyses were performed in R version 4.0.2 (R Team, 2013) using functions available in base R, as well as the following packages; 'zoolog', 'stats','ggplot', 'ggfortify' and 'EvnStats'.

3 | RESULTS

3.1 | Withers height

Examination of withers height (Figure 2) indicates that on average, horses from the Saxon and Norman periods (5th–12th centuries) were ponies by modern standards (i.e. less than 1.48 m, Fédération

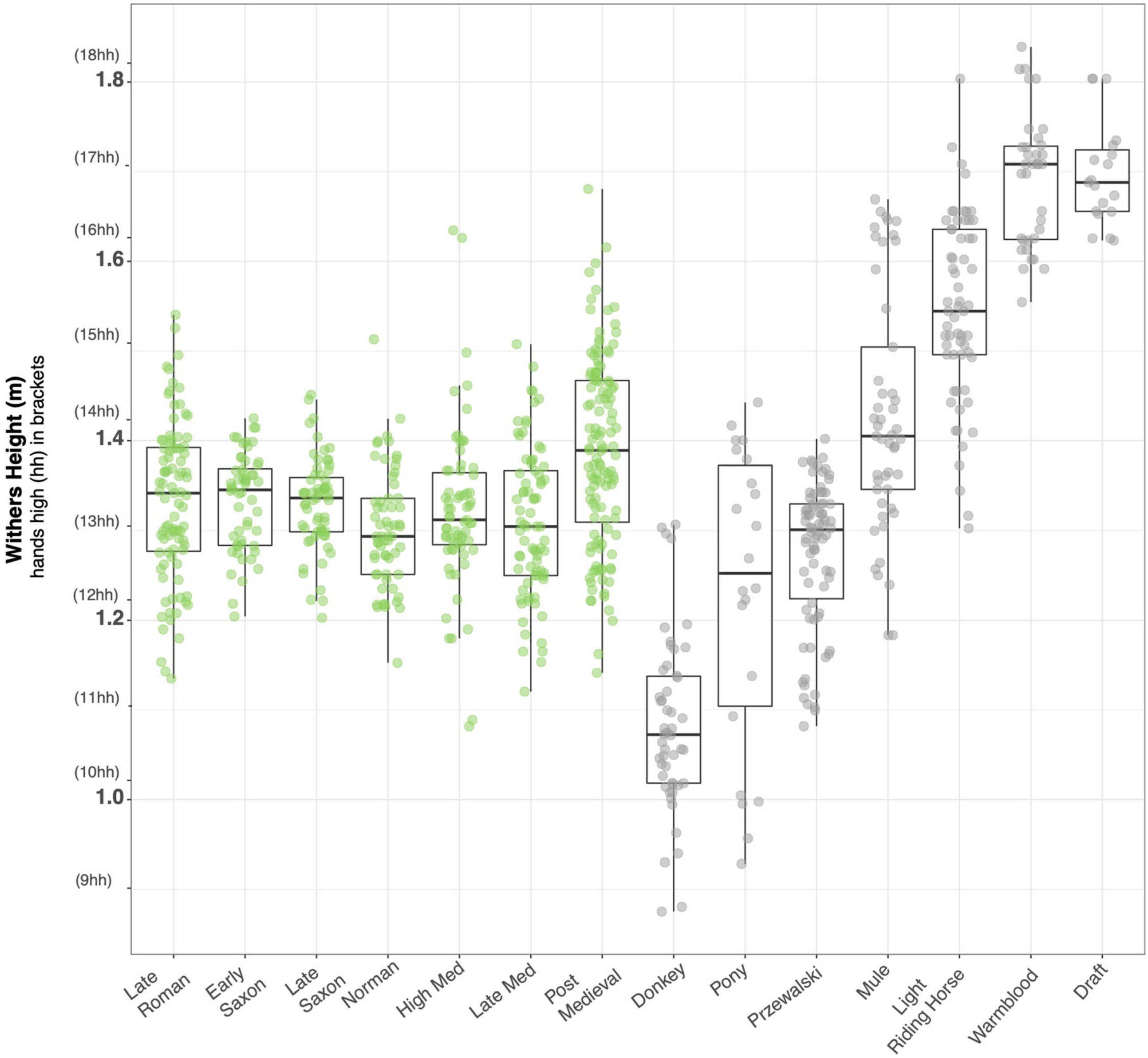

FIGURE 2 Boxplot showing withers heights (in metres) calculated from greatest length (GL) of long bones of archaeological (green) and modern equids (grey). Withers height values are displayed in centimetres and hands high (hh) on the *y*-axis and grouped by chronological period on the *x*-axis [Colour figure can be viewed at wileyonlinelibrary.com]

Equestre Internationale, 2014). The Saxon period horses are, on average, a similar height to their Late Roman counterparts, but there is an observable decrease in variability during these periods, which is not attained again until the late medieval period (1350–1500 AD). Although the average heights were relatively small, larger outliers appear from the Norman period (1066–1200 AD) onwards. For the Norman phase, the maximum height recorded was a horse from Trowbridge Castle, Wiltshire (Holmes, 2018), estimated to be over 1.5 m tall, similar to the size of modern light riding horses (Figure 2). The high medieval period (1200–1350 AD) sees the first emergence of horses over 1.6 m, recovered from Heron Tower, London (Sorapure, 2016), though it is not until the post-medieval period (1500–1650 AD) that the average height of horses becomes significantly larger than those of the preceding periods. It is also in the post-medieval period that the variability in height appears to increase, ranging between less than 1.2 m to almost 1.7 m, and finally approaching the sizes of modern warmblood and draft horses (Figure 2, Table 2).

3.2 | Log Standard Index

The results from the log-scaling analyses are consistent with the withers height data (Figure 3a,b and Tables S3 and S4). Overall, the analysis of both length and width measurements revealed a decrease in mean size during the Norman period. The increase in withers height shown to begin in the high medieval period is reflected in the length LSI metrics as well, with a corresponding increase in width. Significant increases in size and size range are apparent in the post-medieval period (Table 2).

3.3 | Robusticity

Horse metapodia are useful for examining the in-life usage of horses from metrical analyses because of their load-bearing function and proclivity to undergo morphological changes relating to breed and differing physical activities (Brooks et al., 2010; Outram et al., 2009). The ratios between GL and smallest width of diaphysis (SD), and greatest breadth of distal epiphysis (Bd) are indices of general limb robusticity, rather than overall size, and have been used in differentiating equid species (Eisenmann & Beckouche, 1986) and identifying early domestic equids (Outram et al., 2009). An examination of the metapodia from our dataset reveals an increase in robusticity of the metatarsal beginning in the high medieval period (Figure 4b,c), whereas the Norman period has significantly more slender metatarsals than other periods. The trends seen in the rear leg are not found in the front leg, with Saxon horses showing a greater robusticity in comparison with their later medieval counterparts (Figure 4a). Overall, robusticity of the metacarpal decreases until the post-medieval period (Figure 4c). In line with other analyses, the post-medieval period sees the largest and

TABLE 2 Differences in withers height (WH) and LSI length and width among the different temporal groups of horses

Pairwise comparisons using Wilcoxon rank sum test Bonferroni correction							
		Late Roman	Early Saxon	Late Saxon	Norman	High Med	Late Med
Early Saxon	WH	1.0	-	-	-	-	-
	LSI length	1.0	-	-	-	-	-
	LSI width	1.0	-	-	-	-	-
Late Saxon	WH	1.0	1.0	-	-	-	-
	LSI length	1.0	1.0	-	-	-	-
	LSI width	1.0	1.0	-	-	-	-
Norman	WH	0.2737	0.30224	0.11358	-	-	-
	LSI length	0.8624	0.0337	0.9353	-	-	-
	LSI width	0.235	1.0	0.023	-	-	-
High Med	WH	1.0	1.0	1.0	1.0	-	-
	LSI length	1.0	0.4491	1.0	1.0	-	-
	LSI width	0.319	1.0	0.055	1.0	-	-
Late Med	WH	0.80944	1.0	1.0	1.0	1.0	-
	LSI length	1.0	1.0	1.0	1.0	1.0	-
	LSI width	0.221	1.0	0.043	1.0	1.0	-
Post Med	WH	0.00691*	0.00358*	0.00077*	1.30e-06*	0.00051*	5.9e-06*
	LSI length	1.60e-06*	0.0007*	1.40e-07*	2.50e-09*	1.70e-08*	3.90e-08*
	LSI width	4.60e-06*	1.10e-06*	5.70e-05*	2.40e-08*	2.80e-08*	1.60e-10*

Note: Results correspond to the probability (p) of observed differences in mean as calculated with pairwise comparisons using a Wilcoxon rank sum test. Reported p-values are those adjusted for multiple comparisons using the Bonferroni correction.
*Significant results ($p \leq 0.01$).

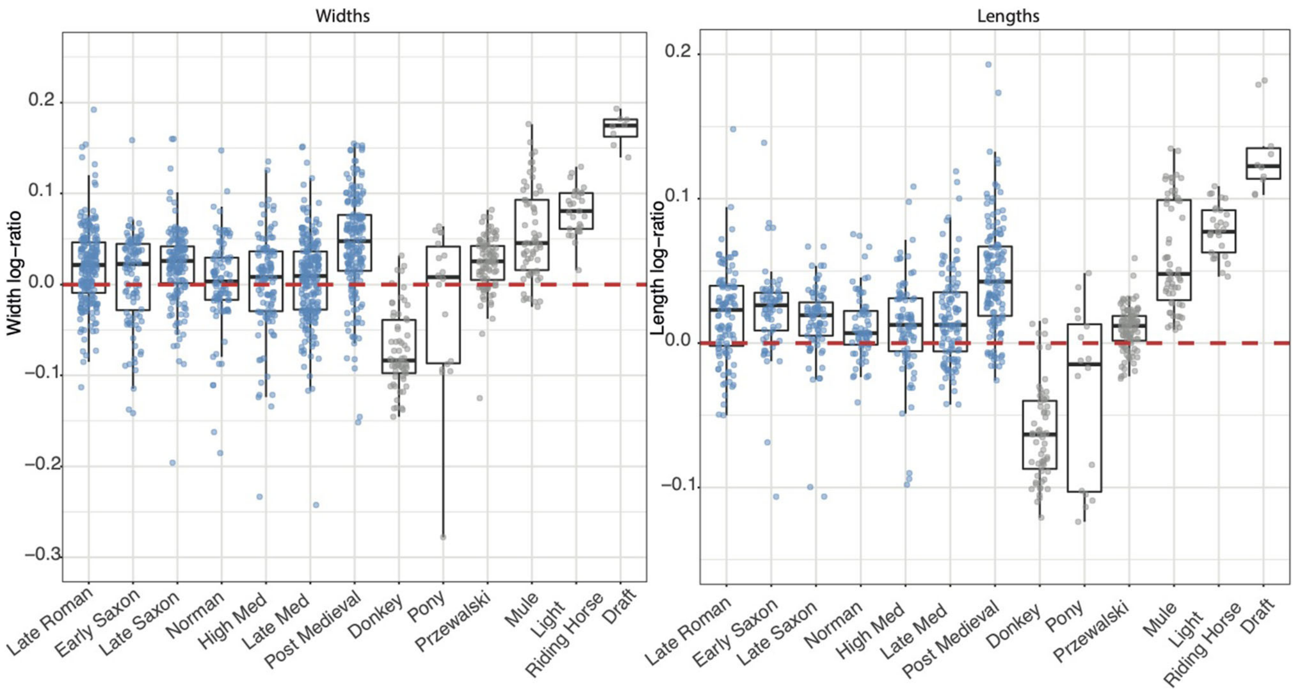

FIGURE 3 Width (left) and length (right) LSI values for archaeological (blue) and modern (grey) equids. LSI values are displayed on the *y*-axis and chronological periods on the *x*-axis [Colour figure can be viewed at wileyonlinelibrary.com]

most robust specimens across both elements. When comparing measurements of robusticity to size as calculated from the greatest length of the metapodia, we can further see that these changes in robusticity through time are not primarily driven by overall stature (Figure 5a,b). Instead, these changes are more likely to reflect activity-related or 'breed' morphology, though further analyses are needed to clarify these trends.

4 | DISCUSSION

The variation of sizes shown in horses across all periods supports historical records which describe a diversity of horses in England during the medieval period, including various types of military horses, as well as riding horses and domestic horses used for traction, ploughing and pack carrying (Thomas et al., 2018). Given the well-established Norman interest in breeding horses for combat purposes (Davis, 1987, 1989), it is perhaps counter-intuitive that the osteological data does not indicate an increase in size of English horses during the Norman period. Instead, although the differences are not statistically significant, it is notable that there is an observed drop in size and robusticity decreases from the preceding Saxon periods. It is important to note that this pattern need not necessarily reflect the use or introduction of smaller horses from Normandy. It could instead reflect the changing state of horse breeding in England during that time. Indeed, it has been suggested that in the period immediately preceding the Norman Conquest, English studs were badly disrupted under Æthelered II (978–1016) and were not a priority for Cnut (1016–1035) (Davis, 1987). It is therefore conceivable that the decline in the stature of English horses may already have been established before the Conquest. Alternatively, or in addition, the military and political impacts of the Norman Conquest could have caused disruption to English breeding programmes, which took time to recover under the new administration. Despite popular perceptions that later medieval destriers often reached 17 or 18hh, the evidence here suggests that horses of 16 and even 15hh were rare, even at the height of the royal stud network during the 13th and 14th centuries (Davis, 1989), and that animals of this size would have been perceived as large by contemporaries relative to the majority of horses. Historical sources rarely indicate which criteria were desirable for late medieval destriers, including withers height, suggesting that these warhorses were likely a range of sizes (Gladitz, 1997).

Identifying the physical remains of horses used in combat is challenging for a variety of reasons. First, the tendency for zooarchaeological assemblages to consist predominantly of single bones rather than complete skeletons from burials makes interpretation of in-life activity difficult (Pluskowski et al., 2009). Even when articulated elements are available, separating horses used in combat from general riding horses remains inconclusive (Pluskowski et al., 2018). The second problem relates to depositional context. It might seem a reasonable assumption that horses found within castles or other high-status sites might be more likely to be warhorses compared with assemblages from other sites. However, castles would have also contained numerous horses used for day-to-day riding and domestic purposes, and even association with a defensive ditch and siege ammunition is not enough to conclusively identify warhorses, as evidence from Odiham castle (Hampshire) shows (Ameen et al., 2021).

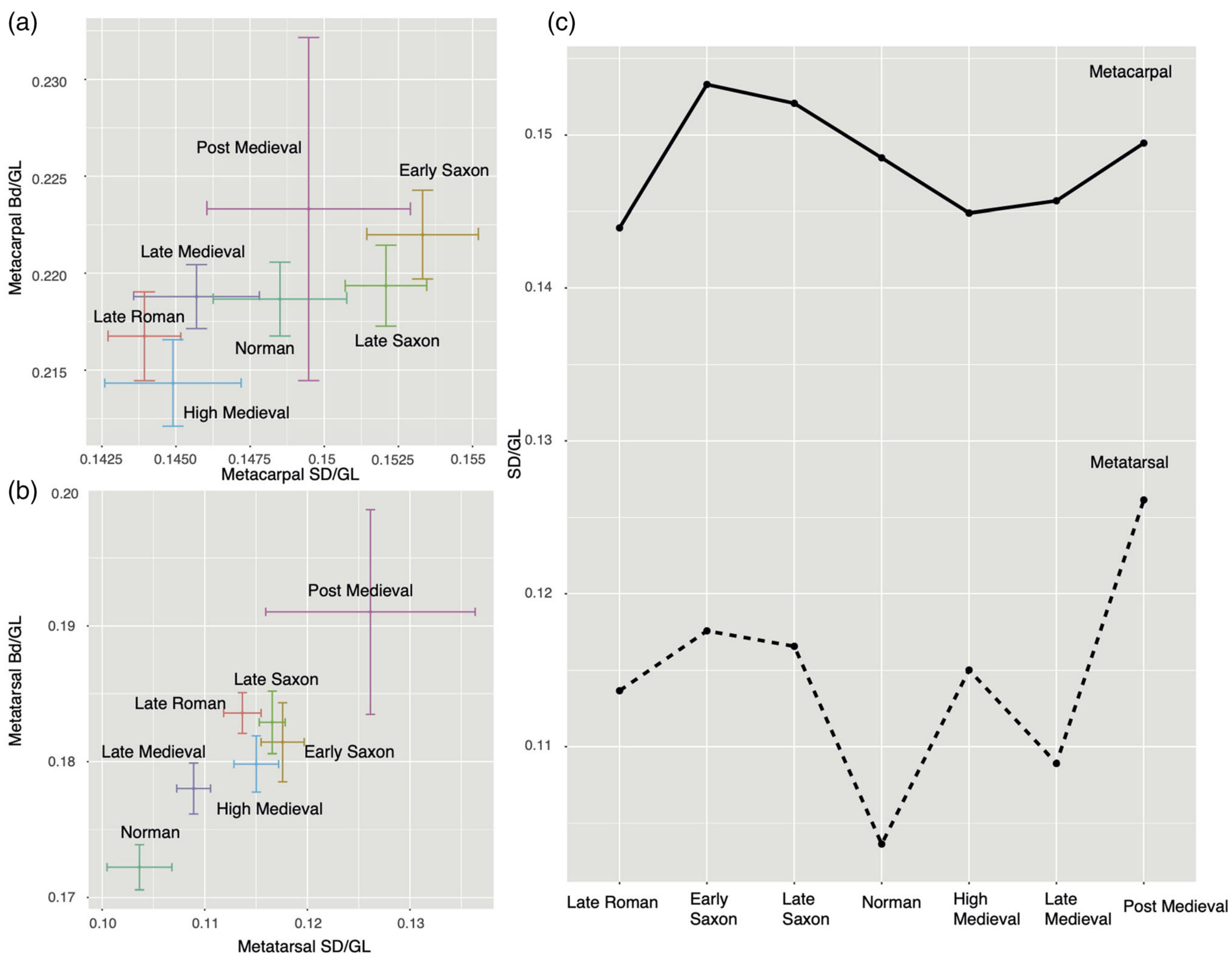

FIGURE 4 Scatter plot of mean ratios of measurements Bd/GL and SD/GL on horse (a) metacarpals and (b) metatarsals from archaeological sites (bars are mean ± standard deviation). (c) Line graph showing mean SD/GL ratio through time for both metapodia [Colour figure can be viewed at wileyonlinelibrary.com]

Another place to expect warhorses would be in mass graves associated with battlefields, though few of these have ever been discovered (Curry & Foard, 2016). Currently, only one major medieval horse cemetery is known from England, at Elverton Street, London (Cowie et al., 1998). The preliminary assessment of the horses from this site shows articulated elements of dismembered horses. The tendency for horse carcasses to be processed post-mortem for both skins and other materials is well documented (MacGregor, 2012; Thomas & Lacock, 2000), and we know that this happened even to highly valuable horses after their death (Ameen et al., 2021). Given the resources invested in the breeding and training of warhorses, it is not surprising that owners sought to profit from their remains. Consequently, it is possible that the remains of warhorses, alongside other domestic and riding horses, are most likely to be found in the refuse from tanneries and knackers' yards, of which Elverton Street might be one. It is worth noting that the number of warhorses is likely to be far smaller than the populations of horses used for other activities throughout the Middle Ages, and thus, their appearance in the archaeological record will reflect this small subset of the total horse population.

It is equally difficult to separate the biological factors which could indicate use in combat from those caused by other domestic and riding activities (Pluskowski et al., 2009). Much of the evidence for horse pathologies is focussed on spinal pathology for indications of riding or weight bearing (Levine et al., 2005) and on tooth morphology as evidence of bit wear (Bendrey, 2007a), whereas the overwhelming emphasis on size alone has likely hindered any conclusive identification of horses used in combat from the zooarchaeological record. Because size and muscle strength do not increase in proportion to each other (Dick & Clemente, 2017), simply breeding taller horses would not result in the strength and mobility required of a combat horse. Because the skeleton must adapt to carrying the weight of a rider in heavy armour while still maintaining an ability to move swiftly and precisely on a battlefield, further examination of the shape of the bones themselves must be considered in combination with detailed analyses of entheseal changes in the context of equid biomechanics to detect these in-life uses in the archaeological record.

Increasingly, studies of other mammals have suggested that long bone morphology is particularly relevant to tracking the in-life usage

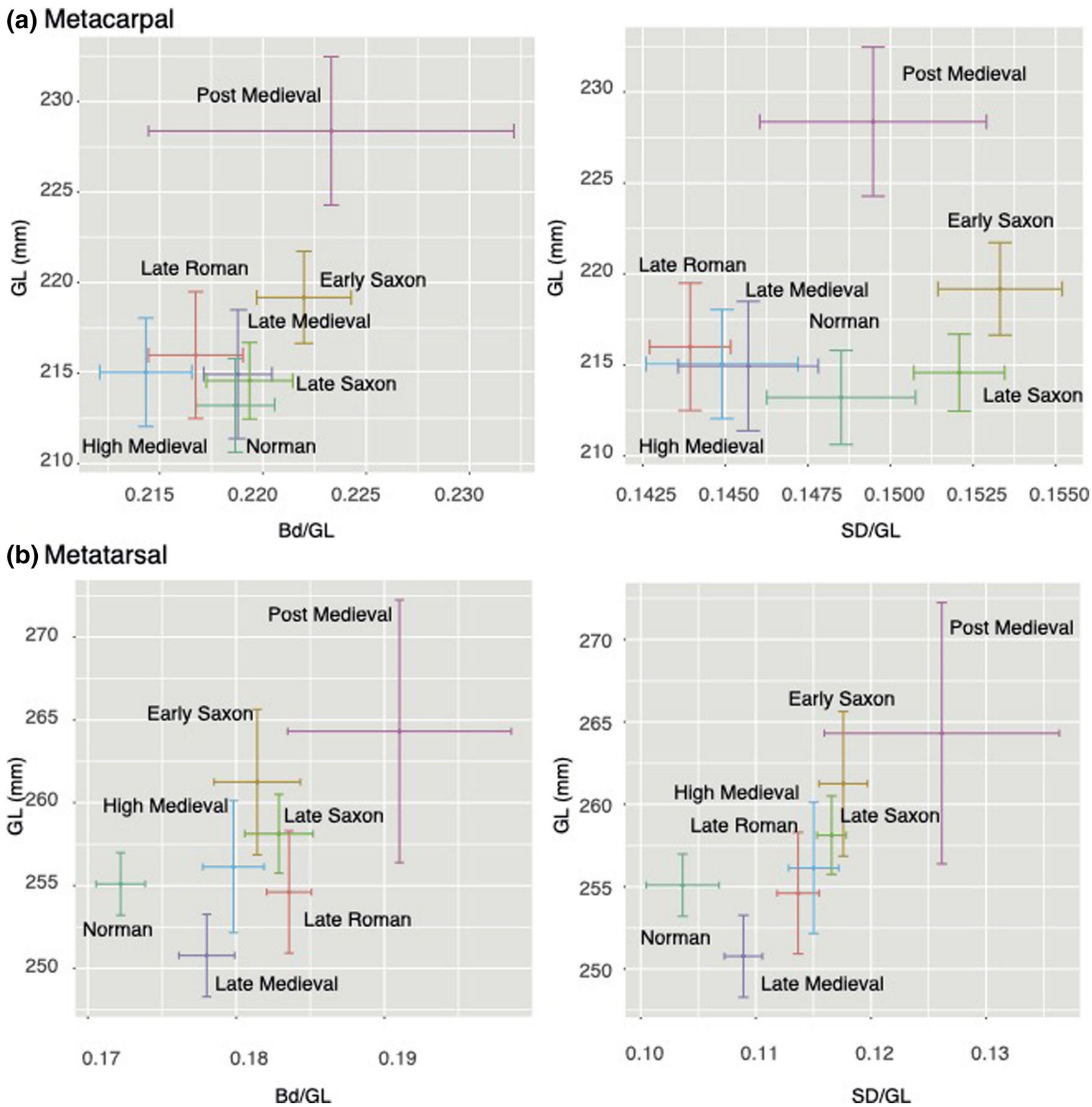

FIGURE 5 Plots of mean ratios of measurements Bd/GL and SD/GL compared with size (GL) on horse (a) metacarpals and (b) metatarsals from archaeological sites (bars are mean ± standard deviation) [Colour figure can be viewed at wileyonlinelibrary.com]

of animals, including variation in husbandry strategy and in vivo activity (Bignon et al., 2005; Eisenmann & Beckouche, 1986; Harbers et al., 2020; Haruda et al., 2019; Salmi et al., 2021). Modern studies on horses indicate that shaft thickness of the metapodia is susceptible to in-life activity related changes (Brooks et al., 2010) as well as correlated with body mass and sex (Scott, 1990). Results of our analyses on the robusticity of the metapodia (Figure 4) illustrate a possible effect of warhorse breeding for a robust rear limb during the High Medieval period. The marked increase in metatarsal robusticity in this period, as compared with the preceding Norman period, could be a result of the dedication to the breeding and/or training of the 'great horse' by Plantagenet kings (Davis, 1989). This coincides with a preference for horses over oxen for agricultural purposes beginning in the 12th century (Langdon, 2002) and compatible evidence for an increase in horseshoe size at this time (Clark, 2004). Together, this evidence may reflect a trend towards the development of an early type of heavy horse with a strong conformation, especially in regard to the rear limbs, while maintaining a similar shoulder height to the rest of the horse population across the period.

This trend of increased robusticity is not seen in the metacarpal during the same period, providing an opportunity to discuss the biological markers and functional morphological requirements necessary for a horse used in combat. Though no studies have yet examined the morphological criteria displayed by military horses specifically, many studies of both modern and archaeological equids have examined a suite of osteological and entheseal changes associated with different in-life usage (Bendrey, 2007b; Bindé et al., 2019; Hanot, 2018; Meira et al., 2013; Vicente et al., 2014). The closest modern comparison to activities performed by a medieval warhorse might be Western Performance horses, particularly those used for barrel racing. The requirement for a modern horse to work at high speed while being prepared for an instantaneous change in direction or an abrupt stop is unique to modern Western performance horses (Currie, 1997), with clear parallels to mounted battlefield tactics (Ellis, 2004). For performance horses, the ideal conformation would be relatively short-backed, with powerful hindquarters, and strong bones and ligaments which allow them to gather and stop quickly after running at all-out speed (Currie, 1997). It is likely that this emphasis on quick stopping and acceleration, as well as the load from a rider shifting the centre of gravity further back, would impact the rear limbs over those of the front. Examinations of draft animals have indicated a preference for strong hindlegs and backs with strong forelegs selected in proportion to support a heavier body (Gaastra et al., 2018; Hanot et al., 2017; Holmes et al., 2021; Salmi et al., 2020). Though analyses of bones from Western performance horses are needed to explore this hypothesis, our results suggest a pattern in the High Middle Ages where rear leg robusticity runs counter to other trends, something not seen elsewhere within the data, highlighting this as a potential direction for further research into combat related morphology, further emphasised by the metric data presented in Figure 5 indicating that bone size increase alone is unlikely to be driving these trends.

Historians have long been interested in the physical characteristics of Norman horses and the military advantages that these might have provided, although now with a more nuanced approach that questions the battlefield supremacy of cavalry and is less inclined to see 1066 as a watershed moment in all aspects of horse breeding (Bennett, 1994, 2006; Harvey, 2020; Morillo, 1999). Although the zooarchaeological evidence presented here—overwhelmingly representing horses which never went anywhere near a battlefield—points to smaller and more slender horses than those of both the preceding Saxon and later high medieval periods, this does not negate the effectiveness of Norman horses on medieval battlefields. The changes observed during the Norman period could in part reflect an influx of Arabian blood into Western European horse stock, which is known from Iberia from the 8th century AD (Hyland, 1994). During this period, the Islamic Conquest in Spain provided Europe with access to novel horse lineages, written sources mention that the Normans were gifted horses of Spanish, French and Moorish origins (Fages et al., 2019; Kelekna, 2009) something also reflected in ancient genomics (Fages et al., 2019; Kelekna, 2009). It is possible that these more gracile Norman horses of mixed lineage were perfectly designed for Norman cavalry tactics (Davis, 1987), which were different from the 'heavy' cavalry tactics of later periods. Although pony-sized horses would have been capable of carrying this increased weight, it is likely that a combination of new equipment as well as environmental and tactical needs led to the breeding of larger destriers during the later medieval periods (Davis, 1989).

The decrease in metatarsal robusticity observed during the late medieval period corresponds with historical information suggesting that by the early 16th century the English administration had difficulties with horse breeding caused by the collapse of the horse trade in the preceding centuries (Thomas et al., 2018). A series of statutes were imposed by the Tudors to reinvigorate the breeding of warhorses and English horses more broadly (MacGregor, 2012). By the post-medieval period, the impact of agricultural improvement can be seen in the overall size (withers height) increase of horses from this period. Indeed, as early as the 14th century, the emergence of new military technologies and tactics began to challenge the primacy of the warhorse on the battlefield. Instead, post-medieval breeding standards were driven by a need for power for traction from agricultural horses, and to meet the increase in demand for coach horses as well as those used in sport (Thomas et al., 2018).

5 | CONCLUSION

Despite the tendency for both historians and zooarchaeologists to focus on the overall size of past horses, the results of these analyses suggest that neither size, nor limb bone robusticity alone, are enough to confidently identify warhorses in the archaeological record. As the historical record indicates by remaining notably silent on the specific criteria which defined a warhorse, it is much more likely that throughout the medieval period, at different times, different conformations of horses were desirable in response to changing battlefield tactics and cultural preferences. The breeding and training of warhorses instead was influenced by a combination of biological and cultural factors, as well as individual behavioural characteristics of the horses themselves such as temperament. This work has highlighted avenues for further exploration into the biological and functional characteristics of equids used in combat. For instance, detailed examination of the morphological variation of the lower limb bones as well as associated entheseal changes has the potential to decipher these biological trends further and aid in the identification of archaeological warhorses. Furthermore, the incorporation of ancient DNA analyses presents the possibility of uniting ancestry related changes and the impact of the introduction of European horse breeds on English stock, whereas advances in ancient genomics allows detection of traits previously unidentifiable from archaeological bone, including coat colour, speed and temperament. Finally, and perhaps most significantly, the contexts of horse remains must be considered for the identification of warhorses. Given the different depositional processes for horses from other domesticates, as well as the tendency for horse carcasses to regularly go through postmortem processing, the search for the 'great horse' must move from castles and battlefields to knackers' yards and domestic middens.

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CONFLICT OF INTERESTS

The authors declare no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available and included in the supporting information.

ORCID

Carly Ameen https://orcid.org/0000-0002-4580-2125

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